

# College of Science

## College of Science

The College of Science encompasses the physical, life, computational, and mathematics sciences, offering 41 disciplinary degree programs and seven interdisciplinary science programs. The leadership of our renowned scholars and researchers drives an ever-expanding culture of discovery and innovation which embraces all perspectives as we endeavor to solve the grand challenges that face our world. Nearly 350 tenure-track faculty conduct world-changing research and deliver a transformative education to nearly 1500 graduate students and 5300 undergraduates. We are a community of learners that develops practical solutions to today's toughest challenges.

By extension, College of Science students are innovation leaders whose disciplinary technical expertise and exemplary problem-solving skills are in high demand. Industry, professional schools, and graduate programs equally value our students for their professional skills and ability to drive discovery in a highly diverse global environment collaboratively. Each undergraduate program blends courses and experiences that create a unique path for each student as they pursue disciplinary interests and personal and professional goals through minors, certificates, and experiential learning opportunities, including research and Study Abroad programs. For example, the Learning Beyond the Classroom certificate, open only to CoS students, blends career and professional; service, citizenship, and leadership; and domestic and international diversity experiences to bring real-world know-how to the classroom experience.

We Science hard. Are you ready?

## Departmental Pages

- [Science Administration](#)
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- [Chemistry](#)
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- [Mathematics](#)
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## Admissions

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# Advising

More Information

# College of Science

Policy Information

# Contact Information

Mailing address:

Purdue University College of Science

150 N. University St

West Lafayette, IN 47907

# Directories

- Science Administration
- Office of Undergraduate Education
- Departments
- Science IT

# Phone and Fax

## Academic Advising Office

- 765-494-1771 (office)
- 765-496-3015 (fax)

## Science Administration

- 765-494-1729 (office)
- 765-494-1736 (fax)

## Science IT Helpline

- 765-494-4488

# College of Science Core Requirements

- Composition and Presentation

- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Multidisciplinary Experience
- Statistics
- Teambuilding and Collaboration
- College of Science: No Count Course List

## College of Science Administration

### About the Department of Science Administration

During their Purdue career, students take advantage of the many benefits of the College of Science. From Nobel Prize-winning faculty to undergraduate research opportunities and study abroad opportunities to facilities found in the international spotlight, the College of Science offers a springboard to academic and career aspirations.

### Faculty

### Contact Information

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Purdue University College of Science  
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Science IT Helpline

- 765-494-4488

<b>Contact Individual College of Science Group</b>	<b>General Email Address</b>	<b>Contact Person</b>	<b>Contact's Email</b>
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Academic Affairs		Angie Teel, Sr. Operations Manager	teel@purdue.edu
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K-12 Outreach	K12science@purdue.edu	Bill Bayley, Director	wbayley@purdue.edu
Special Events & Alumni Relations	scienceevents@purdue.edu	Matt Sampson, Assistant Director of Special Events	mjsampson@purdueforlife.org
Science Advancement	japarker@prf.org	Jimmy Parker, Chief Development Officer	japarker@purdueforlife.org
Science IT	sciencehelp@purdue.edu	call 765.494.4488	

## **Baccalaureate**

### **Interdisciplinary Science, BS (Biology)**

About the Interdisciplinary Science Program

The interdisciplinary science major is designed to provide College of Science students with a broad base in the sciences. By combining a primary area of science study, an interdisciplinary science core, a supporting area of academic interest and the core curriculum shared by all College of Science programs, students explore how the disciplines of science come together to identify and solve scientific challenges. Students customize the major by selecting a departmental or interdepartmental primary area based in science and a supporting area that complements or enhances the primary area. This supporting area may be an approved minor from any college or school at the University or a concentration of 18 credits of courses with a unifying theme. There is a primary area representing each department in the College of Science, however, cross-disciplinary areas may be explored and added as appropriate. With the help of either a faculty member or an academic advisor, students are encouraged to petition for approval of their supporting area.

The Interdisciplinary Science Major is designed to give a student a broad base in the sciences with more depth in a Primary Area of Science and a Supporting Area, usually outside of Science. The Core courses are common across the major but the student customizes the major by selecting a departmental or interdepartmental Primary Area based in Science and a Supporting Area which may come from any college or school at the University. There is a Primary Area representing each department in the College of Science and cross-disciplinary areas will be explored and added as appropriate. Several Supporting Areas will be suggested and a student may petition for approval of others.

Students completing the interdisciplinary science major have gone on to a variety of careers - some in, and others out of, the world of science. These careers include medicine, law and other advanced-study professions, scientific sales, technical and scientific writing, computer programming and engineering.

Interdisciplinary Science Major Change (CODO) Requirements

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

#### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## Degree Requirements

# 120 Credits Required

Departmental/Program Major Courses: Interdisciplinary Science (34-47 credits)

Required Biology Courses (7-8 credits)

*Choose one option below. Select courses COULD satisfy Science for Core.*

#### Option I

- BIOL 11000 - Fundamentals Of Biology I
- BIOL 11100 - Fundamentals Of Biology II

#### Option II

- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior
- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms
- BIOL 13500 - First Year Biology Laboratory

Required Chemistry Courses (4-10 credits)

*Choose one option below. Select courses COULD satisfy Science for Core.*

*Chemistry students must also take the departmental exam for CHM 11500 if they choose Option III.*

#### Option I

- CHM 11500 - General Chemistry

- CHM 11600 - General Chemistry  
Option II
- CHM 12500 - Introduction To Chemistry I
- CHM 12600 - Introduction To Chemistry II  
Option III
- CHM 12901 - General Chemistry With A Biological Focus  
Option IV
- CHM 13600 - General Chemistry Honors

## Required Computing Option (3-4 credits)

*Choose one of the following; Computer Science students must choose CS 18000.*

- CS 15900 - C Programming
- CS 17600 - Data Engineering In Python
- CS 17700 - Programming With Multimedia Objects
- CS 18000 - Problem Solving And Object-Oriented Programming

## Required Earth, Atmospheric, and Planetary Science Option (3-4 credits)

*Choose one option below; EAPS students must choose Option III.*

- Option I - for Non-EAPS Concentrations
- EAPS 10000 - Planet Earth
- Option II - Students who are interested in Geology courses.
- EAPS 10900 - The Dynamic Earth
- Option III - Students who are interested in Environmental, Geology, and Planetary Sciences courses
- EAPS 11100 - Physical Geology
- Option IV - Student who are interested in Atmospheric Science courses.
- EAPS 22100 - Survey Of Atmospheric Science
- EAPS 23000 - Laboratory In Atmospheric Science
- Option V - Student who are interested in Atmospheric Science courses.
- EAPS 22500 - Science Of The Atmosphere
- EAPS 23000 - Laboratory In Atmospheric Science

## Required Mathematics Courses (6-10 credits)

*Choose one option below; only Chemistry or Biology students may choose Option I. Satisfies Quantitative Reasoning for Core.*

- Option I
- MA 16010 - Applied Calculus I
- MA 16020 - Applied Calculus II
- Option II - Take one Calculus I and one Calculus II.
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Required Physics Courses (8 credits)

*Choose one option below; Physics students must choose Option III or Option IV.*

### Option I

- PHYS 23300 - Physics For Life Sciences I
- PHYS 23400 - Physics For Life Sciences II

### Option II

- PHYS 22000 - General Physics
- PHYS 22100 - General Physics

### Option III

- PHYS 17200 - Modern Mechanics
- PHYS 27200 - Electric And Magnetic Interactions

### Option IV

- PHYS 17200 - Modern Mechanics
- PHYS 24100 - Electricity And Optics
- PHYS 25200 - Electricity And Optics Laboratory

## Required Statistics Course (3 credits)

*Choose one course below from those noted for your area.*

- STAT 30100 - Elementary Statistical Methods (Chemistry, EAPS or Physics concentrations only)
- STAT 35000 - Introduction To Statistics (All areas)
- STAT 35500 - Statistics For Data Science (All areas)
- STAT 50300 - Statistical Methods For Biology (Biology, Chemistry, EAPS, Math, or Physics concentrations only)
- STAT 51100 - Statistical Methods (Biology, Chemistry, Computer Science, EAPS or Physics concentrations only)

## Departmental/Program Major Courses: Areas (33-34 credits)

### Required Biology Primary Area Courses (15-16 credits)

- BIOL 23100 - Biology III: Cell Structure And Function
- BIOL 23200 - Laboratory In Biology III: Cell Structure And Function
- BIOL 24100 - Biology IV: Genetics And Molecular Biology
- BIOL 24200 - Laboratory In Biology IV: Genetics And Molecular Biology
- BIOL 28600 - Introduction To Ecology And Evolution
- **BIOLOGY SELECTIVE COURSE** - Choose one option.
- BIOL 32800 - Principles Of Physiology
- BIOL 36700 - Principles Of Development
- BIOL 39500 - Special Assignments (Macromolecules) Credit Hours: 2.00
- BIOL 41500 - Introduction To Molecular Biology



- BIOL 41600 - Viruses And Viral Disease
- BIOL 42000 - Eukaryotic Cell Biology
- BIOL 43600 - Neurobiology
- BIOL 43800 - General Microbiology

## Required Supporting Area Courses (18 credits)

MUST BE APPROVED BY COLLEGE. Please see your advisor for approval options.

## Other Departmental/Program Course Requirements (15-37 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

#### Written Communication (3-4 credits)

Choose one course from this list. (satisfies Written Communication and Information Literacy for core)

#### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found [here](#). (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

### Computing

*Met with required major coursework.*

#### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

## General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

### Laboratory Science

*Met with required major coursework.*

### Mathematics

*Met with required major coursework.*

## Science Technology and Society^\* (0-3 credits)

Choose one from this list (satisfies Science, Technology, Society for core).

### Statistics

*Met with required major coursework.*

## Team-Building and Collaboration\* (0-3 credits)

Choose one from this list.

## Electives (2-38 credits)

## Interdisciplinary Science Other Requirements

### GPA Requirement

- Concentration and Supporting Area blocks require a minimum 2.00 GPA.
- 2.0 Graduation GPA required for Bachelor of Science degree.

## Course Requirements and Notes

- All courses can share with the exception of the Great Issues, General Education and Cultural Diversity (Language & Culture) Courses.

## Non-course / Non-credit Requirements

College of Science students may choose to complete one or more of following core Science requirements through approved learning experiences\*, including, but not limited to: internships, co-ops, research, Study Abroad, Entrepreneurship and EPICS projects.

- Teaming
- Language and Culture
- Multidisciplinary (Research)
- Multidisciplinary (Internship)
- Technical Writing
- Technical Presentation

\*Experiential Learning Contracts must be completed one semester prior to a student's anticipated graduation date.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option. *Transfer credit (including any/all undistributed credit, TR graded course, AP/IB credit, etc.) cannot be applied to the concentration.*

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- BIOL 11000 - Fundamentals Of Biology I ♦  
or
- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior ♦ and
- BIOL 13500 - First Year Biology Laboratory ♦
- Required Mathematics Course: Calculus I - Credit Hours: 3.00 - 5.00
- Required Chemistry Course - Credit Hours: 4.00 - 5.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 0.00 - 1.00

### 15-18 Credits

### Spring 1st Year

- BIOL 11100 - Fundamentals Of Biology II ♦ or
- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms ♦
- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦
- Required Mathematics Course: Calculus II - Credit Hours: 3.00 - 5.00
- Required Chemistry Course - Credit Hours: 4.00 - 5.00

## 13-18 Credits

### Fall 2nd Year

- BIOL 23100 - Biology III: Cell Structure And Function
- BIOL 23200 - Laboratory In Biology III: Cell Structure And Function
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Supporting Area Course - Credit Hours: 3.00
- Elective - Credit Hours: 3.00 - 4.00

## 15-16 Credits

### Spring 2nd Year

- BIOL 24100 - Biology IV: Genetics And Molecular Biology
- BIOL 24200 - Laboratory In Biology IV: Genetics And Molecular Biology
- Supporting Area Course - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00

## 17 Credits

### Fall 3rd Year

- STAT 35000 - Introduction To Statistics or
- STAT 35500 - Statistics For Data Science or
- STAT 50300 - Statistical Methods For Biology or
- STAT 51100 - Statistical Methods
- Supporting Area Course - Credit Hours: 3.00

- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15 Credits

### Spring 3rd Year

- BIOL 28600 - Introduction To Ecology And Evolution
- COM 21700 - Science Writing And Presentation
- Required EAPS Selective Course - Credit Hours: 3.00 - 4.00
- Supporting Area Course - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 1.00

## 15-16 Credits

### Fall 4th Year

- Biology Selective Course 3.00 - 4.00
- Supporting Area Course - Credit Hours: 3.00
- Great Issues In Science - Credit Hours: 3.00
- Required Physics Selective Course: I - Credit Hours: 4.00
- Elective - Credit Hours: 2.00

## 15-16 Credits

### Spring 4th Year

- Supporting Area Course - Credit Hours: 3.00
- Required Physics Selective Course: II - Credit Hours: 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 2.00

## 16-18 Credits

### Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Interdisciplinary Science, BS (Chemistry)

### About the Interdisciplinary Science Program

The interdisciplinary science major is designed to provide College of Science students with a broad base in the sciences. By combining a primary area of science study, an interdisciplinary science core, a supporting area of academic interest and the core curriculum shared by all College of Science programs, students explore how the disciplines of science come together to identify and solve scientific challenges. Students customize the major by selecting a departmental or interdepartmental primary area based in science and a supporting area that complements or enhances the primary area. This supporting area may be an approved minor from any college or school at the University or a concentration of 18 credits of courses with a unifying theme. There is a primary area representing each department in the College of Science, however, cross-disciplinary areas may be explored and added as appropriate. With the help of either a faculty member or an academic advisor, students are encouraged to petition for approval of their supporting area.

The Interdisciplinary Science Major is designed to give a student a broad base in the sciences with more depth in a Primary Area of Science and a Supporting Area, usually outside of Science. The Core courses are common across the major but the student customizes the major by selecting a departmental or interdepartmental Primary Area based in Science and a Supporting Area which may come from any college or school at the University. There is a Primary Area representing each department in the College of Science and cross-disciplinary areas will be explored and added as appropriate. Several Supporting Areas will be suggested and a student may petition for approval of others.

Students completing the interdisciplinary science major have gone on to a variety of careers - some in, and others out of, the world of science. These careers include medicine, law and other advanced-study professions, scientific sales, technical and scientific writing, computer programming and engineering.

Interdisciplinary Science Major Change (CODO) Requirements

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major

2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## **Degree Requirements**

# **120 Credits Required**

**Departmental/Program Major Courses: Interdisciplinary Science (34-47 credits)**



## Required Biology Courses (7-8 credits)

*Choose one option below. Select courses COULD satisfy Science for Core.*

### Option I

- BIOL 11000 - Fundamentals Of Biology I
- BIOL 11100 - Fundamentals Of Biology II

### Option II

- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior
- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms
- BIOL 13500 - First Year Biology Laboratory

## Required Chemistry Courses (4-10 credits)

*Choose one option below. Select courses COULD satisfy Science for Core.*

*Chemistry students must also take the departmental exam for CHM 11500 if they choose Option III.*

### Option I

- CHM 11500 - General Chemistry
- CHM 11600 - General Chemistry

### Option II

- CHM 12500 - Introduction To Chemistry I
- CHM 12600 - Introduction To Chemistry II

### Option III

- CHM 12901 - General Chemistry With A Biological Focus

### Option IV

- CHM 13600 - General Chemistry Honors

## Required Computing Option (3-4 credits)

*Choose one of the following; Computer Science students must choose CS 18000.*

- CS 15900 - C Programming
- CS 17600 - Data Engineering In Python
- CS 17700 - Programming With Multimedia Objects
- CS 18000 - Problem Solving And Object-Oriented Programming

## Required Earth, Atmospheric, and Planetary Science Option (3-4 credits)

*Choose one option below; EAPS students must choose Option III.*

### Option I - for Non-EAPS Concentrations

- EAPS 10000 - Planet Earth

### Option II - Students who are interested in Geology courses.

- EAPS 10900 - The Dynamic Earth

### Option III - Students who are interested in Environmental, Geology, and Planetary Sciences courses

- EAPS 11100 - Physical Geology

### Option IV - Student who are interested in Atmospheric Science courses.

- EAPS 22100 - Survey Of Atmospheric Science
- EAPS 23000 - Laboratory In Atmospheric Science  
Option V - Student who are interested in Atmospheric Science courses.
- EAPS 22500 - Science Of The Atmosphere
- EAPS 23000 - Laboratory In Atmospheric Science

## Required Mathematics Courses (6-10 credits)

*Choose one option below; only Chemistry or Biology students may choose Option I. Satisfies Quantitative Reasoning for Core.*

### Option I

- MA 16010 - Applied Calculus I
- MA 16020 - Applied Calculus II

### Option II - Take one Calculus I and one Calculus II.

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Required Physics Courses (8 credits)

*Choose one option below; Physics students must choose Option III or Option IV.*

### Option I

- PHYS 23300 - Physics For Life Sciences I
- PHYS 23400 - Physics For Life Sciences II

### Option II

- PHYS 22000 - General Physics
- PHYS 22100 - General Physics

### Option III

- PHYS 17200 - Modern Mechanics
- PHYS 27200 - Electric And Magnetic Interactions

### Option IV

- PHYS 17200 - Modern Mechanics
- PHYS 24100 - Electricity And Optics
- PHYS 25200 - Electricity And Optics Laboratory

## Required Statistics Course (3 credits)

*Choose one course below from those noted for your area.*

- STAT 30100 - Elementary Statistical Methods (Chemistry, EAPS or Physics concentrations only)
- STAT 35000 - Introduction To Statistics (All areas)
- STAT 35500 - Statistics For Data Science (All areas)
- STAT 50300 - Statistical Methods For Biology (Biology, Chemistry, EAPS, Math, or Physics concentrations only)
- STAT 51100 - Statistical Methods (Biology, Chemistry, Computer Science, EAPS or Physics concentrations only)

## Departmental/Program Major Courses: Areas (34-36 credits)

### Required Chemistry Primary Area Courses (16-18 credits)

- CHM 24100 - Introductory Inorganic Chemistry
- CHM 37200 - Physical Chemistry

### Organic Chemistry Lecture I (3-4 credits)

Choose one course in Organic Chemistry I.

- CHM 25500 - Organic Chemistry For The Life Sciences I
- CHM 26100 - Organic Chemistry I
- CHM 26505 - Organic Chemistry I
- MCMP 20400 - Organic Chemistry I

### Organic Chemistry Laboratory I (0-2 Credits)

Choose one Organic Chemistry Laboratory I course (students taking MCMP 20400 do not need an additional laboratory I course).

- CHM 25501 - Organic Chemistry For The Life Sciences Laboratory I
- CHM 26300 - Organic Chemistry Laboratory I
- CHM 26600 - Organic Chemistry Laboratory II
- CHM 26700 - Organic Chemistry Laboratory I Honors

### Organic Chemistry Lecture II (3-4 credits)

Choose one course in Organic Chemistry II.

- CHM 25600 - Organic Chemistry For The Life Sciences II
- CHM 26200 - Organic Chemistry II
- CHM 26605 - Organic Chemistry II
- MCMP 20500 - Organic Chemistry II

### Organic Chemistry Laboratory II (0-2 Credits)

Choose one Organic Chemistry Laboratory II course (students taking MCMP 20500 do not need an additional laboratory I course).

- CHM 25601 - Organic Chemistry For The Life Sciences Laboratory II
- CHM 26400 - Organic Chemistry Laboratory II
- CHM 26600 - Organic Chemistry Laboratory II
- CHM 26800 - Organic Chemistry Laboratory II Honors

### Required Supporting Area Courses (18 credits)

MUST BE APPROVED BY COLLEGE. Please see your advisor for approval options.

## Other Departmental/Program Course Requirements (15-37 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ Labeled as a Science Core Selection in the four year plan of study

\*Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

#### Composition & Presentation

##### First-Year Composition (3-4 credits)

Choose one course from this list. (satisfies Written Communication and Information Literacy for core)

##### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

#### Computing

*Met with required major coursework.*

##### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

##### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

##### Great Issues In Science (3 credits)

Choose one course from this list.

## Laboratory Science

*Met with required major coursework.*

## Mathematics

*Met with required major coursework.*

## Science Technology and Society\* (0-3 credits)

Choose one from this list (satisfies Science, Technology, Society for core).

## Statistics

*Met with required major coursework.*

## Team-Building and Collaboration\* (0-3 credits)

Choose one from this list.

## Electives (0-37 credits)

## Interdisciplinary Science Other Requirements

## GPA Requirement

- Concentration and Supporting Area blocks require a minimum 2.00 GPA.
- 2.0 Graduation GPA required for Bachelor of Science degree.

## Course Requirements and Notes

- All courses can share with the exception of the Great Issues, General Education and Cultural Diversity (Language & Culture) Courses.

## Non-course / Non-credit Requirements

College of Science students may choose to complete one or more of following core Science requirements through approved learning experiences\*, including, but not limited to: internships, co-ops, research, Study Abroad, Entrepreneurship and EPICS projects.

- Teaming
- Language and Culture

- Multidisciplinary (Research)
- Multidisciplinary (Internship)
- Technical Writing
- Technical Presentation

\*Experiential Learning Contracts must be completed one semester prior to a student's anticipated graduation date.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option. *Transfer credit (including any/all undistributed credit, TR graded course, AP/IB credit, etc.) cannot be applied to the concentration.*

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the Civics Literacy Proficiency [website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- Calculus I Option - Credit Hours: 3.00 - 5.00
- General Chemistry Selective I - Credit Hours: 4.00 - 5.00
- Biology Selective I - Credit Hours: 4.00
- Science Core First-Year Composition - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 0.00 - 1.00

### 15-18 Credits

### Spring 1st Year

- General Chemistry Selective II - Credit Hours: 4.00 - 5.00
- Biology Selective II - Credit Hours: 3.00 - 4.00
- Biology Selective II - Credit Hours: 0.00 - 2.00
- Calculus II Option - Credit Hours: 3.00 - 5.00
- Science Core Selection - Credit Hours: 3.00 - 4.00

### 15-18 Credits

### Fall 2nd Year

- Organic Chemistry I with Lab - Credit Hours: 4.00 - 5.00

- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Physics Selective I - Credit Hours: 4.00
- Elective - Credit Hours: 1.00

## 15-17 Credits

### Spring 2nd Year

- Organic Chemistry II with Lab - Credit Hours: 4.00 - 5.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Supporting Area Course - Credit Hours: 3.00
- Physics Selective II - Credit Hours: 4.00
- Elective - Credit Hours: 1.00

## 15-17 Credits

### Fall 3rd Year

- STAT 30100 - Elementary Statistical Methods or
- STAT 35000 - Introduction To Statistics or
- STAT 35500 - Statistics For Data Science or
- STAT 50300 - Statistical Methods For Biology or
- STAT 51100 - Statistical Methods
- Supporting Area Course - Credit Hours: 3.00
- Supporting Area Course - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15-16 Credits

### Spring 3rd Year

- COM 21700 - Science Writing And Presentation
- CS 15900 - C Programming or
- CS 17600 - Data Engineering In Python  
or
- CS 17700 - Programming With Multimedia Objects or
- CS 18000 - Problem Solving And Object-Oriented Programming
- EAPS Selective Course - Credit Hours: 3.00 - 4.00
- Supporting Area Course - Credit Hours: 3.00
- Supporting Area Course - Credit Hours: 3.00

## 16-18 Credits



## Fall 4th Year

- CHM 24100 - Introductory Inorganic Chemistry
- Science Core Selection - Credit Hours: 3.00
- Great Issues Option - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

16 Credits

## Spring 4th Year

- CHM 37200 - Physical Chemistry
- Supporting Area Course - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

16 Credits

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## **Interdisciplinary Science, BS (Computer Science)**

## About the Interdisciplinary Science Program

The interdisciplinary science major is designed to provide College of Science students with a broad base in the sciences. By combining a primary area of science study, an interdisciplinary science core, a supporting area of academic interest and the core curriculum shared by all College of Science programs, students explore how the disciplines of science come together to identify and solve scientific challenges. Students customize the major by selecting a departmental or interdepartmental primary area based in science and a supporting area that complements or enhances the primary area. This supporting area may be an approved minor from any college or school at the University or a concentration of 18 credits of courses with a unifying theme. There is a primary area representing each department in the College of Science, however, cross-disciplinary areas may be explored and added as appropriate. With the help of either a faculty member or an academic advisor, students are encouraged to petition for approval of their supporting area.

The Interdisciplinary Science Major is designed to give a student a broad base in the sciences with more depth in a Primary Area of Science and a Supporting Area, usually outside of Science. The Core courses are common across the major but the student customizes the major by selecting a departmental or interdepartmental Primary Area based in Science and a Supporting Area which may come from any college or school at the University. There is a Primary Area representing each department in the College of Science and cross-disciplinary areas will be explored and added as appropriate. Several Supporting Areas will be suggested and a student may petition for approval of others.

Students completing the interdisciplinary science major have gone on to a variety of careers - some in, and others out of, the world of science. These careers include medicine, law and other advanced-study professions, scientific sales, technical and scientific writing, computer programming and engineering.

Interdisciplinary Science Major Change (CODO) Requirements

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete

minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## **Departmental/Program Major Courses: Interdisciplinary Science (34-47 credits)**

### **Required Biology Courses (7-8 credits)**

*Choose one option below. Select courses COULD satisfy Science for Core.*

#### Option I

- BIOL 11000 - Fundamentals Of Biology I
- BIOL 11100 - Fundamentals Of Biology II

#### Option II

- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior
- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms
- BIOL 13500 - First Year Biology Laboratory

### **Required Chemistry Courses (4-10 credits)**

*Choose one option below. Select courses COULD satisfy Science for Core.*

*Chemistry students must also take the departmental exam for CHM 11500 if they choose Option III.*

Option I

- CHM 11500 - General Chemistry
- CHM 11600 - General Chemistry

Option II

- CHM 12500 - Introduction To Chemistry I
- CHM 12600 - Introduction To Chemistry II

Option III

- CHM 12901 - General Chemistry With A Biological Focus

Option IV

- CHM 13600 - General Chemistry Honors

## Required Computing Option (3-4 credits)

*Choose one of the following; Computer Science students must choose CS 18000.*

- CS 15900 - C Programming
- CS 17600 - Data Engineering In Python
- CS 17700 - Programming With Multimedia Objects
- CS 18000 - Problem Solving And Object-Oriented Programming

## Required Earth, Atmospheric, and Planetary Science Option (3-4 credits)

*Choose one option below; EAPS students must choose Option III.*

Option I - for Non-EAPS Concentrations

- EAPS 10000 - Planet Earth

Option II - Students who are interested in Geology courses.

- EAPS 10900 - The Dynamic Earth

Option III - Students who are interested in Environmental, Geology, and Planetary Sciences courses

- EAPS 11100 - Physical Geology

Option IV - Student who are interested in Atmospheric Science courses.

- EAPS 22100 - Survey Of Atmospheric Science
- EAPS 23000 - Laboratory In Atmospheric Science

Option V - Student who are interested in Atmospheric Science courses.

- EAPS 22500 - Science Of The Atmosphere
- EAPS 23000 - Laboratory In Atmospheric Science

## Required Mathematics Courses (6-10 credits)

*Choose one option below; only Chemistry or Biology students may choose Option I. Satisfies Quantitative Reasoning for Core.*

Option I

- MA 16010 - Applied Calculus I
- MA 16020 - Applied Calculus II

Option II - Take one Calculus I and one Calculus II.

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or

- MA 16600 - Analytic Geometry And Calculus II

## Required Physics Courses (8 credits)

*Choose one option below; Physics students must choose Option III or Option IV.*

### Option I

- PHYS 23300 - Physics For Life Sciences I
- PHYS 23400 - Physics For Life Sciences II

### Option II

- PHYS 22000 - General Physics
- PHYS 22100 - General Physics

### Option III

- PHYS 17200 - Modern Mechanics
- PHYS 27200 - Electric And Magnetic Interactions

### Option IV

- PHYS 17200 - Modern Mechanics
- PHYS 24100 - Electricity And Optics
- PHYS 25200 - Electricity And Optics Laboratory

## Required Statistics Course (3 credits)

*Choose one course below from those noted for your area.*

- STAT 30100 - Elementary Statistical Methods (Chemistry, EAPS or Physics concentrations only)
- STAT 35000 - Introduction To Statistics (All areas)
- STAT 35500 - Statistics For Data Science (All areas)
- STAT 50300 - Statistical Methods For Biology (Biology, Chemistry, EAPS, Math, or Physics concentrations only)
- STAT 51100 - Statistical Methods (Biology, Chemistry, Computer Science, EAPS or Physics concentrations only)

## Departmental/Program Major Courses: Areas (34 credits)

### Required Computer Science Primary Area Courses (16 credits)

- CS 18200 - Foundations Of Computer Science
- CS 24000 - Programming In C
- CS 25000 - Computer Architecture
- CS 25100 - Data Structures And Algorithms
- CS Elective at or above 30000 level - Credit Hours: 3.00

### Required Supporting Area Courses (18 credits)

MUST BE APPROVED BY COLLEGE

### Other Departmental/Program Course Requirements (15-37 credits)

# COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four-year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

## Composition & Presentation

### First-Year Composition (3-4 credits)

Choose one course from this list (satisfies Written Communication and Information Literacy for core).

### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

## Computing

*Met with required major coursework.*

### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Sciences for core).

- General Education Option I
- General Education Option II
- General Education Option III

### Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science

*Met with required major coursework.*

## Mathematics

*Met with required major coursework.*

## Science Technology and Society\* (0-3 credits)

Choose one from this list (satisfies Science, Technology, Society for core).

## Statistics

*Met with required major coursework.*

## Team-Building and Collaboration\* (0-3 credits)

Choose one from this list.

## Electives (2-33 credits)

## Interdisciplinary Science Other Requirements

### GPA Requirement

- Concentration and Supporting Area blocks require a minimum 2.00 GPA.
- 2.0 Graduation GPA required for Bachelor of Science degree.

### Course Requirements and Notes

- All courses can share with the exception of the Great Issues, General Education and Cultural Diversity (Language & Culture) Courses.

### Non-course / Non-credit Requirements

College of Science students may choose to complete one or more of following core Science requirements through approved learning experiences\*, including, but not limited to: internships, co-ops, research, Study Abroad, Entrepreneurship and EPICS projects.

- Teaming
- Language and Culture
- Multidisciplinary (Research)
- Multidisciplinary (Internship)

- Technical Writing
- Technical Presentation

\*Experiential Learning Contracts must be completed one semester prior to a student's anticipated graduation date.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option. *Transfer credit (including any/all undistributed credit, TR graded course, AP/IB credit, etc.) cannot be applied to the concentration.*

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement



The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- EAPS Selective Course - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 2.00

### 15-18 Credits

### Spring 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 3.00 - 4.00

### 14-16 Credits

### Fall 2nd Year

- CS 18200 - Foundations Of Computer Science
- CS 24000 - Programming In C
- Supporting Area Course - Credit Hours: 3.00

- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00

## 15-16 Credits

### Spring 2nd Year

- CS 25000 - Computer Architecture
- CS 25100 - Data Structures And Algorithms
- STAT 35000 - Introduction To Statistics ♦ or
- STAT 35500 - Statistics For Data Science ♦ or
- STAT 51100 - Statistical Methods ♦
- Supporting Area Course - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15-16 Credits

### Fall 3rd Year

- COM 21700 - Science Writing And Presentation
- CS Elective 30000 level - Credit Hours: 3.00
- Physics Selective I - Credit Hours: 4.00
- General Chemistry Selective I - Credit Hours: 4.00 - 5.00
- Elective - Credit Hours: 1.00

## 15-16 Credits

### Spring 3rd Year

- Supporting Area Course - Credit Hours: 3.00
- Physics Selective II - Credit Hours: 4.00
- General Chemistry Selective - Credit Hours: 4.00 - 5.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 1.00

## 15-16 Credits

### Fall 4th Year

- Supporting Area Course - Credit Hours: 3.00
- Supporting Area Course - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 0.00 - 3.00
- Biology Selective I - Credit Hours: 4.00
- Great Issues Option: 3.00
- Elective - Credit Hours: 0.00 - 2.00

## 15-16 Credits

### Spring 4th Year

- Science Core Selection - Credit Hours: 3.00
- Supporting Area Course - Credit Hours: 3.00
- Biology Selective II - Credit Hours: 3.00 - 4.00
- Biology Selective II - Credit Hours: 2.00
- Elective - Credit Hours: 4.00

## 15-16 Credits

### Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

### World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

### Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## **Interdisciplinary Science, BS (Earth, Atmospheric, and Planetary Sciences)**

### About the Interdisciplinary Science Program

The interdisciplinary science major is designed to provide College of Science students with a broad base in the sciences. By combining a primary area of science study, an interdisciplinary science core, a supporting area of academic interest and the core curriculum shared by all College of Science programs, students explore how the disciplines of science come together to identify and solve scientific challenges. Students customize the major by

selecting a departmental or interdepartmental primary area based in science and a supporting area that complements or enhances the primary area. This supporting area may be an approved minor from any college or school at the University or a concentration of 18 credits of courses with a unifying theme. There is a primary area representing each department in the College of Science, however, cross-disciplinary areas may be explored and added as appropriate. With the help of either a faculty member or an academic advisor, students are encouraged to petition for approval of their supporting area.

The Interdisciplinary Science Major is designed to give a student a broad base in the sciences with more depth in a Primary Area of Science and a Supporting Area, usually outside of Science. The Core courses are common across the major but the student customizes the major by selecting a departmental or interdepartmental Primary Area based in Science and a Supporting Area which may come from any college or school at the University. There is a Primary Area representing each department in the College of Science and cross-disciplinary areas will be explored and added as appropriate. Several Supporting Areas will be suggested and a student may petition for approval of others.

Students completing the interdisciplinary science major have gone on to a variety of careers - some in, and others out of, the world of science. These careers include medicine, law and other advanced-study professions, scientific sales, technical and scientific writing, computer programming and engineering.

Interdisciplinary Science Major Change (CODO) Requirements

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the preceding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

#### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## Departmental/Program Major Courses: Interdisciplinary Science (34-47 credits)

### Required Biology Courses (7-8 credits)

*Choose one option below. Select courses COULD satisfy Science for Core.*

#### Option I

- BIOL 11000 - Fundamentals Of Biology I
- BIOL 11100 - Fundamentals Of Biology II

#### Option II

- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior
- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms
- BIOL 13500 - First Year Biology Laboratory

### Required Chemistry Courses (4-10 credits)

*Choose one option below. Select courses COULD satisfy Science for Core.*

*Chemistry students must also take the departmental exam for CHM 11500 if they choose Option III.*

#### Option I

- CHM 11500 - General Chemistry
- CHM 11600 - General Chemistry

#### Option II

- CHM 12500 - Introduction To Chemistry I
- CHM 12600 - Introduction To Chemistry II

#### Option III

- CHM 12901 - General Chemistry With A Biological Focus  
Option IV
- CHM 13600 - General Chemistry Honors

## Required Computing Option (3-4 credits)

*Choose one of the following; Computer Science students must choose CS 18000.*

- CS 15900 - C Programming
- CS 17600 - Data Engineering In Python
- CS 17700 - Programming With Multimedia Objects
- CS 18000 - Problem Solving And Object-Oriented Programming

## Required Earth, Atmospheric, and Planetary Science Option (3-4 credits)

*Choose one option below; EAPS students must choose Option III.*

- Option I - for Non-EAPS Concentrations
- EAPS 10000 - Planet Earth
- Option II - Students who are interested in Geology courses.
- EAPS 10900 - The Dynamic Earth
- Option III - Students who are interested in Environmental, Geology, and Planetary Sciences courses
- EAPS 11100 - Physical Geology
- Option IV - Student who are interested in Atmospheric Science courses.
- EAPS 22100 - Survey Of Atmospheric Science
- EAPS 23000 - Laboratory In Atmospheric Science
- Option V - Student who are interested in Atmospheric Science courses.
- EAPS 22500 - Science Of The Atmosphere
- EAPS 23000 - Laboratory In Atmospheric Science

## Required Mathematics Courses (6-10 credits)

*Choose one option below; only Chemistry or Biology students may choose Option I. Satisfies Quantitative Reasoning for Core.*

- Option I
- MA 16010 - Applied Calculus I
- MA 16020 - Applied Calculus II
- Option II - Take one Calculus I and one Calculus II.
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Required Physics Courses (8 credits)

*Choose one option below; Physics students must choose Option III or Option IV.*

Option I

- PHYS 23300 - Physics For Life Sciences I
- PHYS 23400 - Physics For Life Sciences II
- Option II
- PHYS 22000 - General Physics
- PHYS 22100 - General Physics
- Option III
- PHYS 17200 - Modern Mechanics
- PHYS 27200 - Electric And Magnetic Interactions
- Option IV
- PHYS 17200 - Modern Mechanics
- PHYS 24100 - Electricity And Optics
- PHYS 25200 - Electricity And Optics Laboratory

## Required Statistics Course (3 credits)

*Choose one course below from those noted for your area.*

- STAT 30100 - Elementary Statistical Methods (Chemistry, EAPS or Physics concentrations only)
- STAT 35000 - Introduction To Statistics (All areas)
- STAT 35500 - Statistics For Data Science (All areas)
- STAT 50300 - Statistical Methods For Biology (Biology, Chemistry, EAPS, Math, or Physics concentrations only)
- STAT 51100 - Statistical Methods (Biology, Chemistry, Computer Science, EAPS or Physics concentrations only)

## Departmental/Program Major Courses: Areas (33-34 credits)

### Required Earth, Atmospheric, and Planetary Sciences Primary Area Courses (15 - 16 credits)

- EAPS 22100 - Survey Of Atmospheric Science or
- EAPS 22500 - Science Of The Atmosphere
- EAPS 23000 - Laboratory In Atmospheric Science
- EAPS 11200 - Earth Through Time - (or any EAPS course 20000 level or higher) - Credit Hours: 3.00
- EAPS 30000 level or higher - Credit Hours: 3.00
- EAPS 30000 level or higher - Credit Hours: 3.00
- EAPS 30000 level or higher - Credit Hours: 3.00

### Required Supporting Area Courses (18 credits)

MUST BE APPROVED BY COLLEGE. Please see your advisor for approval options.

### Other Departmental/Program Course Requirements (15-37 credits)

## COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four-year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

## Composition & Presentation

### First-Year Composition (3-4 credits)

Choose one course from this list (satisfies Written Communication and Information Literacy for core).

### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

## Computing

*Met with required major coursework.*

### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Sciences for core).

- General Education Option I
- General Education Option II
- General Education Option III

### Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science



*Met with required major coursework.*

## Mathematics

*Met with required major coursework.*

## Science Technology and Society\* (0-3 credits)

Choose one from this list (satisfies Science, Technology, Society for core).

## Statistics

*Met with required major coursework.*

## Team-Building and Collaboration\* (0-3 credits)

Choose one from this list.

## Electives (3-35 credits)

## Interdisciplinary Science Other Requirements

## GPA Requirement

- Concentration and Supporting Area blocks require a minimum 2.00 GPA.
- 2.0 Graduation GPA required for Bachelor of Science degree.

## Course Requirements and Notes

- All courses can share with the exception of the Great Issues, General Education and Cultural Diversity (Language & Culture) Courses.

## Non-course / Non-credit Requirements

College of Science students may choose to complete one or more of following core Science requirements through approved learning experiences\*, including, but not limited to: internships, co-ops, research, Study Abroad, Entrepreneurship and EPICS projects.

- Teaming
- Language and Culture
- Multidisciplinary (Research)
- Multidisciplinary (Internship)
- Technical Writing

- Technical Presentation

\*Experiential Learning Contracts must be completed one semester prior to a student's anticipated graduation date.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option. *Transfer credit (including any/all undistributed credit, TR graded course, AP/IB credit, etc.) cannot be applied to the concentration.*

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Additional Information

*Any additional information that does not fit into any of the categories above.*

## Sample 4-Year Plan

### Fall 1st Year

- EAPS 11100 - Physical Geology
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 2.00

### 15-18 Credits

### Spring 1st Year

- EAPS 23000 - Laboratory In Atmospheric Science
- EAPS 22100 - Survey Of Atmospheric Science or
- EAPS 22500 - Science Of The Atmosphere
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Physics Selective I - Credit Hours: 4.00

### 15-17 Credits

### Fall 2nd Year

- Physics Selective II - Credit Hours: 4.00
- Science Core First-Year Composition - Credit Hours: 3.00 - 4.00
- Supporting Area Course- Credit Hours: 3.00
- Supporting Area Course - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 16-17 Credits

### Spring 2nd Year

- EAPS 11200 - Earth Through Time - (or 20000 level) - Credit Hours 3.00
- CS 15900 - C Programming or
- CS 17600 - Data Engineering In Python or
- CS 17700 - Programming With Multimedia Objects or
- CS 18000 - Problem Solving And Object-Oriented Programming
- STAT 35000 - Introduction To Statistics or
- STAT 35500 - Statistics For Data Science or
- STAT 50300 - Statistical Methods For Biology or
- STAT 51100 - Statistical Methods
- Supporting Area Course - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15-17 Credits

### Fall 3rd Year

- EAPS 22100 - Survey Of Atmospheric Science or
- Elective - Credit Hours: 3.00 (if EAPS 22500 taken)
- Supporting Area Course - Credit Hours: 3.00
- General Chemistry Selective I - Credit Hours: 4.00 - 5.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 16-18 Credits

### Spring 3rd Year

- COM 21700 - Science Writing And Presentation
- EAPS 30000 level - Credit Hours: 3.00
- General Chemistry Selective II or Elective - Credit Hours: 4.00- 5.00
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00

## 16-17 Credits

## Fall 4th Year

- EAPS 30000 level - Credit Hours: 3.00
- Biology Selective I - Credit Hours: 4.00
- Supporting Area Course - Credit Hours: 3.00
- Great Issues Option - Credit Hours: 3.00
- Elective - Credit Hours: 2.00

## 15 Credits

## Spring 4th Year

- EAPS 30000 level - Credit Hours: 3.00
- Biology Selective II - Credit Hours: 3.00 - 4.00
- Biology Selective II or Elective - Credit Hours: 0.00 - 2.00
- Supporting Area Course - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15-18 Credits

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

# Interdisciplinary Science, BS (Mathematics)

## About the Interdisciplinary Science Program

The interdisciplinary science major is designed to provide College of Science students with a broad base in the sciences. By combining a primary area of science study, an interdisciplinary science core, a supporting area of academic interest and the core curriculum shared by all College of Science programs, students explore how the disciplines of science come together to identify and solve scientific challenges. Students customize the major by selecting a departmental or interdepartmental primary area based in science and a supporting area that complements or enhances the primary area. This supporting area may be an approved minor from any college or school at the University or a concentration of 18 credits of courses with a unifying theme. There is a primary area representing each department in the College of Science, however, cross-disciplinary areas may be explored and added as appropriate. With the help of either a faculty member or an academic advisor, students are encouraged to petition for approval of their supporting area.

The Interdisciplinary Science Major is designed to give a student a broad base in the sciences with more depth in a Primary Area of Science and a Supporting Area, usually outside of Science. The Core courses are common across the major but the student customizes the major by selecting a departmental or interdepartmental Primary Area based in Science and a Supporting Area which may come from any college or school at the University. There is a Primary Area representing each department in the College of Science and cross-disciplinary areas will be explored and added as appropriate. Several Supporting Areas will be suggested and a student may petition for approval of others.

Students completing the interdisciplinary science major have gone on to a variety of careers - some in, and others out of, the world of science. These careers include medicine, law and other advanced-study professions, scientific sales, technical and scientific writing, computer programming and engineering.

Interdisciplinary Science Major Change (CODO) Requirements

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## **Departmental/Program Major Courses: Interdisciplinary Science (34-47 credits)**

### **Required Biology Courses (7-8 credits)**

*Choose one option below. Select courses COULD satisfy Science for Core.*

#### Option I

- BIOL 11000 - Fundamentals Of Biology I
- BIOL 11100 - Fundamentals Of Biology II

#### Option II

- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior
- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms
- BIOL 13500 - First Year Biology Laboratory

### **Required Chemistry Courses (4-10 credits)**

*Choose one option below. Select courses COULD satisfy Science for Core.*

*Chemistry students must also take the departmental exam for CHM 11500 if they choose Option III.*

Option I

- CHM 11500 - General Chemistry
- CHM 11600 - General Chemistry

Option II

- CHM 12500 - Introduction To Chemistry I
- CHM 12600 - Introduction To Chemistry II

Option III

- CHM 12901 - General Chemistry With A Biological Focus

Option IV

- CHM 13600 - General Chemistry Honors

## Required Computing Option (3-4 credits)

*Choose one of the following; Computer Science students must choose CS 18000.*

- CS 15900 - C Programming
- CS 17600 - Data Engineering In Python
- CS 17700 - Programming With Multimedia Objects
- CS 18000 - Problem Solving And Object-Oriented Programming

## Required Earth, Atmospheric, and Planetary Science Option (3-4 credits)

*Choose one option below; EAPS students must choose Option III.*

Option I - for Non-EAPS Concentrations

- EAPS 10000 - Planet Earth

Option II - Students who are interested in Geology courses.

- EAPS 10900 - The Dynamic Earth

Option III - Students who are interested in Environmental, Geology, and Planetary Sciences courses

- EAPS 11100 - Physical Geology

Option IV - Student who are interested in Atmospheric Science courses.

- EAPS 22100 - Survey Of Atmospheric Science

- EAPS 23000 - Laboratory In Atmospheric Science

Option V - Student who are interested in Atmospheric Science courses.

- EAPS 22500 - Science Of The Atmosphere

- EAPS 23000 - Laboratory In Atmospheric Science

## Required Mathematics Courses (6-10 credits)

*Choose one option below; only Chemistry or Biology students may choose Option I. Satisfies Quantitative Reasoning for Core.*

Option I

- MA 16010 - Applied Calculus I

- MA 16020 - Applied Calculus II

Option II - Take one Calculus I and one Calculus II.

- MA 16100 - Plane Analytic Geometry And Calculus I or



- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Required Physics Courses (8 credits)

*Choose one option below; Physics students must choose Option III or Option IV.*

### Option I

- PHYS 23300 - Physics For Life Sciences I
- PHYS 23400 - Physics For Life Sciences II

### Option II

- PHYS 22000 - General Physics
- PHYS 22100 - General Physics

### Option III

- PHYS 17200 - Modern Mechanics
- PHYS 27200 - Electric And Magnetic Interactions

### Option IV

- PHYS 17200 - Modern Mechanics
- PHYS 24100 - Electricity And Optics
- PHYS 25200 - Electricity And Optics Laboratory

## Required Statistics Course (3 credits)

*Choose one course below from those noted for your area.*

- STAT 30100 - Elementary Statistical Methods (Chemistry, EAPS or Physics concentrations only)
- STAT 35000 - Introduction To Statistics (All areas)
- STAT 35500 - Statistics For Data Science (All areas)
- STAT 50300 - Statistical Methods For Biology (Biology, Chemistry, EAPS, Math, or Physics concentrations only)
- STAT 51100 - Statistical Methods (Biology, Chemistry, Computer Science, EAPS or Physics concentrations only)

## Departmental/Program Major Courses: Areas (35-36 credits)

### Required Mathematics Primary Area Courses (17-18 credits)

- MA 35100 - Elementary Linear Algebra
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- MA 26200 - Linear Algebra And Differential Equations or
- MA 36600 - Ordinary Differential Equations
- MA 34100 - Foundations Of Analysis or
- MA 44000 - Honors Real Analysis I or
- MA 45300 - Elements Of Algebra I or
- MA 45000 - Algebra Honors
- MA Elective at or above 30000 level

## Required Supporting Area Courses (18 credits)

MUST BE APPROVED BY COLLEGE. Please see your advisor for approval options.

## Other Departmental/Program Course Requirements (15-37 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four-year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

#### First-Year Composition (3-4 credits)

Choose one course from this list (satisfies Written Communication and Information Literacy for core).

#### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

### Computing

*Met with required major coursework.*

#### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

#### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Sciences for core).

- General Education Option I

- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

### Laboratory Science

*Met with required major coursework.*

### Mathematics

*Met with required major coursework.*

## Science Technology and Society\* (0-3 credits)

Choose one from this list (satisfies Science, Technology, Society for core).

### Statistics

*Met with required major coursework.*

## Team-Building and Collaboration\* (0-3 credits)

Choose one from this list.

## Electives (4-37 credits)

## Interdisciplinary Science Other Requirements

### GPA Requirement

- Concentration and Supporting Area blocks require a minimum 2.00 GPA.
- 2.0 Graduation GPA required for Bachelor of Science degree.

## Course Requirements and Notes

- All courses can share with the exception of the Great Issues, General Education and Cultural Diversity (Language & Culture) Courses.

## Non-course / Non-credit Requirements

College of Science students may choose to complete one or more of following core Science requirements through approved learning experiences\*, including, but not limited to: internships, co-ops, research, Study Abroad, Entrepreneurship and EPICS projects.

- Teaming
- Language and Culture
- Multidisciplinary (Research)
- Multidisciplinary (Internship)
- Technical Writing
- Technical Presentation

\*Experiential Learning Contracts must be completed one semester prior to a student's anticipated graduation date.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option. *Transfer credit (including any/all undistributed credit, TR graded course, AP/IB credit, etc.) cannot be applied to the concentration.*

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)

- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the Civics Literacy Proficiency [website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Physics Selective I - Credit Hours: 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00

### 15-18 Credits

### Spring 1st Year

- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Physics Selective II - Credit Hours: 4.00
- Science Core - Credit Hours: 3.00 - 4.00

- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00

## 15-17 Credits

### Fall 2nd Year

- MA 26100 - Multivariate Calculus
- EAPS Selective - Credit Hours: 3.00 - 4.00
- Supporting Area Course - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00

## 16-17 Credits

### Spring 2nd Year

- MA 35100 - Elementary Linear Algebra
- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦
- STAT 35000 - Introduction To Statistics ♦ or
- STAT 35500 - Statistics For Data Science ♦ or
- STAT 50300 - Statistical Methods For Biology ♦
- Supporting Area Course - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00

## 15 Credits

### Fall 3rd Year

- MA 36600 - Ordinary Differential Equations or
- MA 26200 - Linear Algebra And Differential Equations
- Supporting Area Course - Credit Hours: 3.00
- General Chemistry Selective I - Credit Hours: 4.00 - 5.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 1.00

## 15-16 Credits

### Spring 3rd Year

- COM 21700 - Science Writing And Presentation
- MA Elective 30000+ - Credit Hours: 3.00
- Supporting Area Course - Credit Hours: 3.00
- General Chemistry Selective II or Elective - Credit Hours: 4.00 - 5.00
- Science Core Selection - Credit Hours: 3.00

## 16-17 Credits

### Fall 4th Year

- MA 45300 - Elements Of Algebra I or
- MA 45000 - Algebra Honors or
- MA 34100 - Foundations Of Analysis or
- MA 44000 - Honors Real Analysis I
- Biology Selective I - Credit Hours: 4.00
- Supporting Area Course - Credit Hours: 3.00
- Great Issue Option - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00

## 16 Credits

### Spring 4th Year

- Biology Selective II - Credit Hours: 3.00 - 4.00
- Biology Selective II or Elective - Credit Hours: 2.00
- Supporting Area Course - Credit Hours: 3.00
- Elective - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 14-16 Credits

### Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

### World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-

Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Interdisciplinary Science, BS (Physics)

### About the Interdisciplinary Science Program

The interdisciplinary science major is designed to provide College of Science students with a broad base in the sciences. By combining a primary area of science study, an interdisciplinary science core, a supporting area of academic interest and the core curriculum shared by all College of Science programs, students explore how the disciplines of science come together to identify and solve scientific challenges. Students customize the major by selecting a departmental or interdepartmental primary area based in science and a supporting area that complements or enhances the primary area. This supporting area may be an approved minor from any college or school at the University or a concentration of 18 credits of courses with a unifying theme. There is a primary area representing each department in the College of Science, however, cross-disciplinary areas may be explored and added as appropriate. With the help of either a faculty member or an academic advisor, students are encouraged to petition for approval of their supporting area.

The Interdisciplinary Science Major is designed to give a student a broad base in the sciences with more depth in a Primary Area of Science and a Supporting Area, usually outside of Science. The Core courses are common across the major but the student customizes the major by selecting a departmental or interdepartmental Primary Area based in Science and a Supporting Area which may come from any college or school at the University. There is a Primary Area representing each department in the College of Science and cross-disciplinary areas will be explored and added as appropriate. Several Supporting Areas will be suggested and a student may petition for approval of others.

Students completing the interdisciplinary science major have gone on to a variety of careers - some in, and others out of, the world of science. These careers include medicine, law and other advanced-study professions, scientific sales, technical and scientific writing, computer programming and engineering.

Interdisciplinary Science Major Change (CODO) Requirements

### Degree Requirements

## 120 Credits Required

### Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:



1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## **Departmental/Program Major Courses: Interdisciplinary Science (34-47 credits)**

### **Required Biology Courses (7-8 credits)**

*Choose one option below. Select courses COULD satisfy Science for Core.*

Option I

- BIOL 11000 - Fundamentals Of Biology I
- BIOL 11100 - Fundamentals Of Biology II

Option II

- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior
- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms
- BIOL 13500 - First Year Biology Laboratory

## Required Chemistry Courses (4-10 credits)

*Choose one option below. Select courses COULD satisfy Science for Core.*

*Chemistry students must also take the departmental exam for CHM 11500 if they choose Option III.*

Option I

- CHM 11500 - General Chemistry
- CHM 11600 - General Chemistry

Option II

- CHM 12500 - Introduction To Chemistry I
- CHM 12600 - Introduction To Chemistry II

Option III

- CHM 12901 - General Chemistry With A Biological Focus

Option IV

- CHM 13600 - General Chemistry Honors

## Required Computing Option (3-4 credits)

*Choose one of the following; Computer Science students must choose CS 18000.*

- CS 15900 - C Programming
- CS 17600 - Data Engineering In Python
- CS 17700 - Programming With Multimedia Objects
- CS 18000 - Problem Solving And Object-Oriented Programming

## Required Earth, Atmospheric, and Planetary Science Option (3-4 credits)

*Choose one option below; EAPS students must choose Option III.*

Option I - for Non-EAPS Concentrations

- EAPS 10000 - Planet Earth

Option II - Students who are interested in Geology courses.

- EAPS 10900 - The Dynamic Earth

Option III - Students who are interested in Environmental, Geology, and Planetary Sciences courses

- EAPS 11100 - Physical Geology

Option IV - Student who are interested in Atmospheric Science courses.

- EAPS 22100 - Survey Of Atmospheric Science
- EAPS 23000 - Laboratory In Atmospheric Science

Option V - Student who are interested in Atmospheric Science courses.

- EAPS 22500 - Science Of The Atmosphere

- EAPS 23000 - Laboratory In Atmospheric Science

## Required Mathematics Courses (6-10 credits)

*Choose one option below; only Chemistry or Biology students may choose Option I. Satisfies Quantitative Reasoning for Core.*

### Option I

- MA 16010 - Applied Calculus I
- MA 16020 - Applied Calculus II

### Option II - Take one Calculus I and one Calculus II.

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Required Physics Courses (8 credits)

*Choose one option below; Physics students must choose Option III or Option IV.*

### Option I

- PHYS 23300 - Physics For Life Sciences I
- PHYS 23400 - Physics For Life Sciences II

### Option II

- PHYS 22000 - General Physics
- PHYS 22100 - General Physics

### Option III

- PHYS 17200 - Modern Mechanics
- PHYS 27200 - Electric And Magnetic Interactions

### Option IV

- PHYS 17200 - Modern Mechanics
- PHYS 24100 - Electricity And Optics
- PHYS 25200 - Electricity And Optics Laboratory

## Required Statistics Course (3 credits)

*Choose one course below from those noted for your area.*

- STAT 30100 - Elementary Statistical Methods (Chemistry, EAPS or Physics concentrations only)
- STAT 35000 - Introduction To Statistics (All areas)
- STAT 35500 - Statistics For Data Science (All areas)
- STAT 50300 - Statistical Methods For Biology (Biology, Chemistry, EAPS, Math, or Physics concentrations only)
- STAT 51100 - Statistical Methods (Biology, Chemistry, Computer Science, EAPS or Physics concentrations only)

## Departmental/Program Major Courses: Areas (31-32 credits)

## Required Physics Primary Area Courses (13-14 credits)

- MA 26100 - Multivariate Calculus
- PHYS 34200 - Modern Physics or
- PHYS 34400 - Introduction To Quantum Science
- PHYS Elective at or above 30000 level - Credit Hours: 3.00
- PHYS Elective at or above 30000 level - Credit Hours: 3.00

## Required Supporting Area Courses (18 credits)

MUST BE APPROVED BY COLLEGE. Please see your advisor for approval options.

## Other Departmental/Program Course Requirements (15-37 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

#### First-Year Composition (3-4 credits)

Choose one course from this list. (satisfies Written Communication and Information Literacy for core)

#### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found [here](#). (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

### Computing

*Met with required major coursework.*

#### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I

- Language & Culture Option II
- Language & Culture Option III

## General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science

*Met with required major coursework.*

## Mathematics

*Met with required major coursework.*

## Multidisciplinary Experience^\* (0-3 credits)

Choose one from this list (satisfies Science, Technology, Society for core).

## Statistics

*Met with required major coursework.*

## Team-Building and Collaboration\* (0-3 credits)

*Met with required major coursework.*

## Electives (4-37 credits)

## Interdisciplinary Science Other Requirements

## GPA Requirement

- Concentration and Supporting Area blocks require a minimum 2.00 GPA.
- 2.0 Graduation GPA required for Bachelor of Science degree.

## Course Requirements and Notes

- All courses can share with the exception of the Great Issues, General Education and Cultural Diversity (Language & Culture) Courses.

## Non-course / Non-credit Requirements

College of Science students may choose to complete one or more of following core Science requirements through approved learning experiences\*, including, but not limited to: internships, co-ops, research, Study Abroad, Entrepreneurship and EPICS projects.

- Teaming
- Language and Culture
- Multidisciplinary (Research)
- Multidisciplinary (Internship)
- Technical Writing
- Technical Presentation

\*Experiential Learning Contracts must be completed one semester prior to a student's anticipated graduation date.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option. *Transfer credit (including any/all undistributed credit, TR graded course, AP/IB credit, etc.) cannot be applied to the concentration.*

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- PHYS 17200 - Modern Mechanics
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00

### 15-18 Credits

### Spring 1st Year

- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 0.00 - 1.00

## 15-17 Credits

### Fall 2nd Year

- MA 26100 - Multivariate Calculus
- PHYS 34200 - Modern Physics or
- PHYS 34400 - Introduction To Quantum Science
- Supporting Area Course - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 16-18 Credits

### Spring 2nd Year

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦
- PHYS 30000+ Selective - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Supporting Area Course - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

### Fall 3rd Year

- COM 21700 - Science Writing And Presentation
- PHYS 30000+ Credit Hours: 3.00
- Supporting Area Course - Credit Hours: 3.00
- General Chemistry Selective I - Credit Hours: 4.00 - 5.00
- Science Core Selection - Credit Hours: 3.00

## 16-17 Credits

### Spring 3rd Year



- EAPS Selective - Credit Hours: 3.00 - 4.00
- Supporting Area Course - Credit Hours: 3.00
- General Chemistry Selective II or Elective - Credit Hours: 4.00 - 5.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 16-18 Credits

### Fall 4th Year

- STAT 30100 - Elementary Statistical Methods ♦ or
- STAT 35000 - Introduction To Statistics ♦ or
- STAT 35500 - Statistics For Data Science ♦ or
- STAT 50300 - Statistical Methods For Biology ♦ or
- STAT 51100 - Statistical Methods ♦
- Biology Selective I - Credit Hours: 4.00
- Supporting Area Course - Credit Hours: 3.00
- Great Issues Option - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 16 Credits

### Spring 4th Year

- Supporting Area Course - Credit Hours: 3.00
- Biology Selective II - Credit Hours: 3.00 - 4.00
- Biology Selective II or Elective - Credit Hours: 2.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 4.00-6.00

## 15-18 Credits

### Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

### World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-

Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Interdisciplinary Science, BS (Statistics)

### About the Interdisciplinary Science Program

The interdisciplinary science major is designed to provide College of Science students with a broad base in the sciences. By combining a primary area of science study, an interdisciplinary science core, a supporting area of academic interest and the core curriculum shared by all College of Science programs, students explore how the disciplines of science come together to identify and solve scientific challenges. Students customize the major by selecting a departmental or interdepartmental primary area based in science and a supporting area that complements or enhances the primary area. This supporting area may be an approved minor from any college or school at the University or a concentration of 18 credits of courses with a unifying theme. There is a primary area representing each department in the College of Science, however, cross-disciplinary areas may be explored and added as appropriate. With the help of either a faculty member or an academic advisor, students are encouraged to petition for approval of their supporting area.

The Interdisciplinary Science Major is designed to give a student a broad base in the sciences with more depth in a Primary Area of Science and a Supporting Area, usually outside of Science. The Core courses are common across the major but the student customizes the major by selecting a departmental or interdepartmental Primary Area based in Science and a Supporting Area which may come from any college or school at the University. There is a Primary Area representing each department in the College of Science and cross-disciplinary areas will be explored and added as appropriate. Several Supporting Areas will be suggested and a student may petition for approval of others.

Students completing the interdisciplinary science major have gone on to a variety of careers - some in, and others out of, the world of science. These careers include medicine, law and other advanced-study professions, scientific sales, technical and scientific writing, computer programming and engineering.

Interdisciplinary Science Major Change (CODO) Requirements

### Degree Requirements

## 120 Credits Required

### Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## **Departmental/Program Major Courses: Interdisciplinary Science (34-47 credits)**

### **Required Biology Courses (7-8 credits)**

*Choose one option below. Select courses COULD satisfy Science for Core.*

Option I

- BIOL 11000 - Fundamentals Of Biology I
- BIOL 11100 - Fundamentals Of Biology II

Option II

- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior
- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms
- BIOL 13500 - First Year Biology Laboratory

## Required Chemistry Courses (4-10 credits)

*Choose one option below. Select courses COULD satisfy Science for Core.*

*Chemistry students must also take the departmental exam for CHM 11500 if they choose Option III.*

Option I

- CHM 11500 - General Chemistry
- CHM 11600 - General Chemistry

Option II

- CHM 12500 - Introduction To Chemistry I
- CHM 12600 - Introduction To Chemistry II

Option III

- CHM 12901 - General Chemistry With A Biological Focus

Option IV

- CHM 13600 - General Chemistry Honors

## Required Computing Option (3-4 credits)

*Choose one of the following; Computer Science students must choose CS 18000.*

- CS 15900 - C Programming
- CS 17600 - Data Engineering In Python
- CS 17700 - Programming With Multimedia Objects
- CS 18000 - Problem Solving And Object-Oriented Programming

## Required Earth, Atmospheric, and Planetary Science Option (3-4 credits)

*Choose one option below; EAPS students must choose Option III.*

Option I - for Non-EAPS Concentrations

- EAPS 10000 - Planet Earth

Option II - Students who are interested in Geology courses.

- EAPS 10900 - The Dynamic Earth

Option III - Students who are interested in Environmental, Geology, and Planetary Sciences courses

- EAPS 11100 - Physical Geology

Option IV - Student who are interested in Atmospheric Science courses.

- EAPS 22100 - Survey Of Atmospheric Science
- EAPS 23000 - Laboratory In Atmospheric Science

Option V - Student who are interested in Atmospheric Science courses.

- EAPS 22500 - Science Of The Atmosphere

- EAPS 23000 - Laboratory In Atmospheric Science

## Required Mathematics Courses (6-10 credits)

*Choose one option below; only Chemistry or Biology students may choose Option I. Satisfies Quantitative Reasoning for Core.*

### Option I

- MA 16010 - Applied Calculus I
- MA 16020 - Applied Calculus II

### Option II - Take one Calculus I and one Calculus II.

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Required Physics Courses (8 credits)

*Choose one option below; Physics students must choose Option III or Option IV.*

### Option I

- PHYS 23300 - Physics For Life Sciences I
- PHYS 23400 - Physics For Life Sciences II

### Option II

- PHYS 22000 - General Physics
- PHYS 22100 - General Physics

### Option III

- PHYS 17200 - Modern Mechanics
- PHYS 27200 - Electric And Magnetic Interactions

### Option IV

- PHYS 17200 - Modern Mechanics
- PHYS 24100 - Electricity And Optics
- PHYS 25200 - Electricity And Optics Laboratory

## Required Statistics Course (3 credits)

*Choose one course below from those noted for your area.*

- STAT 30100 - Elementary Statistical Methods (Chemistry, EAPS or Physics concentrations only)
- STAT 35000 - Introduction To Statistics (All areas)
- STAT 35500 - Statistics For Data Science (All areas)
- STAT 50300 - Statistical Methods For Biology (Biology, Chemistry, EAPS, Math, or Physics concentrations only)
- STAT 51100 - Statistical Methods (Biology, Chemistry, Computer Science, EAPS or Physics concentrations only)

## Departmental/Program Major Courses: Areas (30-31 credits)

## Required Statistics Primary Area Courses (12-13 credits)

- STAT 22500 - Introduction To Probability Models or
  - STAT 31100 - Introductory Probability or
  - STAT 41600 - Probability or
  - STAT 51600 - Basic Probability And Applications
  - STAT 41700 - Statistical Theory or
  - STAT 51300 - Statistical Quality Control or
  - STAT 51400 - Design Of Experiments or
  - MA 26100 - Multivariate Calculus
  - STAT 51200 - Applied Regression Analysis
- AND
- STAT 51300 - Statistical Quality Control or
  - STAT 51400 - Design Of Experiments

NOTE: STAT 51300 and STAT 51400 can only be taken one time each to meet primary area course requirements.

## Required Supporting Area Courses (18 credits)

MUST BE APPROVED BY COLLEGE. Please see your advisor for approval options.

## Other Departmental/Program Course Requirements (15-37 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

#### First-Year Composition (3-4 credits)

Choose one course from this list. (satisfies Written Communication and Information Literacy for core)

#### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found [here](#). (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

## Computing

*Met with required major coursework.*

## Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

## General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science

*Met with required major coursework.*

## Mathematics

*Met with required major coursework.*

## Science Technology and Society\* (0-3 credits)

Choose one from this list (satisfies Science, Technology, Society for core).

## Statistics

*Met with required major coursework.*

## Team-Building and Collaboration\* (0-3 credits)

Choose one from this list.

## Electives (5-38 credits)

## Interdisciplinary Science Other Requirements

### GPA Requirement

- Concentration and Supporting Area blocks require a minimum 2.00 GPA.
- 2.0 Graduation GPA required for Bachelor of Science degree.

### Course Requirements and Notes

- All courses can share with the exception of the Great Issues, General Education and Cultural Diversity (Language & Culture) Courses.

### Non-course / Non-credit Requirements

College of Science students may choose to complete one or more of following core Science requirements through approved learning experiences\*, including, but not limited to: internships, co-ops, research, Study Abroad, Entrepreneurship and EPICS projects.

- Teaming
- Language and Culture
- Multidisciplinary (Research)
- Multidisciplinary (Internship)
- Technical Writing
- Technical Presentation

\*Experiential Learning Contracts must be completed one semester prior to a student's anticipated graduation date.

### College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

### College of Science Transfer Credit Policy



College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option. *Transfer credit (including any/all undistributed credit, TR graded course, AP/IB credit, etc.) cannot be applied to the concentration.*

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

### Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- MA 16100 - Plane Analytic Geometry And Calculus I or

- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Physics Selective I - Credit Hours: 4.00
- Elective - Credit Hours: 1.00

## 15-18 Credits

### Spring 1st Year

- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00
- Physics Selective II - Credit Hours: 4.00
- Elective - Credit Hours: 1.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

### Fall 2nd Year

- MA 26100 - Multivariate Calculus or
- STAT 41700 - Statistical Theory or
- STAT 51300 - Statistical Quality Control or
- STAT 51400 - Design Of Experiments

Note: MA 26100 can be taken this semester. If another choice is selected, it will need to be moved down in the plan of study to accommodate pre-requisites.

- Supporting Area Course - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- EAPS Selective - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

### Spring 2nd Year

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 35500 - Statistics For Data Science ♦
- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦
- Supporting Area Course - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00

## 15-16 Credits

## Fall 3rd Year

- STAT 22500 - Introduction To Probability Models or
- STAT 31100 - Introductory Probability or
- STAT 41600 - Probability or
- STAT 51600 - Basic Probability And Applications
- Supporting Area Course - Credit Hours: 3.00
- General Chemistry Selective I - Credit Hours: 4.00 - 5.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 2.00

## 15-16 Credits

## Spring 3rd Year

- COM 21700 - Science Writing And Presentation
- Supporting Area Course - Credit Hours: 3.00
- General Chemistry Selective II or Elective - Credit Hours: 4.00 - 5.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 16-17 Credits

## Fall 4th Year

- STAT 51200 - Applied Regression Analysis
- Supporting Area Course - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Biology Selective I - Credit Hours: 4.00
- Great Issues Option - Credit Hours: 3.00

## 16 Credits

## Spring 4th Year

- STAT 51300 - Statistical Quality Control or
- STAT 51400 - Design Of Experiments
- Supporting Area Course - Credit Hours: 3.00
- Biology Selective II - Credit Hours: 3.00 - 4.00
- Biology Selective II or Elective - Credit Hours: 0.00 - 2.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours - 0.00 - 3.00

## 15 Credits

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Science Education - Biology Concentration, BS

### About the Science Education Program

A College of Science degree in Science Education prepares future science teachers for certification at the middle and high school level. Students customize their focus by selecting a major area of study in biology, chemistry, physics, or earth and space science within an interdisciplinary science framework. The Science Education degree ensures students are thoroughly educated in their content discipline and modern theories of learning and education. Graduates are in high demand as STEM education and careers continue to grow in demand.

This program meets state and national licensure standards and is accredited by the Council for the Accreditation of Educator Preparation (CAEP) and the State of Indiana, State Board of Education. Admission to and successful completion of the Teacher Education Program (TEP) are required.

Science Education Major Change (CODO) Requirements

### Degree Requirements

## 124 Credits Required

### Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## **Departmental/Program Major Courses**

**Biology Concentration 2.50 GPA:** *Overall GPA for Biology Concentration courses with the Departmental/Program Major Courses must be 2.50 or greater. This includes all courses under the Science Education Core plus all courses in the Biology Concentration.*

## Required Science Education Core Courses (25-30 credits)

Overall GPA for Biology Concentration courses with the Departmental/Program Major Courses must be  $\geq 2.50$ . This includes all courses under the Science Education Core plus all courses in the Biology Concentration.

## Required Chemistry Course (4-5 credits)

*Biology students must take CHM 12901; Chemistry, Earth/Space, and Physics students choose CHM 11500 or CHM 12500.*

- CHM 11500 - General Chemistry ♦ (CHEM, ESSE, or PHYS) or
- CHM 12500 - Introduction To Chemistry I ♦ (CHEM, ESSE, or PHYS) or
- CHM 12901 - General Chemistry With A Biological Focus ♦ (BIOL only)

## Required Computing Option (3-4 credits)

*Choose one.*

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦ or
- TDM 10100 - The Data Mine Seminar I and TDM 10200 - The Data Mine Seminar II.

## Required Calculus Courses (6-10 credits)

*Choose one sequence available for your concentration. (satisfies Quantitative Reasoning for core)*

### Option 1 (all concentrations)

- MA 16100 - Plane Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II

### Option 2 (all concentrations)

- MA 16500 - Analytic Geometry And Calculus I
- MA 16600 - Analytic Geometry And Calculus II

### Option 3 (Biology only)

- MA 16010 - Applied Calculus I
- MA 16020 - Applied Calculus II

## Required Physics Courses (8 credits)

*Choose one sequence available for your concentration. (satisfies Science for core)*

### Option 1 (Biology, Chemistry, Earth/Space)

- PHYS 17200 - Modern Mechanics
- PHYS 27200 - Electric And Magnetic Interactions

### Option 2 (Physics only)

- PHYS 17200 - Modern Mechanics - HONORS version required
- PHYS 27200 - Electric And Magnetic Interactions - HONORS version required

### Option 3 (Biology, Chemistry, Earth/Space)

- PHYS 17200 - Modern Mechanics
- PHYS 24100 - Electricity And Optics
- PHYS 25200 - Electricity And Optics Laboratory

### Option 4 (Earth/Space only)

- PHYS 22000 - General Physics
- PHYS 22100 - General Physics

### Option 5 (Biology only)

- PHYS 23300 - Physics For Life Sciences I
- PHYS 23400 - Physics For Life Sciences II

### Required Statistics Course (3 credits)

*Choose one available for your concentration.*

- STAT 30100 - Elementary Statistical Methods (CHEM, ESSE, PHYS) or
- STAT 35000 - Introduction To Statistics (CHEM) or
- STAT 50300 - Statistical Methods For Biology (BIOL)

### Biology Concentration (37 credits)

Overall GPA for Biology Concentration courses with the Departmental/Program Major Courses must be  $\geq 2.50$ . This includes all courses under the Science Education Core plus all courses in the Biology Concentration.

### Biology Core (19 credits)

- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior ♦ (satisfies STS for core)
- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms ♦
- BIOL 23100 - Biology III: Cell Structure And Function ♦
- BIOL 23200 - Laboratory In Biology III: Cell Structure And Function ♦
- BIOL 24100 - Biology IV: Genetics And Molecular Biology ♦
- BIOL 24200 - Laboratory In Biology IV: Genetics And Molecular Biology ♦

- BIOL 28600 - Introduction To Ecology And Evolution
- BIOL 13500 - First Year Biology Laboratory or
- BIOL 19500 - Special Assignments
  - Diet, Dis & Immune Sys-Honors - Credit Hours: 2.00 **Credit Hours: 2.00**
  - Year 1 Bio Lab Disease Ecology - Credit Hours: 2.00 **Credit Hours: 2.00**
  - Yr 1 Bio Lab Phges Flds-Honors - Credit Hours: 2.00 **Credit Hours: 2.00**

## Upper-Level Biology Coursework (10-12 credits)

*Must have at least 10 credits of coursework, including courses which meet each of the following categories: "Intermediate," "Group A," "Group B," "BIOL 500-level," and "Base Lab Requirement."*

*Courses may double-dip among requirements; if used multiple places, course credits will only count once towards the required 10 credits of Upper-Level Biology Coursework. Any excess Upper-Level Biology Coursework beyond 12 credits will count as free "electives."*

## Intermediate Selective (0-4 credits)

*Choose one of the options below. All options are also listed under either Group A or Group B selective. A course may double-dip among requirements; if used multiple places, course credits will only count once towards the required 10 credits of Upper-Level Biology Coursework.*

- BIOL 32800 - Principles Of Physiology
- BIOL 36700 - Principles Of Development
- BIOL 39500 - Special Assignments -Macromolecules - Credit Hours: 2.00 **Credit Hours: 2.00**
- BIOL 41500 - Introduction To Molecular Biology
- BIOL 41600 - Viruses And Viral Disease
- BIOL 42000 - Eukaryotic Cell Biology
- BIOL 43600 - Neurobiology
- BIOL 43800 - General Microbiology

## Group A Selective (at least 2 credits)

*Course may overlap with other major requirements.*

- BIOL 39500 - Special Assignments -Macromolecules - Credit Hours: 2.00
- BIOL 41500 - Introduction To Molecular Biology
- BIOL 41600 - Viruses And Viral Disease
- BIOL 42000 - Eukaryotic Cell Biology
- BIOL 43600 - Neurobiology
- BIOL 43800 - General Microbiology
- BIOL 44400 - Human Genetics
- BIOL 44600 - Molecular Bacterial Pathogenesis
- BIOL 47800 - Introduction To Bioinformatics
- BIOL 48100 - Eukaryotic Genetics
- BIOL 49500 - Special Assignments
  - RNA World:CRISPR & Coronavirus - Credit Hours: 2.00
- BIOL 51600 - Molecular Biology Of Cancer
- BIOL 51700 - Molecular Biology: Proteins



- BIOL 52900 - Bacterial Physiology
- BIOL 53300 - Medical Microbiology
- BIOL 53601 - Biological And Structural Aspects Of Drug Design And Action
- BIOL 53800 - Molecular, Cellular, And Developmental Neurobiology
- BIOL 54100 - Molecular Genetics Of Bacteria
- BIOL 54900 - Microbial Ecology
- BIOL 56200 - Neural Systems
- BIOL 56310 - Protein Bioinformatics
- BIOL 59500 - Special Assignments
  - Cell Biology Of Plants - Credit Hours: 3.00
  - CRISPR Mechanism & App - Credit Hours: 3.00
  - CryoEM 3D Reconstruction - Credit Hours: 3.00
  - Immun Of Cancer & Infect Dis - Credit Hours: 2.00
  - Meth Meas Biophys Chem - Credit Hours: 2.00
  - Neural Mech Health & Disease - Credit Hours: 3.00
  - Neurobiol Learning & Memory - Credit Hours: 3.00
  - Pathways Human Health & Disease - Credit Hours: 3.00
  - Practical Bio Comput - Credit Hours: 3.00
  - Theory Of Molecular Methods - Credit Hours: 3.00
  - X-Ray Crystallography - Credit Hours: 3.00
- BCHM 43400 - Medical Topics In Biochemistry
- BCHM 56100 - General Biochemistry I
- BCHM 56200 - General Biochemistry II
- CHM 33900 - Biochemistry: A Molecular Approach
- CHM 43300 - Biochemistry

### Group B Selective (at least 2 credits)

*Course may overlap with other major requirements.*

- BIOL 20400 - Human Anatomy And Physiology
- BIOL 32800 - Principles Of Physiology
- BIOL 36700 - Principles Of Development
- BIOL 39500 - Special Assignments
  - Exp Dsgn&Quant Analys I-Honors - Credit Hours: 3.00
- BIOL 48300 - Great Issues: Environmental And Conservation Biology
- BIOL 49500 - Special Assignments
  - Biodiversity & Museum Research - Credit Hours: 3.00
  - Data Science For Biologists - Credit Hours: 3.00
- BIOL 53700 - Immunobiology
- BIOL 58000 - Evolution
- BIOL 58210 - Ecological Statistics
- BIOL 58705 - Animal Communication
- BIOL 59100 - Field Ecology
- BIOL 59200 - The Evolution Of Behavior
- BIOL 59500 - Special Assignments
  - Building The Tree Of Life - Credit Hours: 3.00
  - Disease Ecology - Credit Hours: 3.00
  - Ecology - Credit Hours: 3.00
- HORT 30100 - Plant Physiology

## BIOL 500-level Selective (0 or 2-3 credits)

Select one 3-credit BIOL 500-level course from Group A or Group B (course may double-dip between requirements).

## Base Lab Requirement (0-4 credits)

*Click Base Lab Requirements for all Biology majors for additional lists. Courses used for the Base Lab Requirement may also count for other major requirements.*

## Additional Selective Courses (0-7 credits)

*Additional courses if needed to reach 10 credits total Upper Level Biology Coursework.*

*Can either be additional courses from Groups A or B or the 'Base Lab Requirement' above, or from the lists below.*

## Undergraduate Research (0-2 credits)

*A maximum of 2 credits total (combined BIOL 49400/49900) can count towards the "Upper-Level Biology Coursework" tally (any credits beyond two count as free "electives").*

*NOTE: if using Undergraduate Research towards the "Base Lab Requirement": Objectives A and/or B, FOUR credits must be accumulated, plus the Research Mentor's approval as one or both Objectives. However, only TWO credits contribute to the "Upper-Level Biology Coursework" minimum of 10 credits.*

- BIOL 49400 - Biology Research
- BIOL 49900 - Biology Honors Thesis Research

## Academic Seminars/Other Courses

- BIOL 44100 - Biology Senior Seminar In Genetics
- BCHM 52100 - Comparative Genomics

## Organic Chemistry (8 credits)

### Organic Chemistry I

- CHM 25500 - Organic Chemistry For The Life Sciences I ♦
- CHM 25501 - Organic Chemistry For The Life Sciences Laboratory I

### Organic Chemistry II

- CHM 25600 - Organic Chemistry For The Life Sciences II ♦
- CHM 25601 - Organic Chemistry For The Life Sciences Laboratory II

## Professional Education Requirements (43-44 credits)

*All Professional Education courses, including Learner (Specialty) Pathway Concentration courses, are calculated into the Professional Education GPA ("B" average with no grade lower than a "C-").*

- EDCI 20002 - Special Populations Seminar: English Language Learners And Students With Gifts And Talents
- EDCI 20500 - Exploring Teaching As A Career ♦ (2 credits; satisfies Written Communication for core)
- EDCI 27000 - Introduction To Educational Technology And Computing (1 credit required; satisfies Information Literacy for core)
- EDCI 28500 - Multiculturalism And Education ♦ (2 credits required; satisfies Behavioral & Social Sciences for core)
- EDCI 30900 - Reading In Middle And Secondary Schools: Methods And Problems (1 credit required)
- EDCI 35000 - Community Issues & Applications For Educators (1 credit required)
- EDCI 37001 - Teaching And Learning English As A New Language (2 credits required)
- EDCI 42100 - The Teaching Of Biology In Secondary Schools
- EDCI 49800 - Supervised Teaching (12 credits required)
- EDPS 20001 - Special Populations Seminar: Focus On Students With Disabilities And Differentiation Approaches
- EDPS 23500 - Learning And Motivation (2 credits required)
- EDPS 24000 - Children With Gifts, Creativity, And Talents
- EDPS 24800 - Differentiating Curriculum And Instruction
- EDPS 26501 - The Inclusive Classroom
- EDPS 32700 - Classroom Assessment (1 credit required)
- EDPS 36201 - Positive Behavioral Supports (2 credits required)
- EDPS 43010 - Secondary Creating And Managing Learning Environments (2 credits required)
- EDST 20010 - Educational Policies And Laws (1 credit required)
- EDCI 42800 - Teaching Science In The Middle And Junior High School or
- EDCI 55800 - Integrated Science, Technology, Engineering And Mathematics (STEM) Education Methods-Secondary

## Learner Pathway Selective

*Choose one course from one of the learner pathway areas below. Students can elect to take additional coursework to complete a full concentration if they choose, but is not required. See the links for concentration requirements.*

*If you desire additional information regarding the Learner Pathway Concentrations, please reach out to your academic advisor or visit the Learner Specialty Concentrations tab found here.*

### **English Language Learners**

- EDCI 51900 - Teaching English Language Learners
- EDCI 52600 - Language Study For Educators

**High Ability** - All courses must be completed with a B- or better average.

- EDPS 54200 - Curriculum And Program Development In Gifted Education
- EDPS 54500 - Social And Affective Development Of Gifted Students

### **Special Education**

- EDPS 21100 - Special Education Law, Policy, And Ethical Guidelines

### **Applied Behavior Analysis**

- EDPS 34100 - Introduction To Philosophical Underpinnings And Concepts Of Applied Behavior Analysis
- EDPS 34200 - Applied Behavior Analysis - Assessment And Intervention

## Optional Concentration

## Other Departmental /Program Course Requirements (9-21 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

#### Composition & Presentation

##### Written Communication

Met with EDCI 20500. (satisfies Written Communication and Information Literacy for core)

##### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found [here](#). (satisfies OC for core)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

\*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.

International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

#### Computing

*Met with required major coursework (CS 15900, CS 17600, CS 17700, or CS 18000).*

##### Cultural Diversity (Language & Culture)^\* (0-6 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I - Met with EDCI 28500
- Language & Culture Option II
- Language & Culture Option III

##### General Education^ (6 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I - met with EDPS 23500
- General Education Option II

- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

### Laboratory Science

*Met with required major coursework (BIOL 12100/13100).*

### Mathematics

*Met with required major coursework (MA 16100/16200; MA 16500/16600); MA 16010/16020).*

### Science, Technology and Society

*Met with BIOL 12100 in major. (satisfies STS for core)*

### Statistics

*Met with required major coursework (STAT 30100, 35000, or 50300).*

### Team-Building and Collaboration

*Met with EDCI 49800 in major.*

## Electives (0-10 credits)

## Grade Requirements

- *All Professional Education courses, including Learner (Specialty) Pathway Concentration courses, must have no grade lower than a "C-."*

## GPA Requirements

- 2.0 average in BIOL courses required to graduate.
- 2.5 average in Biology concentration courses required to graduate.
- 2.0 Graduation GPA is required for the Bachelor of Science degree.
- 2.5 Overall GPA is required for the Teacher Education Program and Indiana Licensure.
- 2.5 Content GPA, as calculated by the Office of Teacher Education and Licensure, is required for the Teacher Education Program and Indiana Licensure.
- 3.0 Professional GPA is required for the Teacher Education Program and Indiana Licensure.

## Course Requirements and Notes

- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Additional Information

- *This degree is intended to give students many options. Students need to consult with a College of Science Academic Advisor regarding requirements.*
- Indiana Licensure information.

## Sample 4-Year Plan

### Fall 1st Year

- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior ♦
- CHM 12901 - General Chemistry With A Biological Focus ♦
- EDCI 20500 - Exploring Teaching As A Career ♦
- EDST 20010 - Educational Policies And Laws
- BIOL 13500 - First Year Biology Laboratory or
- BIOL 19500 - Special Assignments (*2 credits required*)
- MA 16010 - Applied Calculus I or
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Elective - Credit Hours: 1.00 (*BIOL 11500 recommended*)

### 16-18 Credits

### Spring 1st Year

- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms ♦
- CHM 25500 - Organic Chemistry For The Life Sciences I ♦
- CHM 25501 - Organic Chemistry For The Life Sciences Laboratory I
- EDCI 28500 - Multiculturalism And Education ♦
- EDCI 35000 - Community Issues & Applications For Educators
- MA 16020 - Applied Calculus II or
- MA 16200 - Plane Analytic Geometry And Calculus II or

- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection Language & Culture - Credit Hours: 3.00

## 16-18 Credits

### Fall 2nd Year

- BIOL 23100 - Biology III: Cell Structure And Function ♦
- BIOL 23200 - Laboratory In Biology III: Cell Structure And Function ♦
- EDCI 20002 - Special Populations Seminar: English Language Learners And Students With Gifts And Talents
- EDCI 37001 - Teaching And Learning English As A New Language
- EDPS 24800 - Differentiating Curriculum And Instruction
- EDPS 36201 - Positive Behavioral Supports
- CHM 25600 - Organic Chemistry For The Life Sciences II ♦
- CHM 25601 - Organic Chemistry For The Life Sciences Laboratory II
- Science Core Selection General Education - Credit Hours: 3.00

## 15 Credits

### Spring 2nd Year

- BIOL 24100 - Biology IV: Genetics And Molecular Biology ♦
- BIOL 24200 - Laboratory In Biology IV: Genetics And Molecular Biology ♦
- BIOL 28600 - Introduction To Ecology And Evolution
- EDPS 20001 - Special Populations Seminar: Focus On Students With Disabilities And Differentiation Approaches
- EDPS 23500 - Learning And Motivation
- EDPS 24000 - Children With Gifts, Creativity, And Talents
- EDPS 26501 - The Inclusive Classroom
- Science Core Selection Language & Culture - Credit Hours: 3.00

## 16 Credits

### Fall 3rd Year

- EDCI 27000 - Introduction To Educational Technology And Computing
- EDCI 30900 - Reading In Middle And Secondary Schools: Methods And Problems
- PHYS 17200 - Modern Mechanics or
- PHYS 23300 - Physics For Life Sciences I
- Intermediate Biology Selective - Credit Hours: 3.00 - 4.00
- Group A Selective - Credit Hours: 2.00 - 3.00
- Science Core Selection General Education - Credit Hours: 3.00
- Learner Pathway Selective - Credit Hours: 3.00

## 17-18 Credits



## Spring 3rd Year

- CS 17700 - Programming With Multimedia Objects ♦
- EDCI 42800 - Teaching Science In The Middle And Junior High School or
- EDCI 55800 - Integrated Science, Technology, Engineering And Mathematics (STEM) Education Methods-Secondary
- PHYS 23400 - Physics For Life Sciences II or
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory
- Group B Selective - Credit Hours: 2.00
- Science Core Selection TW/TP - Credit Hours: 3.00
- Elective (BIOL 39300 recommended) - Credit Hours: 1.00

## 15-17 Credits

## Fall 4th Year

- STAT 50300 - Statistical Methods For Biology
- EDCI 42100 - The Teaching Of Biology In Secondary Schools
- EDPS 32700 - Classroom Assessment
- EDPS 43010 - Secondary Creating And Managing Learning Environments
- Base Lab Requirement - Credit Hours: 2.00 - 4.00
- 50000 Level Biology Selective - Credit Hours: 3.00 - 4.00
- Science Core Selection Great Issues In Science - Credit Hours: 3.00

## 17-19 Credits

## Spring 4th Year

- EDCI 49800 - Supervised Teaching

## 12 Credits

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Science Education - Chemistry Concentration, BS

### About the Science Education Program

A College of Science degree in Science Education prepares future science teachers for certification at the middle and high school level. Students customize their focus by selecting a major area of study in biology, chemistry, physics, or earth and space science within an interdisciplinary science framework. The Science Education degree ensures students are thoroughly educated in their content discipline and modern theories of learning and education. Graduates are in high demand as STEM education and careers continue to grow in demand.

This program meets state and national licensure standards and is accredited by the Council for the Accreditation of Educator Preparation (CAEP) and the State of Indiana, State Board of Education. Admission to and successful completion of the Teacher Education Program (TEP) are required.

Science Education Major Change (CODO) Requirements

### Degree Requirements

## 124 Credits Required

### Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## **Departmental/Program Major Courses**

### **Required Science Education Core Courses (24-30 credits)**

Overall GPA for Chemistry Concentration courses with the Departmental/Program Major Courses must be  $\geq 2.50$ . This includes all courses under the Science Education Core plus all courses in the Chemistry Concentration unless otherwise indicated.

### **Required Chemistry Course (4-5 credits)**

*Biology students must take CHM 12901; Chemistry, Earth/Space, and Physics students choose CHM 11500 or CHM 12500. (satisfies Science for University Core)*

- CHM 11500 - General Chemistry or
- CHM 12500 - Introduction To Chemistry I or
- CHM 12901 - General Chemistry With A Biological Focus

## Required Computing Option (3-4 credits)

*Choose one. NOT included in the CONTENT GPA.*

- CS 15900 - C Programming
- CS 17600 - Data Engineering In Python
- CS 17700 - Programming With Multimedia Objects
- CS 18000 - Problem Solving And Object-Oriented Programming

## Required Calculus Selective Courses (6-10 credits)

*Choose one sequence available for your concentration. (satisfies Quantitative Reasoning for University Core)*

### Option 1 (all concentrations)

- MA 16100 - Plane Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II

### Option 2 (all concentrations)

- MA 16500 - Analytic Geometry And Calculus I
- MA 16600 - Analytic Geometry And Calculus II

### Option 3 (Biology only)

- MA 16010 - Applied Calculus I
- MA 16020 - Applied Calculus II

## Required Physics Selective Courses (8 credits)

*Choose one sequence available for your concentration. (satisfies Science for core)*

- PHYS 17200 - Modern Mechanics
- PHYS 27200 - Electric And Magnetic Interactions
- OR
- PHYS 24100 - Electricity And Optics and
- PHYS 25200 - Electricity And Optics Laboratory

### Option 1 (Biology, Chemistry, Earth/Space)

- PHYS 17200 - Modern Mechanics
- PHYS 27200 - Electric And Magnetic Interactions

### Option 2 (Physics only)

- PHYS 17200 - Modern Mechanics - HONORS version required
- PHYS 27200 - Electric And Magnetic Interactions - HONORS version required

### Option 3 (Biology, Chemistry, Earth/Space)

- PHYS 17200 - Modern Mechanics
- PHYS 24100 - Electricity And Optics
- PHYS 25200 - Electricity And Optics Laboratory

### Option 4 (Earth/Space only)

- PHYS 22000 - General Physics
- PHYS 22100 - General Physics

### Option 5 (Biology only)

- PHYS 23300 - Physics For Life Sciences I
- PHYS 23400 - Physics For Life Sciences II

### Required Statistics Course (3 credits)

*Choose one available for your concentration. NOT included in the CONTENT GPA.*

- STAT 30100 - Elementary Statistical Methods (CHEM, ESSE, PHYS; satisfies Information Literacy for Core) or
- STAT 35000 - Introduction To Statistics (CHEM) or
- STAT 50300 - Statistical Methods For Biology (BIOL)

### Chemistry Concentration (38-42 credits)

Overall GPA for Chemistry Concentration courses with the Departmental/Program Major Courses must be  $\geq 2.50$  (CONTENT GPA). This includes all courses under the Science Education Core plus all courses in the Chemistry Concentration unless otherwise indicated.

- CHM 24100 - Introductory Inorganic Chemistry
- CHM 29400 - Sophomore Chemistry Seminar
- CHM 34200 - Inorganic Chemistry
- CHM 37300 - Physical Chemistry I
- CHM 37301 - Physical Chemistry Laboratory I
- CHM 37400 - Physical Chemistry II
- CHM 37401 - Physical Chemistry Laboratory II
- CHM 11600 - General Chemistry (satisfies Science for core) or
- CHM 12600 - Introduction To Chemistry II (satisfies Science for core) or
- CHM 12901 - General Chemistry With A Biological Focus (satisfies Science for core) or
- CHM 13600 - General Chemistry Honors (satisfies Science for core)
- CHM 26100 - Organic Chemistry I or
- CHM 26505 - Organic Chemistry I
- CHM 26300 - Organic Chemistry Laboratory I or
- CHM 26500 - Organic Chemistry Laboratory I or
- CHM 26700 - Organic Chemistry Laboratory I Honors
- CHM 26200 - Organic Chemistry II or

- CHM 26600 - Organic Chemistry Laboratory II or
- CHM 26605 - Organic Chemistry II
- CHM 26400 - Organic Chemistry Laboratory II or
- CHM 26800 - Organic Chemistry Laboratory II Honors
- CHM 32100 - Analytical Chemistry I or
- CHM 32300 - Analytical Chemistry I Honors
- CHM 33900 - Biochemistry: A Molecular Approach or
- CHM 43300 - Biochemistry or
- BCHM 30700 - Biochemistry  
or
- BCHM 56100 - General Biochemistry I
- MA 26100 - Multivariate Calculus (satisfies Quantitative Reasoning for core) or
- MA 27101 - Honors Multivariate Calculus (satisfies Quantitative Reasoning for core)

## Professional Education Requirements (43-44 credits)

*All Professional Education courses, including Learner (Specialty) Pathway Concentration courses, are calculated into the Professional Education GPA ("B" average with no grade lower than a "C").*

- EDCI 20002 - Special Populations Seminar: English Language Learners And Students With Gifts And Talents
- EDCI 20500 - Exploring Teaching As A Career ♦ (2 credits required; satisfies Written Communication for core)
- EDCI 27000 - Introduction To Educational Technology And Computing (1 credit required; satisfies Information Literacy for University Core)
- EDCI 28500 - Multiculturalism And Education ♦ (2 credits required; satisfies Behavioral & Social Sciences for University Core)
- EDCI 30900 - Reading In Middle And Secondary Schools: Methods And Problems (1 credit required)
- EDCI 35000 - Community Issues & Applications For Educators (1 credit required)
- EDCI 37001 - Teaching And Learning English As A New Language (2 credits required)
- EDCI 42400 - The Teaching Of Earth And Physical Science In The Secondary Schools
- EDCI 49800 - Supervised Teaching
- EDPS 20001 - Special Populations Seminar: Focus On Students With Disabilities And Differentiation Approaches
- EDPS 23500 - Learning And Motivation (2 credits required; satisfies Behavioral & Social Sciences for University Core)
- EDPS 24000 - Children With Gifts, Creativity, And Talents
- EDPS 24800 - Differentiating Curriculum And Instruction
- EDPS 26501 - The Inclusive Classroom
- EDPS 32700 - Classroom Assessment (1 credit required)
- EDPS 36201 - Positive Behavioral Supports (2 credits required)
- EDPS 43010 - Secondary Creating And Managing Learning Environments (2 credits required)
- EDST 20010 - Educational Policies And Laws (1 credit required)
- EDCI 42800 - Teaching Science In The Middle And Junior High School or
- EDCI 55800 - Integrated Science, Technology, Engineering And Mathematics (STEM) Education Methods-Secondary

## Learner Pathway Selective (3 credits)

Choose one.

**English Language Learners**

- EDCI 51900 - Teaching English Language Learners
- EDCI 52600 - Language Study For Educators

**High Ability** - All courses must be completed with a B- or better average.

- EDPS 54200 - Curriculum And Program Development In Gifted Education
- EDPS 54500 - Social And Affective Development Of Gifted Students

**Special Education**

- EDPS 21100 - Special Education Law, Policy, And Ethical Guidelines

**Applied Behavior Analysis**

- EDPS 34100 - Introduction To Philosophical Underpinnings And Concepts Of Applied Behavior Analysis
- EDPS 34200 - Applied Behavior Analysis - Assessment And Intervention

## Optional Concentration

K-12 Integrated STEM Optional Concentration for Education

## Other Departmental /Program Course Requirements (13-25 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

#### Written Communication

Met with EDCI 20500 (satisfies Written Communication and Information Literacy for core)

#### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

\*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.

International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

### Computing

*Met with required major coursework (CS 15900, 17600, 17700, 18000).*

## Cultural Diversity (Language & Culture)^\* (0-6 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I - Met with EDCI 28500
- Language & Culture Option II
- Language & Culture Option III

## General Education^ (6 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I - met with EDPS 23500
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science

*Met with required major coursework (CHM 11500/11600; CHM 12500/12600).*

## Mathematics

*Met with required major coursework (MA 16100/16200; MA 16500/16600).*

## Science Technology and Society (3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics

*Met with required major coursework.*

## Team-Building and Collaboration

*Met with EDCI 49800 in major.*

## Required Pre-Requisite Course (1 Credit)

- CHM 19400 - Freshman Chemistry Orientation



## Electives (0-6 credits)

## Grade Requirements

- *All Professional Education courses, including Learner (Specialty) Pathway Concentration courses, must be completed with no grade lower than a "C."*

## GPA Requirements

- 2.0 average in CHM courses required to graduate.
- 2.5 average or above in Chemistry Content courses required to graduate
- 2.0 Graduation GPA required for the Bachelor of Science degree.
- 2.5 Overall GPA is required for the Teacher Education Program and Indiana Licensure.
- 2.5 Content GPA, as calculated by the Office of Teacher Education and Licensure, is required for the Teacher Education Program and Indiana Licensure.
- 3.0 Professional GPA is required for the Teacher Education Program and Indiana Licensure.
- Overall GPA for Chemistry Concentration courses with the Departmental/Program Major Courses must be  $\geq 2.50$ . This includes all courses under the Science Education Core plus all courses in the Chemistry Concentration unless otherwise indicated.

## Course Requirements and Notes

- No Count Courses are not allowed for credit
- Overlapping Course Content courses - only one course can be used for courses considered to have overlapping content.
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

### Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

### Additional Information

- This degree is intended to give students many options. Students need to consult with a College of Science Academic Advisor regarding requirements.
- Indiana Licensure information.

## Sample 4-Year Plan

### Fall 1st Year

- CHM 19400 - Freshman Chemistry Orientation
- EDCI 20500 - Exploring Teaching As A Career ♦
- EDST 20010 - Educational Policies And Laws
- CHM 11500 - General Chemistry or
- CHM 12500 - Introduction To Chemistry I
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection General Education - Credit Hours: 3.00

### 15-17 Credits

### Spring 1st Year

- EDCI 28500 - Multiculturalism And Education ♦
- EDCI 35000 - Community Issues & Applications For Educators
- PHYS 17200 - Modern Mechanics
- CHM 11600 - General Chemistry or
- CHM 12600 - Introduction To Chemistry II or
- CHM 12901 - General Chemistry With A Biological Focus or
- CHM 13600 - General Chemistry Honors
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00

### 18-20 Credits

### Fall 2nd Year

- CHM 29400 - Sophomore Chemistry Seminar
- EDCI 37001 - Teaching And Learning English As A New Language
- EDPS 24800 - Differentiating Curriculum And Instruction
- EDPS 36201 - Positive Behavioral Supports
- CHM 26505 - Organic Chemistry I or
- CHM 26100 - Organic Chemistry I
- CHM 26300 - Organic Chemistry Laboratory I or
- CHM 26500 - Organic Chemistry Laboratory I or
- CHM 26700 - Organic Chemistry Laboratory I Honors
- EDCI 20002 - Special Populations Seminar: English Language Learners And Students With Gifts And Talents
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus

## 15-17 Credits

### Spring 2nd Year

- CHM 24100 - Introductory Inorganic Chemistry
- EDPS 20001 - Special Populations Seminar: Focus On Students With Disabilities And Differentiation Approaches
- EDPS 23500 - Learning And Motivation
- EDPS 24000 - Children With Gifts, Creativity, And Talents
- EDPS 26501 - The Inclusive Classroom
- CHM 26605 - Organic Chemistry II or
- CHM 26200 - Organic Chemistry II
- CHM 26400 - Organic Chemistry Laboratory II or
- CHM 26600 - Organic Chemistry Laboratory II or
- CHM 26800 - Organic Chemistry Laboratory II Honors
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 Electricity And Optics Laboratory

## 18-19 Credits

### Fall 3rd Year

- CHM 37300 - Physical Chemistry I
- CHM 37301 - Physical Chemistry Laboratory I
- EDCI 27000 - Introduction To Educational Technology And Computing
- EDCI 30900 - Reading In Middle And Secondary Schools: Methods And Problems
- STAT 30100 - Elementary Statistical Methods or
- STAT 35000 - Introduction To Statistics
- Science Core Selection TWTP (COM 21700 strongly recommended) - Credit Hours: 3.00
- Science Core Selection Language & Culture - Credit Hours: 3.00

## 15 Credits

### Spring 3rd Year

- CHM 34200 - Inorganic Chemistry
- CHM 37400 - Physical Chemistry II
- CHM 37401 - Physical Chemistry Laboratory II
- CS 17700 - Programming With Multimedia Objects or
- CS 18000 - Problem Solving And Object-Oriented Programming
- EDCI 42800 - Teaching Science In The Middle And Junior High School or
- EDCI 55800 - Integrated Science, Technology, Engineering And Mathematics (STEM) Education Methods-Secondary
- Science Core Selection General Education - Credit Hours: 3.00

## 16-17 Credits

## Fall 4th Year

- EDCI 42400 - The Teaching Of Earth And Physical Science In The Secondary Schools
- EDPS 32700 - Classroom Assessment
- EDPS 43010 - Secondary Creating And Managing Learning Environments
- CHM 32100 - Analytical Chemistry I or
- CHM 32300 - Analytical Chemistry I Honors
- CHM 33900 - Biochemistry: A Molecular Approach or
- CHM 43300 - Biochemistry or
- BCHM 56100 - General Biochemistry I
- Science Core Selection Great Issues - Credit Hours: 3.00

## 16 Credits

## Spring 4th Year

- EDCI 49800 - Supervised Teaching

## 12 Credits

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## **Science Education - Earth Space Science Concentration, BS**

### About the Science Education Program

A College of Science degree in Science Education prepares future science teachers for certification at the middle and high school level. Students customize their focus by selecting a major area of study in biology, chemistry, physics, or earth and space science within an interdisciplinary science framework. The Science Education degree ensures students are thoroughly educated in their content discipline and modern theories of learning and education. Graduates are in high demand as STEM education and careers continue to grow in demand.

This program meets state and national licensure standards and is accredited by the Council for the Accreditation of Educator Preparation (CAEP) and the State of Indiana, State Board of Education. Admission to and successful completion of the Teacher Education Program (TEP) are required.

Science Education Major Change (CODO) Requirements

### Degree Requirements

## **124 Credits Required**

### Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

## College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### Earning Core Curricular Requirements through Experience

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## Departmental/Program Major Courses

### Required Science Education Core Courses (24-30 credits)

Overall GPA for Earth Space Concentration courses with the Departmental/Program Major Courses must be  $\geq 2.50$ . This includes all courses under the Science Education Core plus all courses in the Earth Space Concentration unless otherwise indicated.

### Required Chemistry Course (4-5 credits)

*Biology students must take CHM 12901; Chemistry, Earth/Space, and Physics students choose CHM 11500 or CHM 12500. (satisfies Science for core)*

- CHM 11500 - General Chemistry ♦ or
- CHM 12500 - Introduction To Chemistry I ♦ or
- CHM 12901 - General Chemistry With A Biological Focus ♦

### Required Computing Option (3-4 credits)

*Choose one available for your concentration. Meets College of Science Computing Requirement. NOT included in CONTENT GPA.*

- CS 15900 - C Programming
- CS 17600 - Data Engineering In Python

- CS 17700 - Programming With Multimedia Objects
- CS 18000 - Problem Solving And Object-Oriented Programming

## Required Calculus Selective Courses (6-10 credits)

*Choose one sequence available for your concentration. (satisfies Quantitative Reasoning for core). NOT included in CONTENT GPA.*

### Option 1 (all concentrations)

- MA 16100 - Plane Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II

### Option 2 (all concentrations)

- MA 16500 - Analytic Geometry And Calculus I
- MA 16600 - Analytic Geometry And Calculus II

### Option 3 (Biology only)

- MA 16010 - Applied Calculus I
- MA 16020 - Applied Calculus II

## Required Physics Selective Courses (8 credits)

*Choose one sequence available for your concentration. (satisfies Science for core)*

### Option 1 (Biology, Chemistry, Earth/Space)

- PHYS 17200 - Modern Mechanics
- PHYS 27200 - Electric And Magnetic Interactions

### Option 2 (Physics only)

- PHYS 17200 - Modern Mechanics - HONORS version required
- PHYS 27200 - Electric And Magnetic Interactions - HONORS version required

### Option 3 (Biology, Chemistry, Earth/Space)

- PHYS 17200 - Modern Mechanics
- PHYS 24100 - Electricity And Optics
- PHYS 25200 - Electricity And Optics Laboratory

### Option 4 (Earth/Space only)

- PHYS 22000 - General Physics



- PHYS 22100 - General Physics

### Option 5 (Biology only)

- PHYS 23300 - Physics For Life Sciences I
- PHYS 23400 - Physics For Life Sciences II

### Required Statistics Course (3 credits)

*Choose one available for your concentration.* Meets College of Science Statistics Requirement. NOT included in CONTENT GPA.

- STAT 30100 - Elementary Statistical Methods ♦ (CHEM, ESSE, PHYS; satisfies Information Literacy for core) or
- STAT 35000 - Introduction To Statistics ♦ (CHEM) or
- STAT 50300 - Statistical Methods For Biology ♦ (BIOL)

### Earth Space Science Concentration (32-33 credits)

Overall GPA for Earth Space Concentration courses with the Departmental/Program Major Courses must be  $\geq 2.50$ . This includes all courses under the Science Education Core plus all courses in the Earth Space Concentration unless otherwise indicated.

- EAPS 10500 - The Planets (satisfies Science for core)
- EAPS 11700 - Introduction To Atmospheric Science (satisfies Science for core)
- EAPS 20000 - Water World: Processes And Challenges In Global Hydrology (satisfies Science, Technology, Society for core)
- EAPS 24300 - Mineralogy ♦ (satisfies Science for core)
- EAPS 35300 - Earth And Planetary Surface Processes
- EAPS 35400 - Earth And Planetary Geophysics
- EAPS 39000 - Geologic Field Methods
- CHM 11600 - General Chemistry ♦ (satisfies Science for core) or
- CHM 12600 - Introduction To Chemistry II ♦ (satisfies Science for core) or
- CHM 12901 - General Chemistry With A Biological Focus ♦ or
- CHM 13600 - General Chemistry Honors ♦ (satisfies Science for core)
- EAPS 10900 - The Dynamic Earth (satisfies Science for core) or
- EAPS 11200 - Earth Through Time (satisfies Science for core)
- EAPS 11800 - Introduction To Earth Sciences ♦ or
- EAPS 11100 - Physical Geology (satisfies Science for University Core)

### Professional Education Requirements (43-44 credits)

*All Professional Education courses, including Learner (Specialty) Pathway Concentration courses, are calculated into the Professional Education GPA ("B" average with no grade lower than a "C").*

- EDCI 20002 - Special Populations Seminar: English Language Learners And Students With Gifts And Talents

- EDCI 20500 - Exploring Teaching As A Career ♦ (2 credits required; satisfies Written Communication for core)
- EDCI 27000 - Introduction To Educational Technology And Computing (1 credit required; satisfies Information Literacy for core)
- EDCI 28500 - Multiculturalism And Education ♦ (2 credits required; satisfies BSS for core)
- EDCI 30900 - Reading In Middle And Secondary Schools: Methods And Problems (1 credit required)
- EDCI 35000 - Community Issues & Applications For Educators (1 credit required)
- EDCI 37001 - Teaching And Learning English As A New Language (2 credits required)
- EDCI 42400 - The Teaching Of Earth And Physical Science In The Secondary Schools
- EDCI 49800 - Supervised Teaching (12 credits required)
- EDPS 20001 - Special Populations Seminar: Focus On Students With Disabilities And Differentiation Approaches
- EDPS 23500 - Learning And Motivation (2 credits required; satisfies BSS for core)
- EDPS 24000 - Children With Gifts, Creativity, And Talents
- EDPS 24800 - Differentiating Curriculum And Instruction
- EDPS 26501 - The Inclusive Classroom
- EDPS 32700 - Classroom Assessment (1 credit required)
- EDPS 36201 - Positive Behavioral Supports (2 credits required)
- EDPS 43010 - Secondary Creating And Managing Learning Environments (2 credits required)
- EDST 20010 - Educational Policies And Laws (1 credit required; satisfies BSS for core)
- EDCI 42800 - Teaching Science In The Middle And Junior High School or
- EDCI 55800 - Integrated Science, Technology, Engineering And Mathematics (STEM) Education Methods-Secondary

## Learner Pathway Selective (3 credits)

*Choose one course from one of the learner pathway areas below. Students can elect to take additional coursework to complete a full concentration if they choose, but is not required. See the links for concentration requirements.*

*If you desire additional information regarding the Learner Pathway Concentrations, please reach out to your academic advisor or visit the Learner Specialty Concentrations tab found here.*

### **English Language Learners**

- EDCI 51900 - Teaching English Language Learners
- EDCI 52600 - Language Study For Educators

**High Ability** - All courses must be completed with a B- or better average.

- EDPS 54200 - Curriculum And Program Development In Gifted Education
- EDPS 54500 - Social And Affective Development Of Gifted Students

### **Special Education**

- EDPS 21100 - Special Education Law, Policy, And Ethical Guidelines

### **Applied Behavior Analysis**

- EDPS 34100 - Introduction To Philosophical Underpinnings And Concepts Of Applied Behavior Analysis
- EDPS 34200 - Applied Behavior Analysis - Assessment And Intervention

## Optional Concentration

K-12 Integrated STEM Optional Concentration for Education

## Other Departmental/Program Course Requirements (9-21 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

#### Composition & Presentation

##### Written Communication

Met with EDCI 20500. (satisfies Written Communication and Information Literacy for core)

##### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

#### Computing

*Met with required major coursework (CS 15900, 17600, 17700, 18000).*

##### Cultural Diversity (Language & Culture)^\* (0-6 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I - Met with EDCI 28500
- Language & Culture Option II
- Language & Culture Option III

##### General Education^ (6 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I - met with EDPS 23500
- General Education Option II
- General Education Option III

##### Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science

*Met with required major coursework (CHM 11500/11600).*

## Mathematics

*Met with required major coursework (MA 16100/16200; 16500/16600).*

## Science Technology and Society

*Met with EAPS 20000 in major.*

## Statistics

*Met with required major coursework.*

## Team-Building and Collaboration

*Met with EDCI 49800 in major.*

## Electives (0-16 credits)

## Grade Requirements

- All Professional Education courses, including Learner (Specialty) Pathway Concentration courses, must be completed with no grade lower than a "C."

## GPA Requirements

- 2.0 Graduation GPA required for Bachelor of Science degree.
- 2.0 average in EAPS major classes required to graduate.
- Overall GPA for Earth Space Science Concentration courses with the Departmental/Program Major Courses must be  $\geq 2.5$
- 2.5 Overall GPA is required for the Teacher Education Program and Indiana Licensure.
- 2.5 Content GPA, as calculated by the Office to Teacher Education and Licensure, is required for the Teacher Education Program and Indiana Licensure.
- 3.0 Professional Education GPA is required for the Teacher Education Program and Indiana Licensure.
- Overall GPA for Earth Space Concentration courses with the Departmental/Program Major Courses must be  $\geq 2.50$ . This includes all courses under the Science Education Core plus all courses in the Earth Space Concentration unless otherwise indicated.

## Course Requirements and Notes

- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Additional Information

- *This degree is intended to give students many options. Students need to consult with a College of Science Academic Advisor regarding requirements.*
- Indiana Licensure Information

## Sample 4-Year Plan

### Fall 1st Year

- EDCI 20500 - Exploring Teaching As A Career ♦
- CHM 11500 - General Chemistry ♦ or
- CHM 12500 - Introduction To Chemistry I ♦
- EAPS 11800 - Introduction To Earth Sciences ♦ or
- EAPS 11100 - Physical Geology ♦
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00-4.00

### 16-19 Credits

### Spring 1st Year

- EDCI 28500 - Multiculturalism And Education ♦
- EDCI 35000 - Community Issues & Applications For Educators
- EDST 20010 - Educational Policies And Laws
- CHM 11600 - General Chemistry ♦ or
- CHM 12600 - Introduction To Chemistry II ♦ or
- CHM 12901 - General Chemistry With A Biological Focus ♦ or
- CHM 13600 - General Chemistry Honors ♦
- EAPS 10900 - The Dynamic Earth or
- EAPS 11200 - Earth Through Time

- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## 15-17 Credits

### Fall 2nd Year

- EAPS 24300 - Mineralogy ♦
- EDCI 20002 - Special Populations Seminar: English Language Learners And Students With Gifts And Talents
- EDCI 37001 - Teaching And Learning English As A New Language
- EDPS 24800 - Differentiating Curriculum And Instruction
- EDPS 36201 - Positive Behavioral Supports
- PHYS 17200 - Modern Mechanics or
- PHYS 22000 - General Physics
- Science Core Selection - Credit Hours: 3.00

## 17 Credits

### Spring 2nd Year

- EAPS 20000 - Water World: Processes And Challenges In Global Hydrology
- EAPS 35400 - Earth And Planetary Geophysics
- EDPS 20001 - Special Populations Seminar: Focus On Students With Disabilities And Differentiation Approaches
- EDPS 23500 - Learning And Motivation
- EDPS 24000 - Children With Gifts, Creativity, And Talents
- EDPS 26501 - The Inclusive Classroom
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 22100 - General Physics or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory

## 16 Credits

### Fall 3rd Year

- EAPS 10500 - The Planets
- EAPS 11700 - Introduction To Atmospheric Science
- EAPS 35300 - Earth And Planetary Surface Processes
- EDCI 27000 - Introduction To Educational Technology And Computing
- EDCI 30900 - Reading In Middle And Secondary Schools: Methods And Problems
- Science Core Selection - Credit Hours: 3.00
- Elective (if needed) - Credit Hours: 3.00

## 14-17 Credits

## Spring 3rd Year

- COM 21700 - Science Writing And Presentation
- EAPS 39000 - Geologic Field Methods
- EDCI 42800 - Teaching Science In The Middle And Junior High School or
- EDCI 55800 - Integrated Science, Technology, Engineering And Mathematics (STEM) Education Methods-Secondary
- Learner Pathway Selective - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Elective (if needed) - Credit Hours: 3.00

## 14-18 Credits

## Fall 4th Year

- EDCI 42400 - The Teaching Of Earth And Physical Science In The Secondary Schools
- EDPS 32700 - Classroom Assessment
- EDPS 43010 - Secondary Creating And Managing Learning Environments
- STAT 30100 - Elementary Statistical Methods
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦
- Great Issues Option - Credit Hours: 3.00

## 16 Credits

## Spring 4th Year

- EDCI 49800 - Supervised Teaching

## 12 Credits

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.



In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Science Education - Physics Concentration, BS

### About the Science Education Program

A College of Science degree in Science Education prepares future science teachers for certification at the middle and high school level. Students customize their focus by selecting a major area of study in biology, chemistry, physics, or earth and space science within an interdisciplinary science framework. The Science Education degree ensures students are thoroughly educated in their content discipline and modern theories of learning and education. Graduates are in high demand as STEM education and careers continue to grow in demand.

This program meets state and national licensure standards and is accredited by the Council for the Accreditation of Educator Preparation (CAEP) and the State of Indiana, State Board of Education. Admission to and successful completion of the Teacher Education Program (TEP) are required.

Science Education Major Change (CODO) Requirements

### Degree Requirements

## 124 Credits Required

### Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## **Departmental/Program Major Courses**

### **Required Science Education Core Courses (24-30 credits)**

#### **Required Chemistry Course (4-5 credits)**

*Biology students must take CHM 12901; Chemistry, Earth/Space, and Physics students choose CHM 11500 or CHM 12500. (satisfies Science for core)*

- CHM 11500 - General Chemistry ♦ or
- CHM 12500 - Introduction To Chemistry I ♦ or
- CHM 12901 - General Chemistry With A Biological Focus ♦

#### **Required Computing Option (3-4 credits)**

*Choose one.*

- CS 15900 - C Programming
- CS 17600 - Data Engineering In Python
- CS 17700 - Programming With Multimedia Objects
- CS 18000 - Problem Solving And Object-Oriented Programming

## Required Calculus Selective Courses (6-10 credits)

*Choose one sequence available for your concentration. (satisfies Quantitative Reasoning for core)*

### Option 1 (all concentrations)

- MA 16100 - Plane Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II

### Option 2 (all concentrations)

- MA 16500 - Analytic Geometry And Calculus I
- MA 16600 - Analytic Geometry And Calculus II

### Option 3 (Biology only)

- MA 16010 - Applied Calculus I
- MA 16020 - Applied Calculus II

## Required Physics Courses (8 credits)

*Choose one sequence available for your concentration. (satisfies Science for core)*

### Option 1 (Biology, Chemistry, Earth/Space)

- PHYS 17200 - Modern Mechanics
- PHYS 27200 - Electric And Magnetic Interactions

### Option 2 (Physics only)

- PHYS 17200 - Modern Mechanics - HONORS version required
- PHYS 27200 - Electric And Magnetic Interactions - HONORS version required

### Option 3 (Biology, Chemistry, Earth/Space)

- PHYS 17200 - Modern Mechanics
- PHYS 24100 - Electricity And Optics
- PHYS 25200 - Electricity And Optics Laboratory

### Option 4 (Earth/Space only)

- PHYS 22000 - General Physics
- PHYS 22100 - General Physics

### Option 5 (Biology only)

- PHYS 23300 - Physics For Life Sciences I
- PHYS 23400 - Physics For Life Sciences II

### Required Statistics Selective Courses (3 credits)

- STAT 30100 - Elementary Statistical Methods (CHEM, ESSE, PHYS; satisfies Information Literacy for core) or
- STAT 35000 - Introduction To Statistics (CHEM) or
- STAT 50300 - Statistical Methods For Biology (BIOL)

### Professional Education Requirements (43-44 credits)

*All Professional Education courses, including Learner (Specialty) Pathway Concentration courses, are calculated into the Professional Education GPA ("B" average with no grade lower than a "C").*

- EDCI 20002 - Special Populations Seminar: English Language Learners And Students With Gifts And Talents
- EDCI 20500 - Exploring Teaching As A Career ♦ (2 credits required; satisfies Written Communication for core)
- EDCI 27000 - Introduction To Educational Technology And Computing (1 credit required; satisfies Information Literacy for core)
- EDCI 28500 - Multiculturalism And Education ♦ (2 credits required; satisfies Behavioral/Social Science for core)
- EDCI 30900 - Reading In Middle And Secondary Schools: Methods And Problems (1 credit required)
- EDCI 35000 - Community Issues & Applications For Educators (1 credit required)
- EDCI 37001 - Teaching And Learning English As A New Language (2 credits required)
- EDCI 42400 - The Teaching Of Earth And Physical Science In The Secondary Schools
- EDCI 49800 - Supervised Teaching (12 credits required)
- EDPS 20001 - Special Populations Seminar: Focus On Students With Disabilities And Differentiation Approaches
- EDPS 23500 - Learning And Motivation (2 credits required; satisfies Behavioral/Social Science for core)
- EDPS 24000 - Children With Gifts, Creativity, And Talents
- EDPS 24800 - Differentiating Curriculum And Instruction
- EDPS 26501 - The Inclusive Classroom
- EDPS 32700 - Classroom Assessment (1 credit required)
- EDPS 36201 - Positive Behavioral Supports (2 credits required)
- EDPS 43010 - Secondary Creating And Managing Learning Environments (2 credits required)
- EDST 20010 - Educational Policies And Laws (1 credit required)
- EDCI 42800 - Teaching Science In The Middle And Junior High School or
- EDCI 55800 - Integrated Science, Technology, Engineering And Mathematics (STEM) Education Methods-Secondary

### Learner Pathway Selective (3 credits)

Choose one course from one of the learner pathway areas below. Students can elect to take additional coursework to complete a full concentration if they choose, but is not required. See the links for concentration requirements.

If you desire additional information regarding the Learner Pathway Concentrations, please reach out to your academic advisor or visit the Learner Specialty Concentrations tab found here.

#### **English Language Learners**

- EDCI 51900 - Teaching English Language Learners
- EDCI 52600 - Language Study For Educators
- **High Ability** - All courses must be completed with a B- or better average.
- EDPS 54200 - Curriculum And Program Development In Gifted Education
- EDPS 54500 - Social And Affective Development Of Gifted Students

#### **Special Education**

- EDPS 21100 - Special Education Law, Policy, And Ethical Guidelines

#### **Applied Behavior Analysis**

- EDPS 34100 - Introduction To Philosophical Underpinnings And Concepts Of Applied Behavior Analysis
- EDPS 34200 - Applied Behavior Analysis - Assessment And Intervention

## Physics Concentration (36-38 credits)

Overall GPA for Physics Concentration courses with the Departmental/Program Major Courses must be  $\geq 2.5$

Required courses for the Physics Concentration that are met within Department/Program requirements, but included in the content GPA for this concentration:

- CHM 11500/12500/12300
- PHYS 17200/17200H (note: Majors in Physics must take the Honors Versions)
- PHYS 27200/27200H (note: Majors in Physics must take the Honors Versions)
- PHYS 30600 - Mathematical Methods Of Physics I
- PHYS 30700 - Mathematical Methods Of Physics II
- PHYS 31000 - Intermediate Mechanics
- PHYS 33000 - Intermediate Electricity And Magnetism
- PHYS 34000 - Modern Physics Laboratory
- PHYS 34400 - Introduction To Quantum Science
- PHYS 36000 - Quantum Mechanics
- PHYS 42200 - Waves And Oscillations
- PHYS 45000 - Intermediate Laboratory
- CHM 11600 - General Chemistry ♦ (satisfies Science for core) or
- CHM 12600 - Introduction To Chemistry II ♦ (satisfies Science for core) or
- CHM 13600 - General Chemistry Honors ♦

## PHYS Major Selectives (6-7 credits)

- PHYS 53600 - Electronic Techniques For Research or
- PHYS 58000 - Computational Physics
- PHYS/ASTR  $\geq 300$  level - Credit Hours: 3.00
- Science/Engineering  $\geq 300$  level (met with STAT 30100)
- Science/Engineering  $\geq 300$  level (met with Great Issues Option)

## Optional Concentration

K-12 Integrated STEM Optional Concentration for Education

## Other Departmental /Program Course Requirements (13-26 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

#### Written Communication

Met with EDCI 20500 (satisfies Written Communication and Information Literacy for core).

#### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

### Computing

*Met with required major coursework.*

#### Cultural Diversity (Language & Culture)^\* (0-6 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I - Met with EDCI 28500
- Language & Culture Option II
- Language & Culture Option III

#### General Education^ (6 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I - met with EDPS 23500

- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

### Laboratory Science

*Met with required major coursework.*

### Mathematics

*Met with required major coursework.*

### Science Technology & Society

*Met with EDCI 42400 in major.*

### Statistics

*Met with required major coursework.*

### Team-Building and Collaboration

*Met with EDCI 49800 in major.*

## Required Pre-Requisite Course (4-5 Credits)

- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus

## Electives (0-8 credits)

## Grade Requirements

*All Professional Education courses, including Learner (Specialty) Pathway Concentration courses, must be completed with no grade lower than a "C".*

## GPA Requirements

- Overall GPA for Physics Concentration courses with the Departmental/Program Major Courses must be  $\geq 2.5$ 
  - Required courses for the Physics Concentration that are met within Department/Program requirements, but included in the content GPA for this concentration:
    - CHM 11500/12500/12300
    - PHYS 17200/17200H (note: Majors in Physics must take the Honors Versions)

- PHYS 27200/27200H (note: Majors in Physics must take the Honors Versions)
- 2.5 average in Physics concentration courses required to graduate
- 2.0 Graduation GPA for a Bachelor of Science degree.
- 2.5 Overall GPA is required for the Teacher Education Program and Indiana Licensure.
- 2.50 Content GPA, as calculated by the Office of Teacher Education and Licensure, is required for the Teacher Education Program and Indiana Licensure.
- 3.0 Professional Education GPA is required for the Teacher Education Program and Indiana Licensure.

## Course Requirements and Notes

- No Count Courses are not allowed for credit
- Overlapping Course Content courses - only one course can be used for courses considered to have overlapping content

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)



- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Additional Information

- This degree is intended to give students many options. Students need to consult with a College of Science Academic Advisor regarding requirements.
- Indiana Licensure Information

## Sample 4-Year Plan

### Fall 1st Year

- EDCI 20500 - Exploring Teaching As A Career ♦
- PHYS 17200 - Modern Mechanics ♦ (HONORS)
- CHM 11500 - General Chemistry ♦ or
- CHM 12500 - Introduction To Chemistry I ♦
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection Language & Culture - Credit Hours: 3.00

### 17-19 Credits

### Spring 1st Year

- EDCI 28500 - Multiculturalism And Education ♦
- EDCI 35000 - Community Issues & Applications For Educators
- EDST 20010 - Educational Policies And Laws
- PHYS 27200 - Electric And Magnetic Interactions ♦ (HONORS)
- CHM 11600 - General Chemistry ♦ or
- CHM 12600 - Introduction To Chemistry II ♦ or
- CHM 13600 - General Chemistry Honors ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## 16-18 Credits

### Fall 2nd Year

- EDCI 20002 - Special Populations Seminar: English Language Learners And Students With Gifts And Talents
- EDCI 37001 - Teaching And Learning English As A New Language
- EDPS 24800 - Differentiating Curriculum And Instruction
- EDPS 36201 - Positive Behavioral Supports
- PHYS 30600 - Mathematical Methods Of Physics I
- PHYS 34000 - Modern Physics Laboratory
- PHYS 34400 - Introduction To Quantum Science
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus

## 18-19 Credits

### Spring 2nd Year

- EDPS 20001 - Special Populations Seminar: Focus On Students With Disabilities And Differentiation Approaches
- EDPS 23500 - Learning And Motivation
- EDPS 24000 - Children With Gifts, Creativity, And Talents
- EDPS 26501 - The Inclusive Classroom
- PHYS 30700 - Mathematical Methods Of Physics II
- PHYS 42200 - Waves And Oscillations
- STAT 30100 - Elementary Statistical Methods
- Science Core Selection TWTP (COM 21700 strongly recommended) - Credit Hours: 3.00

## 15 Credits

### Fall 3rd Year

- EDCI 27000 - Introduction To Educational Technology And Computing
- EDCI 30900 - Reading In Middle And Secondary Schools: Methods And Problems
- PHYS 31000 - Intermediate Mechanics

- PHYS 33000 - Intermediate Electricity And Magnetism
- PHYS 45000 - Intermediate Laboratory
- Learner Pathway Selective - Credit Hours: 3.00
- Science Core Selection Language & Culture - Credit Hours: 3.00

## 17 Credits

### Spring 3rd Year

- PHYS 36000 - Quantum Mechanics
- CS 15900 - C Programming or
- CS 17600 - Data Engineering In Python or
- CS 17700 - Programming With Multimedia Objects or
- CS 18000 - Problem Solving And Object-Oriented Programming
- EDCI 42800 - Teaching Science In The Middle And Junior High School or
- EDCI 55800 - Integrated Science, Technology, Engineering And Mathematics (STEM) Education Methods-Secondary
- PHYS 53600 - Electronic Techniques For Research or
- PHYS 58000 - Computational Physics
- Science Core Selection General Education - Credit Hours: 3.00

## 15-17 Credits

### Fall 4th Year

- EDCI 42400 - The Teaching Of Earth And Physical Science In The Secondary Schools
- EDPS 32700 - Classroom Assessment
- EDPS 43010 - Secondary Creating And Managing Learning Environments
- PHYS/ASTR  $\geq$  300 level - Credit Hours: 3.00
- Science Core Selection Great Issues - Credit Hours: 3.00
- Science Core Selection General Education - Credit Hours: 3.00
- Elective - Credit Hours: 2.00

## 17 Credits

### Spring 4th Year

- EDCI 49800 - Supervised Teaching - Spring only

## 12 Credits

### World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-

Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Certificate

### Applications in Data Science Certificate

Data science involves the development or application of statistical, mathematical and algorithmic techniques or tools with an aim to extract knowledge from large-scale and/or complex datasets and communicate findings.

The Applications in Data Science Undergraduate Certificate program's learning outcomes will consist of the following:

1. Describe the stages of the data life cycle (data acquisition, organization, curation, analysis, preservation, and communication) and create an effective data management and data analysis plan
2. Develop a foundation in statistical, mathematical and algorithmic techniques or tools for the analysis of large-scale datasets
3. Apply statistical, mathematical and algorithmic techniques or tools in order to extract knowledge and insights from large-scale datasets
4. Interpret results from large-scale data analysis and communicate findings
5. Identify ethical and social implications of data-science-driven decision making and policies and one's own ethical and social responsibilities when working with data

### About the Certificate

Data science involves the development or application of statistical, mathematical and algorithmic techniques or tools with an aim to extract knowledge from large-scale and/or complex datasets and communicate findings.

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1. Describe the stages of the data life cycle (data acquisition, organization, curation, analysis, preservation, and communication) and create an effective data management and data analysis plan
2. Develop a foundation in statistical, mathematical and algorithmic techniques or tools for the analysis of large-scale datasets
3. Apply statistical, mathematical and algorithmic techniques or tools in order to extract knowledge and insights from large-scale datasets
4. Interpret results from large-scale data analysis and communicate findings
5. Identify ethical and social implications of data-science-driven decision making and policies and one's own ethical and social responsibilities when working with data

## Requirements for the Certificate (16 credits)

### Core Courses (10 credits)

#### Foundation in Statistical Methods (3 credits)

##### Education

- EDPS 55600 - Introduction To Quantitative Data Analysis Methods In Education I
- EDPS 55700 - Introduction To Quantitative Data Analysis Methods In Education II

##### Engineering

- AAE 36100 - Introduction To Random Variables In Engineering \*
- CHE 32000 - Statistical Modeling And Quality Enhancement
- ECE 20875 - Python For Data Science
- ECE 30200 - Probabilistic Methods In Electrical And Computer Engineering
- IDE 36000 - Multidisciplinary Engineering Statistics
- IE 33000 - Probability And Statistics In Engineering II

##### Health and Human Sciences

- PSY 20100 - Introduction To Statistics In Psychology

##### Liberal Arts

- ANTH 30600 - Quantitative Methods For Anthropological Research
- COM 30400 - Quantitative Methods For Communication Research
- COM 41100 - Communication And Social Networks
- POL 30000 - Introduction To Political Analysis
- POL 50100 - Political Science: Methodology
- SOC 40900 - Social Networks

##### Management

- ECON 26000 - Data Visualization And Inference
- ECON 36000 - Econometrics
- MGMT 30500 - Business Statistics
- MGMT 30600 - Management Science

##### Science

- BIOL 39500 - Special Assignments \*
- BIOL 49500 - Special Assignments \*
- BIOL 58210 - Ecological Statistics
- BIOL 59500 - Special Assignments \*

- EAPS 31000 - Introductory Statistics For Geosciences
- PHYS 49000 - Special Assignments \*
- STAT 22500 - Introduction To Probability Models
- STAT 30100 - Elementary Statistical Methods
- STAT 30301 - Probability And Statistics For Business
- STAT 35000 - Introduction To Statistics
- STAT 35500 - Statistics For Data Science
- STAT 49000 - Topics In Statistics For Undergraduates \*
- STAT 50100 - Experimental Statistics I
- STAT 50300 - Statistical Methods For Biology
- STAT 51100 - Statistical Methods

### Foundation in Computation (3 credits)

#### Agriculture

- ABE 20500 - Computations For Engineering Systems
- ABE 30100 - Numerical And Computational Modeling In Biological Engineering
- AGECE 20201 - Introduction To Data Analytics For Agricultural Business
- ASM 10500 - Computing Technology With Applications

#### Engineering

- ECE 26400 - Advanced C Programming
- ECE 36800 - Data Structures
- ECE 46900 - Operating Systems Engineering
- ECE 47300 - Introduction To Artificial Intelligence
- IE 33200 - Computing In Industrial Engineering

#### Management

- MGMT 28800 - Programming For Business Applications

#### Polytechnic

- CNIT 10500 - Introduction To C Programming
- CNIT 13600 - Personal Computing Technology And Applications
- CNIT 17600 - Information Technology Architectures

#### Science

- CS 10100 - Digital Literacy
- CS 15900 - C Programming
- CS 17600 - Data Engineering In Python
- CS 17700 - Programming With Multimedia Objects
- CS 18000 - Problem Solving And Object-Oriented Programming
- CS 19000 - Topics In Computer Sciences \*
- CS 23500 - Introduction To Organizational Computing
- MA 16290 - Data Science Labs: Calculus

### Foundation in Data Literacy, Management, and Analytics (3 credits)

#### Agriculture

- AGECE 20201 - Introduction To Data Analytics For Agricultural Business

- BCHM 42100 - R For Molecular Biosciences
- ENTM 24200 - Data Science
  - Data Mine (Requires three 1-credit seminars listed below to complete the requirement.)
- TDM 10100 - The Data Mine Seminar I (*formerly offered as STAT 19000 - Tpcs In Stat For UG \* The Data Mine I*)
- TDM 10200 - The Data Mine Seminar II (*formerly offered as STAT 19000 - Tpcs In Stat For UG \* The Data Mine II*)
- TDM 20100 - The Data Mine Seminar III (*formerly offered as STAT 29000 - Tpcs In Stat For UG \* The Data Mine III*)
- TDM 20200 - The Data Mine Seminar IV (*formerly offered as STAT 29000 - Tpcs In Stat For UG \* The Data Mine IV*)
- TDM 30100 - The Data Mine Seminar V (*formerly offered as STAT 39000 - Tpcs In Stat For UG \* The Data Mine V*)
- TDM 30200 - The Data Mine Seminar VI (*formerly offered as STAT 39000 - Tpcs In Stat For UG \* The Data Mine VI*)
- TDM 40100 - The Data Mine Seminar VII (*formerly offered as STAT 49000 - Tpcs In Stat For UG \* The Data Mine VII*)
- TDM 40200 - The Data Mine Seminar VIII (*formerly offered as STAT 49000 - Tpcs In Stat For UG \* The Data Mine VIII*)
- Engineering
  - ECE 20875 - Python For Data Science
  - ECE 29595 - Selected Topics In Electrical And Computer Engineering \*
  - ECE 30010 - Introduction To Machine Learning And Pattern Recognition
  - ECE 47300 - Introduction To Artificial Intelligence
- Honors
  - HONR 39500 - Interdisciplinary Honors - Independent Study \*
- Information Studies
  - ILS 29500 - Special Topics In Information And Data Science \*
  - ILS 59500 - Special Topics In Information And Data Science \*
- Management
  - ECON 26000 - Data Visualization And Inference
  - MGMT 38200 - Management Information Systems
  - MGMT 54400 - Database Management Systems
- Polytechnic
  - CNIT 17500 - Visual Programming
  - CNIT 48800 - Data Warehousing
  - CNIT 57000 - IT Data Analytics
- Science
  - BIOL 49500 - Special Assignments \*
  - BIOL 59500 - Special Assignments \*
  - CS 17600 - Data Engineering In Python
  - CS 19000 - Topics In Computer Sciences \*
  - CS 24200 - Introduction To Data Science
  - CS 25100 - Data Structures And Algorithms
  - MA 16290 - Data Science Labs: Calculus
  - PHYS 49000 - Special Assignments \*
  - STAT 24200 - Introduction To Data Science
  - STAT 47401 - Statistics For Risk Modeling
  - STAT 49000 - Topics In Statistics For Undergraduates \*

- STAT 51200 - Applied Regression Analysis
- STAT 51400 - Design Of Experiments

## Foundation in Data Ethics and Digital Citizenship (1-4 credits)

### Honors

- HONR 39900 - Interdisciplinary Honors - Special Topics Seminar \*
- HONR 49900 - Honors Research Project \*

### Information Studies

- ILS 10300 - Introduction To Data Lifecycle Management
- ILS 23000 - Data Science And Society: Ethical Legal Social Issues
- ILS 29500 - Special Topics In Information And Data Science \*

### Liberal Arts

- PHIL 20700 - Ethics For Technology, Engineering, And Design
- PHIL 20800 - Ethics Of Data Science
- PHIL 29000 - Environmental Ethics
- PHIL 29300 - Selected Topics In Philosophy \*
- POL 22800 - Data Science And Public Policy
- POL 22900 - Emerging Problems In Political Science \*

## Application Focus (6 credits)

### Agriculture

- ABE 49800 - Undergraduate Research In Agricultural And Biological Engineering \*
- AGECE 30500 - Agricultural Prices
- AGECE 32100 - Principles Of Commodity Marketing
- AGECE 35200 - Quantitative Techniques For Firm Decision Making
- AGECE 42100 - Advanced Commodity Marketing
- AGECE 45100 - Applied Econometrics
- AGECE 49800 - Special Problems \*
- AGECE 49900 - Thesis \*
- AGECE 50600 - Agricultural Marketing And Price Analysis
- AGECE 51600 - Mathematical Tools For Agricultural And Applied Economics
- AGECE 55200 - Introduction To Mathematical Programming
- AGR 33300 - Data Science For Agriculture
- AGRY 32000 - Genetics
- AGRY 39900 - Individual Study \*
- AGRY 44400 - Weather Analysis And Forecasting
- AGRY 48500 - Precision Crop Management
- AGRY 53000 - Advanced Plant Genetics
- AGRY 54500 - Remote Sensing Of Land Resources
- AGRY 56500 - Soils And Landscapes
- AGRY 59800 - Special Problems \*
- ANSC 31100 - Animal Breeding And Genetics
- ANSC 51100 - Population Genetics
- ASEC 49000 - Special Problems \*



- ASEC 49700 - Thesis Research \*
- ASEC 49900 - Special Problems In Agricultural Communication \*
- ASEC 59000 - Special Problems \*
- ASM 42200 - Advanced Machine Technology For Agricultural Crop Production
- ASM 49000 - Special Problems \*
- ASM 49500 - Agricultural Systems Management Capstone Project \*
- ASM 54000 - Geographic Information System Application
- BCHM 42200 - Computational Genomics
- BCHM 49800 - Research In Biochemistry \*
- BCHM 49801 - Head Start To Biochemistry Research \*
- BCHM 52100 - Comparative Genomics
- BTNY 30200 - Plant Ecology
- BTNY 49800 - Research In Plant Science \*
- BTNY 53500 - Plant Disease Epidemiology
- ENTM 30100 - Experimentation And Analysis
- ENTM 41000 - Applied Insect Biology
- ENTM 41001 - Insects Of Urban Landscapes
- ENTM 41002 - Insects Of Agricultural Crops
- ENTM 49310 - Insect Biology Capstone Experience \*
- ENTM 49700 - Special Problems In Forensic Science \*
- ENTM 49800 - Special Problems In Entomology \*
- FNR 21000 - Natural Resource Information Management
- FNR 34800 - Wildlife Investigational Techniques
- FNR 35100 - Aquatic Sampling Techniques
- FNR 35300 - Natural Resources Measurement
- FNR 35500 - Quantitative Methods For Resource Management
- FNR 35700 - Fundamental Remote Sensing
- FNR 35910 - Spatial Ecology
- FNR 35950 - Spatial Ecology Laboratory
- FNR 38400 - Statistics For Natural Resources
- FNR 49800 - Special Assignments \*
- FNR 55800 - Remote Sensing Analysis And Applications
- FS 44400 - Statistical Process Control
- FS 49100 - Special Assignments In Food Science \*
- HORT 49100 - Special Assignments In Horticulture \*
- HORT 53000 - Introduction To Computing For Biologists
- HORT 53100 - Applied Plant Genomics
- HORT 55100 - Plant Responses To The Environment
- LA 49000 - Special Problems In Landscape Architecture \*
- NRES 49800 - Individual Studies In Environmental Science \*
- SFS 39100 - Special Problems In Sustainable Food And Farming Systems \*

## Data Mine

*To fulfill the Application Focus, the courses listed in the Data Mine section must be taken as part of the Data Mine.*

- TDM 11100 - Corporate Partners I *(formerly offered as STAT 19000 - Tpcs In Stat For UG \* Data Mine Corporate Partners I)*

- TDM 11200 - Corporate Partners II (*formerly offered as STAT 19000 - Tpcs In Stat For UG \* Data Mine Corporate Partners II*)
- TDM 21100 - Corporate Partners III (*formerly offered as STAT 29000 - Tpcs In Stat For UG \* Data Mine Corporate Partners III*)
- TDM 21200 - Corporate Partners IV (*formerly offered as STAT 29000 - Tpcs In Stat For UG \* Data Mine Corporate Partners IV*)
- TDM 31100 - Corporate Partners V (*formerly offered as STAT 39000 - Tpcs In Stat For UG \* Data Mine Corporate Partners V*)
- TDM 31200 - Corporate Partners VI (*formerly offered as STAT 39000 - Tpcs In Stat For UG \* Data Mine Corporate Partners VI*)
- TDM 41100 - Corporate Partners VII (*formerly offered as STAT 49000 - Tpcs In Stat For UG \* Data Mine Corporate Partners VII*)
- TDM 41200 - Corporate Partners VIII (*formerly offered as STAT 49000 - Tpcs In Stat For UG \* Data Mine Corporate Partners VIII*)
- EAPS 19100 - Introductory Topics In Earth And Atmospheric Science \*
- MGMT 29000 - Problems In Management \*
- PHYS 39000 - Special Assignments \*

## Education

- EDCI 52800 - Human Performance Technology
- EDCI 55700 - Assessment Of Culturally And Linguistically Diverse Students
- EDCI 56400 - Integration And Management Of Technology For Learning
- EDCI 57700 - Strategic Assessment And Evaluation
- EDPS 32700 - Classroom Assessment
- EDPS 53100 - Introduction To Measurement And Instrument Design
- EDPS 53300 - Introduction To Educational Research I: Methodology
- EDPS 53400 - Introduction To Educational Research II: Measurement Consideration

## Engineering

- ABE 31400 - Design Of Electronic Systems
- ABE 45000 - Finite Element Method In Design And Optimization
- ABE 46000 - Sensors And Process Control
- ABE 52700 - Computer Models In Environmental And Natural Resources Engineering
- ABE 53100 - Instrumentation And Data Acquisition
- ABE 59100 - Special Topics \*
- BME 40100 - Mathematical & Computational Analysis Of Complex System Dynamics In Biology, Medicine, & Healthcare
- CE 40800 - Geographic Information Systems In Engineering
- CHE 45000 - Design And Analysis Of Processing Systems
- ECE 30834 - Fundamentals Of Computer Graphics
- ECE 43800 - Digital Signal Processing With Applications
- ECE 44000 - Transmission Of Information
- ECE 47300 - Introduction To Artificial Intelligence
- ECE 57700 - Engineering Aspects Of Remote Sensing
- EEE 25000 - Environmental, Ecological, and Engineering Systems
- EEE 30000 - Environmental And Ecological Systems Modeling

- IE 33500 - Operations Research - Optimization
- IE 33600 - Operations Research - Stochastic Models
- IE 59000 - Topics In Industrial Engineering \*
- ME 36500 - Measurement And Control Systems I
- ME 37500 - Measurement And Control Systems II
- NUCL 59700 - Selected Topics In Nuclear Engineering I \*
- VIP 37920 - Junior Participation In Vertically Integrated Projects (VIP) *(formerly offered as ENGR 37920 Junior Participation In Vertically Integrated Projects)\*\**
- VIP 47920 - Senior Participation In Vertically Integrated Projects (VIP) *(formerly offered as ENGR 47920 Senior Participation In Vertically Integrated Projects)\*\**
- VIP 47921 - Senior Design Participation In Vertically Integrated Projects (VIP) I *(formerly offered as ENGR 47921 Senior Design Participation I In Vertically Integrated Projects)\*\**
- VIP 47922 - Senior Design Participation In Vertically Integrated Projects (VIP) II *(formerly offered as ENGR 47922 Senior Design Participation II In Vertically Integrated Projects)\*\**

## Health and Human Sciences

- HTM 50200 - Management Information Systems For The Hospitality Industry
- PSY 30500 - Understanding And Analyzing Psychological Data
- PSY 39800 - Independent Research In Psychology \*
- PSY 49800 - Senior Research \*
- PSY 51300 - Introduction To Computational Cognitive Neuroscience
- PSY 51400 - Introduction To Mathematical Psychology
- PUBH 40500 - Principles Of Epidemiology

## Information Studies

- ILS 59500 - Special Topics In Information And Data Science \*

## Liberal Arts

- ANTH 52300 - GIS For Humanities And Social Science Research
- ENGL 28000 - Games, Narrative, Culture
- PHIL 20800 - Ethics Of Data Science
- PHIL 29000 - Environmental Ethics
- PHIL 29300 - Selected Topics In Philosophy \*
- POL 22800 - Data Science And Public Policy
- POL 22900 - Emerging Problems In Political Science \*
- SOC 34000 - General Social Psychology
- SOC 38300 - Introduction To Research Methods In Sociology

## Management

- ECON 32500 - Economics Of Sports
- ECON 36000 - Econometrics
- ECON 47100 - Behavioral Economics
- ECON 48500 - Economics Of Racial And Gender Discrimination

- ECON 56200 - Econometrics I
- ECON 57300 - Financial Econometrics
- ECON 58500 - Behavioral Economics
- MGMT 30500 - Business Statistics
- MGMT 30600 - Management Science
- MGMT 38200 - Management Information Systems
- MGMT 40500 - Six Sigma And Quality Analytics
- MGMT 42110 - Marketing Analytics
- MGMT 46300 - Supply Chain Analytics
- MGMT 47200 - Advanced Spreadsheet Modeling And Simulation
- MGMT 47300 - Data Mining
- MGMT 47400 - Predictive Analytics
- MGMT 47900 - Data Visualization
- MGMT 48800 - Data-Driven Decisions In Digital Markets
- MGMT 52500 - Marketing Analytics
- MGMT 54400 - Database Management Systems

## Polytechnic

- AT 31900 - Unmanned Aerial Systems Applications, Data And Documentation
- CGT 27000 - Introduction To Data Visualization
- CGT 27001 - Topics In Data Visualization
- CGT 27500 - Data Visualization II
- CGT 35600 - Web Programming, Development And Data Integration
- CGT 37000 - Interactive Data Visualization
- CGT 37700 - Scientific Visualization
- CGT 45600 - Advanced Web Programming, Development And Data Integration
- CGT 47000 - Data Visualization Studio
- CGT 51200 - Foundational Readings Of User Experience Design
- CGT 52000 - Computer Graphics Programming
- CGT 52100 - Advanced Real-Time Computer Graphics
- CGT 58100 - Workshop In Computer Graphics Technology \*
- CNIT 37200 - Database Programming
- CNIT 39200 - Enterprise Data Management
- CNIT 48101 - Topics In Computer Information Technology IV \*
- CNIT 48200 - Six Sigma Data Quality For Continuous Improvement
- CNIT 48700 - Database Administration
- CNIT 55900 - Data Warehousing
- CNIT 57000 - IT Data Analytics
- CNIT 58100 - Workshop In Computer Technology \*
- ECET 32700 - Instrumentation And Data Acquisition Design
- ECET 35901 - Computer Based Data Acquisition Applications
- IET 41300 - Problem-Solving With Automatic Data Collection
- TECH 53300 - Design Theory And Technology

## Science

- BCHM 42200 - Computational Genomics
- BCHM 52100 - Comparative Genomics
- BIOL 29400 - Biology Research \*
- BIOL 31200 - Great Issues Genomics And Society
- BIOL 44207 - Exploration Of Protein Structure
- BIOL 44400 - Human Genetics
- BIOL 47800 - Introduction To Bioinformatics
- BIOL 49400 - Biology Research \*
- BIOL 49900 - Biology Honors Thesis Research \*
- BIOL 56310 - Protein Bioinformatics
- BIOL 58210 - Ecological Statistics
- CS 30700 - Software Engineering I
- CS 34800 - Information Systems
- CS 37300 - Data Mining And Machine Learning
- CS 47300 - Web Information Search And Management
- EAPS 22700 - Introduction To Atmospheric Observation And Measurements
- EAPS 30900 - Computer-Aided Analysis For Geosciences
- EAPS 42000 - Global Change Modeling
- EAPS 50700 - Introduction To Analysis And Computing With Geoscience Data
- EAPS 50900 - Data Analysis Techniques In Earth And Atmospheric Sciences
- EAPS 51000 - Climate Time Series Analysis
- EAPS 52300 - Radar Meteorology
- EAPS 53000 - Extreme Weather And Climate: Science And Risk
- EAPS 54000 - Introduction To Geodesy
- EAPS 54100 - Geodetic Data And Applications
- EAPS 55700 - Introduction To Seismology
- EAPS 55900 - Topics In Seismology \*
- EAPS 59100 - Advanced Topics In Earth And Atmospheric Sciences \*
- MA 16290 - Data Science Labs: Calculus
- PHYS 32300 - Research With Big Data I
- PHYS 32400 - Research In Big Data II
- PHYS 41600 - Thermal And Statistical Physics Honors
- STAT 47401 - Statistics For Risk Modeling
- STAT 49000 - Topics In Statistics For Undergraduates \*

## Notes

- \* - Course requires approval before it can be used for this certificate (special topics, special assignments, research, etc). For a list of course titles already approved, [click here](#).
- \*\* - Project must be approved by the College Representative on the Applications In Data Science Curriculum Committee.
- Each course can only be used once toward certificate completion; cannot count toward multiple areas.
- A minimum of 6 credits must be in coursework outside the student's major requirements.
- A grade of C- or better must be earned in any course used to fulfill the certificate. Students may also use a Pass (P) in any course used to fulfill the certificate.
- Students with a Data Science major are not permitted to receive the Applications In Data Science Certificate.
- Transfer credit brought in as an equivalent course is allowed to apply to the certificate requirements; undistributed transfer credit cannot be applied.

## Prerequisite Information

For current pre-requisites for courses, click [here](#).

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Learning Beyond the Classroom Certificate

Learning Beyond the Classroom (LBC) is open only to students majoring in the College of Science. It is a voluntary program aimed at encouraging you, the College of Science student, to engage in activities that provide hands-on experience and opportunities to apply classroom knowledge. Successful completion of the LBC program will be noted on your official Purdue transcript. You will also receive a certificate of completion.

Participation in LBC involves attending, organizing, or leading activities that fall into three general categories: career and professional development; service, citizenship and leadership; and experience with domestic and international diversity. Progress in each of the three areas is tracked by a point system. Points are earned by submitting reports on participation in activities. The number of points earned varies with the intensity of the activity.

[Learning Beyond the Classroom website](#)

## Requirements for the Certificate

**Completing the LBC certificate requires that you:**

1. Accumulate a total of 24 points, with at least 4 points in each of 3 categories.
2. Participate in at least one intensive activity lasting an extended period of time, such as semester-long study abroad, full-time summer internship, two (consecutive) semesters of undergraduate research, an entrepreneurial activity together with the certificate of Entrepreneurship and Innovation, and academic year resident assistant. Such an activity is worth 10 points.
3. Include either (a) 3 credits of approved coursework with grades of P or C- or higher (one or more courses totaling 3 credits can meet this requirement) or (b) a semester-long study abroad program (worth 10 points) or some combination of spring break (4 points) and/or summer study abroad activities (6 points), totaling 10 points.
4. In most cases, a maximum of 6 points per year and 10 points in total may be earned for any particular activity. It is estimated that completion of the certificate will take approximately 30 hours over your college career in addition to the intensive 10-point activity described above.

[Learning Beyond the Classroom Details](#)

## Courses

Among the requirements of the Learning Beyond the Classroom Certificate Program is that you participate in either (a) approved coursework with grades of P (pass) or C- or higher (one or more courses totaling 3 credits meets this requirement) or (b) semester-long study abroad or the equivalent.

Below you will find a table of courses that have been identified as meeting the objectives of this program. If there is an experiential course which is not here that you believe to be similar to those listed, contact the administrator. The College of Science Office of Undergraduate Education reserves the right to determine whether a course meets the program criteria.

- AGR 49000 - Special Problems
  - International Development Strategies
- BIOL 11500 - Biology Resource Seminar
- BIOL 19700 - Biology Freshman Honors Seminar
- BIOL 29300 - Sophomore Seminar: Planning Your Future In Biology
- BIOL 29400 - Biology Research
- BIOL 29500 - Special Assignments
  - Teaching Biology
- BIOL 39300 - Preparing For Your Future In Biology
- BIOL 49400 - Biology Research
- BIOL 49700 - Biology Honors Seminar
- BIOL 49800 - Biology Teaching
- BIOL 49900 - Biology Honors Thesis Research
- CHM 19400 - Freshman Chemistry Orientation
- CHM 19700 - Chemistry Freshman Honors Research
- CHM 29400 - Sophomore Chemistry Seminar
- CHM 49400 - Junior-Senior Chemistry Seminar
- CHM 49900 - Special Assignments
- CS 19100 - Freshman Resources Seminar
- CS 19700 - Freshman Honors Seminar
- CS 29000 - Topics In Computer Sciences
  - Individual Study
- CS 29100 - Sophomore Development Seminar
- CS 39000 - Topics In Computer Sciences
- CS 39100 - Junior Resources Seminar
- CS 49000 - Topics In Computer Sciences For Undergraduates
  - Indiv Study or Part-time Prof Experience CS
- CS 49700 - Honors Research Project
- EAPS 10900 - The Dynamic Earth
- EAPS 11800 - Introduction To Earth Sciences
- EAPS 13700 - Freshman Seminar In Earth, Atmospheric, And Planetary Sciences
- EAPS 19100 - Introductory Topics In Earth And Atmospheric Science
  - Service Learning in Outreach
- EAPS 35200 - Structural Geology
- EAPS 35300 - Earth And Planetary Surface Processes
- EAPS 39000 - Geologic Field Methods
- EAPS 39100 - Topics In Earth And Atmospheric Sciences
  - Team Weather Forecasting or Meteorology Intern
- EAPS 41900 - Internship In Environmental Geosciences
- EAPS 43400 - Weather Analysis And Forecasting
- EAPS 49700 - Earth And Atmospheric Sciences Undergraduate Readings And Research
- EAPS 55600 - Planetary Surface Processes
- EAPS 59000 - Field Geology North America

- ECE 37900 - Junior Participation In Vertically Integrated Projects (VIP) In Electrical And Computer Engineering
- ECE 47900 - Senior Participation In Vertically Integrated Projects (VIP) In Electrical And Computer Engineering
- EDCI 20500 - Exploring Teaching As A Career
- EDCI 49000 - Individual Research And Teaching Experience
  - Science Teaching Service Learning
- EDCI 49800 - Supervised Teaching
- ENTM 49800 - Special Problems In Entomology
  - Indiv Study or Forensic Teaching Assistant
- ENTR 48000 - Entrepreneurial Leadership And Careers
- EPCS 10100 - First Year Participation In EPICS
- EPCS 10200 - First Year Participation In EPICS
- EPCS 20100 - Sophomore Participation In EPICS
- EPCS 20200 - Sophomore Participation In EPICS
- GS 19501 - Preparing For Your Undergraduate Research Experience
- GS 29501 - Understanding Your Undergraduate Research Experience I
- GS 39501 - Understanding Your Undergraduate Research Experience II
- GS 49000 - Directed Reading In General Studies
  - Purdue Promise Facilitation Course or Discovery Park Undergr Res
- MA 10800 - Mathematics As A Profession And A Discipline
- MA 17000 - Introduction To Actuarial Science
- MA 48400 - Seminar On Teaching College Algebra And Trigonometry
- MA 49000 - Topics In Mathematics For Undergraduates
- MCMP 49000 - Special Topics
  - Indiv Study or TA for MCMP 20400/MCMP 20500 lab
- PHYS 10400 - First Year Physics Seminar
- PHYS 23500 - Seminar In Careers In Physics
- PHYS 32300 - Research With Big Data I
- PHYS 32400 - Research In Big Data II
- PHYS 39000 - Special Assignments
  - Title: Research with Big Data I - 3.00 credits
- PHYS 49000 - Special Assignments
- PHYS 59000 - Reading And Research
- PHYS 59300 - Independent Research
- PSY 39000 - Research Experience In Psychology
- SCI 10000 - Multicultural Leadership Seminar
- SCI 19500 - Special Topics In Science
  - Global Science Leadership Seminar
- SCI 39500 - Special Topics In Science
  - Global Science Experience
- SCI 49000 - Topics In Science For Undergraduates
  - Dean's Leadership Forum
- STAT 17000 - Introduction To Actuarial Science
- STAT 19000 - Topics In Statistics For Undergraduates
  - First Year Statistics Seminar
- STAT 29000 - Topics In Statistics For Undergraduates
  - Rising Above the Storm
- STAT 47201 - Actuarial Models-Life Contingencies



- STAT 49000 - Topics In Statistics For Undergraduates

## Notes

- Students who are enrolling in EDCI 49800 or ENTR 48000 during their final semester and wish to receive points toward LBC should alert LBC of their plans at the beginning of the semester.

## Prerequisite Information

For current pre-requisites for courses, click [here](#).

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Program Information

### College of Science Core: Composition and Presentation

**Curricular Outcome:** Ability to communicate well, both orally and in writing. Students will develop college-level writing and presentation skills through the Technical Writing and Technical Presentation requirement.

### Written Communication

- *Any course that meets the University Core Written Communication (WC) requirement.*

### Technical Writing & Presenting (TWTP)

Students may elect to take one course to meet the TWTP requirement or a combination of courses. The list of approved courses below contains all course options. Students may also elect to use experiences as defined below to complete this important Science core requirement.

### Technical Writing

The Technical Writing requirement may be met by completing one of the following options:

*International Students Only: International students whose primary high school/equivalent instruction was not in English must meet the Technical Writing requirement using option 1 only.*

#### Option 1

*A course in technical writing from the list of approved courses below.*

- ENGL 30400 - Advanced Composition
- ENGL 30900 - Digital Design And Production
- ENGL 41900 - Multimedia Writing
- ENGL 42000 - Business Writing
- ENGL 42100 - Technical Writing
- ENGL 42201 - Writing For The Health And Human Sciences
- ENGL 42400 - Writing For High Technology Industries
- ENGL 43400 - Science And Medical Writing
- ENGL 49000 - Worksite Internship Practicum (must be taken for 3 credits)
- MGMT 39100 - Strategic Thinking And Decision-Making

## Option 2

- Scholarly publication:
  - Paper accepted for publication in a peer-reviewed journal or peer-reviewed conference proceedings in which the student is the lead author or has written the large majority of the paper; **or**
  - Paper a College of Science faculty member with expertise in the area deems of publishable quality; **or**
  - Three approved papers of at least 1,500 words each, at least one of which makes a strong or persuasive argument
- Students wishing to meet the Technical Writing requirement through Option 2 are required to complete the Experiential Learning contract process.

## Technical Presenting (Oral Communication)

*International Students Only: International students whose primary high school/equivalent instruction was not in English must meet the Technical Presenting requirement using option 1 only.*

### Option 1

- Any course that meets the University Core Oral Communication (OC) requirement.

### Option 2

- Presentation of scientific work
  - at a scientific meeting (sole or predominant presenter); or
  - at an adjudicated poster session in the presence of a certified judge (written feedback will be required to complete the Experiential Learning Contract process); or
  - during an internship or co-op; or
  - Three approved 10-minute (or longer) presentations within science course(s).
- Students wishing to meet the Technical Presentation requirement through Option 2 are required to complete the Experiential Learning Contract process.

## Technical Writing & Presenting

*The following courses meet **both** Technical Writing & Technical Presenting.*

- COM 21700 - Science Writing And Presentation

- CHM 46200 - Intermediate Organic Chemistry

## Additional Information

- Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- Earning Core Curricular Requirements through Experience (Option 2)
  - Students may meet The Technical Presentation (Technical Writing) requirement through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## College of Science Core: Computing

Curricular Outcome: Ability to think and function as a scientist. Students will complement critical thinking and analytical abilities gained within their major area of study by completing an approved computing course. Approved courses are department dependent.

### Computing

- CS 15900 - C Programming
- CS 17600 - Data Engineering In Python
- CS 17700 - Programming With Multimedia Objects
- CS 18000 - Problem Solving And Object-Oriented Programming
- ECE 49500 - Selected Topics In Electrical And Computer Engineering - (Intro to Computer Systems - Credit Hours: 3.00)
- ENGR 14200 - Honors Creativity And Innovation In Engineering Design II
- ENGR 16200 - Honors Introduction To Innovation And The Physical Science Of Engineering Design II

Three (3) of the following one (1) credit courses

- MA 29000 - Topics In Mathematics For Undergraduates The Data Science Labs in Multivariate Calculus
- MA 39000 - Topics In Mathematics For Undergraduates The Data Science Labs in Fourier Analysis
- MA 49000 - Topics In Mathematics For Undergraduates The Data Science Labs in Probability

Any TWO-COURSE combination of the TDM Data Mine Seminar courses.

- TDM 10100 - The Data Mine Seminar I
- TDM 10200 - The Data Mine Seminar II
- TDM 20100 - The Data Mine Seminar III
- TDM 20200 - The Data Mine Seminar IV
- TDM 30100 - The Data Mine Seminar V
- TDM 30200 - The Data Mine Seminar VI
- TDM 40100 - The Data Mine Seminar VII
- TDM 40200 - The Data Mine Seminar VIII

# College of Science Core: Cultural Diversity (Language and Culture)

**Curricular Outcome:** Demonstrated breadth of knowledge and cultural appreciation. College of Science students are expected to develop an understanding of at least one other culture in addition to their own through learning a language, taking culture and/or diversity courses, or participating in an approved Study Abroad experience. Satisfaction of this requirement includes completion of a Justice, Equity, Diversity, and Inclusion (JEDI) course.

## Requirement Options

This nine-credit core requirement is satisfied by the completion of one of the following options:

### Option 1

Two (2) approved foreign language courses, and one (1) JEDI course from the Culture and Diversity course list.

### Option 2

One (1) approved foreign language course, one (1) JEDI course from the Culture and Diversity list, and an approved short-term study abroad program (minimum eight (8) days containing a minimum 3-credit course and significant immersion in the local culture). See your Academic Advisor for more information.

### Option 3

Three (3) approved courses from the Culture and Diversity list below, containing at least one (1) JEDI course.

- Course selections must enhance a student's understanding and appreciation of other cultures.
- Selections must be made from the approved Culture and Diversity list below.
- Course selections must build upon one another and deepen a student's understanding of a culture or an aspect of multiple cultures.
- Courses may be chosen from different subject matter areas or may be within one subject area. If one subject is chosen, courses must build a student's knowledge of a culture.
- Only one 10000-level course may be used to meet the requirement. A combination of 20000, 30000 and 40000 will be used to complete the requirement.
- A Culture and Diversity Three Course Sequence Approval Form must be submitted to the student's academic advisor explaining the reasoning behind proposed course selections and intended learning outcomes. The advisor will approve the student's course selections or work with the student to develop a plan that meets the intent of the Foreign Language and Culture requirement.

### Option 4

An approved study abroad experience\* and one (1) JEDI course from the Culture and Diversity list below. Once approved, a non-credit waiver will be applied to a student's degree audit, and six (6) credits are available for elective coursework to meet their 120-credit hour degree requirement. See your Academic Advisor for more information.

An approved program must satisfy the following criteria:

- Take place outside the United States and meet one of the following program requirements:

- Approved semester or year-long Study Abroad program.
- Summer program of at least seven and a half weeks duration.
- Approved short-term study abroad program (not less than 8 days) containing a minimum 3-credit course and significant immersion in the local culture to meet the Culture requirement.
- Purdue Summer Internship Program
- College of Education Maymester in Tanzania Study Abroad Program
- Include a minimum three (3) credits of coursework or research
- Include significant immersion in the local culture and language independent of any US-based program in which the student may be participating.

## Option 5

International Students. International students meet the intent of the Foreign Language and Culture requirement through their international experience at Purdue University and completion of one (1) JEDI course from the Culture and Diversity list below. A non-credit waiver will be applied to a student's MyPurduePlan audit, and six (6) credits are added to elective coursework to meet the minimum 120-credit hour degree requirement. See your academic advisor for guidelines and approval.

## Curriculum Note

Courses which have been taken to meet the Cultural Diversity requirement **may not** also be used to meet a student's General Education or Great Issues requirement.

## \*Study Abroad Notes

## Approval Process

Students wishing to use an approved study abroad program to meet the Foreign Language and Culture requirement are required to complete the Experiential Learning Contract process.

## Scholarships

Study Abroad scholarship opportunities are available.

## Language and Culture Electives/Foreign Language Requirement

Courses that also meet the JEDI requirement are noted with an "^" mark.

- ARAB 10100 - Standard Arabic Level I
- ARAB 10200 - Standard Arabic Level II
- ARAB 20100 - Standard Arabic Level III
- ASL 10100 - American Sign Language I
- ASL 10200 - American Sign Language II
- ASL 20100 - American Sign Language III
- CHNS 10100 - Chinese Level I
- CHNS 10200 - Chinese Level II
- CHNS 20100 - Chinese Level III
- FR 10100 - French Level I

- FR 10200 - French Level II
- FR 20100 - French Level III
- GER 10100 - German Level I
- GER 10200 - German Level II
- GER 20100 - German Level III
- HEBR 10100 - Modern Hebrew Level I
- HEBR 10200 - Modern Hebrew II
- HEBR 20100 - Modern Hebrew Level III
- HEBR 12100 - Biblical Hebrew Level I
- HEBR 12200 - Biblical Hebrew Level II
- HEBR 22100 - Biblical Hebrew Level III
- ITAL 10100 - Italian Level I
- ITAL 10200 - Italian Level II
- ITAL 20100 - Italian Level III
- JPNS 10100 - Japanese Level I
- JPNS 10200 - Japanese Level II
- JPNS 20100 - Japanese Level III
- KOR 10100 - Korean Level I
- KOR 10200 - Korean Level II
- KOR 20100 - Korean Level III
- LATN 10100 - Latin Level I
- LATN 10200 - Latin Level II
- LATN 20100 - Latin Level III
- PTGS 10100 - Portuguese Level I
- PTGS 10200 - Portuguese Level II
- PTGS 20100 - Portuguese Level III
- RUSS 10100 - Russian Level I
- RUSS 10200 - Russian Level II
- RUSS 20100 - Russian Level III
- SPAN 10100 - Spanish Level I
- SPAN 10200 - Spanish Level II
- SPAN 20100 - Spanish Level III

## Culture and Diversity Course List

- AD 22700 - History Of Art Since 1400
- AD 38500 - History Of Interior Design
- AAS 27100 - Introduction To African American Studies ^
- AAS 27700 - African American Popular Culture
- AAS 35900 - Black Women Writers
- AAS 37000 - Black Women Rising
- AAS 37100 - The African American Experience ^ Black Politics Martin L. King African American Athletes and the Problem of Race Black Leisure & Recrtion The Black Athlete African American Music Black Women in Politics Blackness in Culture
- AAS 37300 - Issues In African American Studies ^ History of Injustice in the US Post Sout Black Lit Post 1960 North African Lit & Culture Philosophy and Culture Race & Religion in the U.S.&nbsp; Studies in African Diaspora The Black Community The Harlem Renaissance The Black Family The Black Male Phil,Cul,African Ameri

- AAS 37500 - The Black Family
- AAS 37600 - The Black Male
- AAS 39200 - Caribbean History And Culture
- AAS 47300 - Blacks In Hollywood Film ^
- AAS 49100 - Special Topics In African American Studies  
Africa in 20th Century, Afro Borinquen Cult&Identity, Black Satire and Humor, Carnival: Re-member Diasp Trad, Contemporary Issues in Black Education, Identity in the Midst of Differences, The Classics and Black Literature, W.E.B. DuBois, R.F. Williams Seminar
- AAS 57500 - Theories Of African American Studies
- AD 31100 - Ancient Greek Art
- AD 31200 - Ancient Roman Art
- AD 33900 - Women Artists In The 20th Century
- AD 34300 - Northern Renaissance Art
- AD 34400 - Latin American Art In The 20th Century
- AD 34600 - Italian Renaissance Art
- AD 34800 - History Of Islamic Art
- AD 35900 - Medieval European Art
- AD 38000 - Baroque Art
- AD 38200 - A Global History Of Modern Art
- AD 39100 - History Of Chinese Art
- AGECE 25000 - Economic Geography Of World Food And Resources
- AGECE 34000 - International Economic Development
- AGECE 45000 - International Agricultural Trade
- AGR 20100 - Communicating Across Culture ^
- AGRY 28500 - World Crop Adaptation And Distribution
- AGRY 35000 - Global Awareness
- AMST 20100 - Interpreting America  
African American Pop Culture, Asian American Pop Culture, Intro Asian American Studies, Intro to American Studies: Arab-American Literature, Sports in American Culture
- AMST 30100 - Perspectives On America Asian Amer Pop Cul, Sports & Popular Feminisms, Afro-Asia Pol & Cul Alli, New Media, Post Soul Black Lit Post 1960, American Beauty, American Representations of the Middle East and North Africa, Contemporary Issues in Asian American Studies, Electr Music & Pop Cult, Gender, Media & Pop Culture, Global Hist Theory & Practice, New Media Culture, North African Lit & Culture, The 1960's Rock to Revolution ^
- AMST 31000 - Invention, Innovation, And Design
- ANSC 33100 - The Role Of Horses In Human History, Culture, And Society
- ANTH 20100 - Introduction To Archaeology And World Prehistory
- ANTH 20500 - Human Cultural Diversity ^
- ANTH 21000 - Technology And Culture
- ANTH 21200 - Culture, Food And Health
- ANTH 23000 - Gender Across Cultures ^
- ANTH 25400 - Archaeological Hoaxes, Myths And Frauds
- ANTH 28200 - Introduction To LGBTQ Studies
- ANTH 30700 - The Development Of Contemporary Anthropological Theory
- ANTH 31000 - Mortuary Practices Across Cultures
- ANTH 31100 - The Archaeology Of The Ancient Andes
- ANTH 31200 - The Archaeology Of Ancient Egypt And The Near East
- ANTH 31300 - Archaeology Of North America
- ANTH 32000 - Ancient States And Empires

- ANTH 34000 - Global Perspectives On Health ^
- ANTH 35800 - African Cultures
- ANTH 37300 - Anthropology Of Religion
- ANTH 37800 - Archaeology And Cultural Anthropology Of Mesoamerica (Mexico, Belize And Guatemala)
- ANTH 37900 - Native American Cultures
- ANTH 38400 - Designing For People: Anthropological Approaches
- ANTH 39200 - Selected Topics In Anthropology  
Anthropology and Blackness, Archaeology of Religion and Ritual, Emcees&Jihadis Race & Pop Cult, Race & Religion in the U.S., Race, Religion and Popular Culture in America, The African Amer Experience,&nbsp;Amazonia and Film,&nbsp;Blackness and Culture, Colonial Globaln Food Justice
- ARAB 23000 - Arabic Literature In Translation
- ARAB 23900 - Arab Women Writers
- ARAB 28000 - Arabic Culture
- ARAB 28100 - Introduction To Islamic Civilization And Culture
- ARAB 33400 - North African Literature And Culture ^
- ASAM 24000 - Introduction To Asian American Studies
- ASAM 34000 - Contemporary Issues In Asian American Studies  
Contemporary Issues In Asian American Studies, Social Issues in Immigration, AsAm Popular Culture, Afro-Asia Pol & Cul Alli, American Music Pol Image
- ASEC 33100 - The Role Of Horses In Human History, Culture And Society
- ASEC 49100 - Special Topics In Agricultural Science And Education Communication
- ASL 28000 - American Deaf Community: Language, Culture, And Society ^
- CDIS 23900 - Introduction To Disability Studies ^
- CHNS 24100 - Introduction To The Study Of Chinese Literature
- CHNS 28000 - Topics In Chinese Civilization And Culture ^
- CHNS 28100 - Introduction To Chinese Food Culture ^
- CHNS 34100 - Chinese Literature I: Traditional Chinese Literature
- CHNS 34200 - Chinese Literature II: Modern Chinese Literature
- CHNS 49000 - Special Topics In Chinese Language  
Food Culture Drinks and Snacks, Intro to Chinese Food Culture, Introduction to Chinese Films
- CHNS 59400 - Special Topics In Chinese Literature  
Chinese Classical Tales, Chinese Lit and Culture, Chinese Poetry & Painting, Dream Of Red Chamber, Modern Chinese Theatre, Poetry of Li Bai and Du Fu, Tang Dynasty Poetry
- CLCS 18100 - Classical World Civilizations
- CLCS 23010 - Survey Of Greek Literature In Translation
- CLCS 23100 - Survey Of Latin Literature
- CLCS 23300 - Comparative Mythology
- CLCS 23500 - Introduction To Classical Mythology
- CLCS 23700 - Gender And Sexuality In Greek And Roman Antiquity ^
- CLCS 23800 - The Tragic Vision
- CLCS 23900 - The Comic Vision
- CLCS 28000 - Topics In Classical Civilization  
Culture And Society In The Age Of Pericles, Studies in Greek Warfare, Archaeology of Greece
- CLCS 33700 - The Ancient Epic
- CLCS 38000 - Alexander The Great And Hellenistic World
- CLCS 38100 - Julius Caesar: Statesman, Soldier, Citizen
- CLCS 38300 - The Roman Empire
- CLCS 38400 - Ancient Western Medicine



- CLCS 38500 - Science, Medicine And Magic In The Ancient West
- CLCS 38600 - Ancient Greek Religion
- CLCS 38700 - Roman Religion
- CLCS 48000 - Potters And Society In Antiquity
- CLCS 48100 - Culture And Society In The Age Of Pericles
- CLCS 48300 - Republican Rome
- CLCS 59300 - Special Topics In Classical Literature
- CMPL 23000 - Crossing Borders: Introduction To Comparative Literature ^  
Arab-American Literature, Arabic Culture, Nature in German Literature, Soviet Literature and Beyond, Women Writers in Translation, North African Lit & Culture, Brit Lit Thru 18 Ct, Israel and the Modern World
- CMPL 26700 - World Literature: From 1700 A D To The Present
- COM 30301 - Mentored Intercultural Communication Experience
- COM 32800 - Diversity At Work: A Rhetorical Approach
- CMPL 33000 - International Cinema ^
- COM 22400 - Communicating In The Global Workplace ^
- COM 30300 - Intercultural Communication ^
- COM 31200 - Rhetoric In The Western World
- COM 37600 - Communication And Gender ^
- COM 38100 - Gender And Feminist Studies In Communication
- CSR 33200 - Cross-Cultural Marketing And International Retailing
- ECON 48500 - Economics Of Racial And Gender Discrimination ^
- EDCI 28500 - Multiculturalism And Education ^
- EDPS 21100 - Special Education Law, Policy, And Ethical Guidelines
- EDPS 26500 - The Inclusive Classroom
- EDPS 26501 - The Inclusive Classroom
- EDPS 30000 - Student Leadership Development
- EDPS 30100 - Peer Counseling Training
- EDPS 31600 - Collaborative Leadership: Cross-Cultural Settings ^
- EDPS 49000 - Individual Research And Teaching Experience  
Global Leadership in Spain
- ENGL 21500 - Inventing Languages
- ENGL 22500 - Literature, Inequality, And Injustice
- ENGL 22800 - Language And Social Identity
- ENGL 23000 - Great Narrative Works
- ENGL 23200 - Thematic Studies In Literature  
Arab Women Writers, Arab-American Literature, Arabic Culture, Contemporary Foreign Women Writers, German Folk & Fairy Tales, Intro to Islamic Civ & Cul, Italian Women Writers in Translation, Nature in German Literature, Russian Fairy Tales, Span Am Lit in Trans, Women Writers in Translation, Intro to Disability Studies, North African Lit & Culture, Russian and Slavic Fairy Tales
- ENGL 24000 - British Literature Before 1789
- ENGL 24100 - British Literature After 1789
- ENGL 24900 - Great British Books
- ENGL 25700 - Literature Of Black America
- ENGL 26200 - Greek And Roman Classics In Translation
- ENGL 26400 - The Bible As Literature
- ENGL 26600 - World Literature: From The Beginnings To 1700 A.D.
- ENGL 26700 - World Literature: From 1700 A.D. To The Present

- ENGL 28000 - Games, Narrative, Culture
- ENGL 33000 - Games And Diversity ^
- ENGL 33100 - Medieval English Literature
- ENGL 35200 - Native American Literature ^
- ENGL 35400 - Asian American Literature Afro-Asia Pol & Cul Alli, Post Soul Black Lit Post 1960,&nbsp;Asian American Literature
- ENGL 35800 - Black Drama
- ENGL 35900 - Black Women Writers
- ENGL 36000 - Gender And Literature
- ENGL 36500 - Literature And Imperialism ^
- ENGL 36600 - Postcolonial Literatures
- ENGL 38100 - The British Novel
- ENGL 38700 - History Of Film Since 1950
- ENGL 39300 - Interdisciplinary Approaches To Environmental And Sustainability Studies
- ENGL 39600 - Studies In Literature And Language  
Latina/o Of The U S, Maghrebi Literature & Culture, Spirit of Italian Comedy, Theories of Global Studies, International Cinema, Post Soul Black Lit Post 1960, Teaching for Social Justice, North African Lit & Culture
- ENGL 41200 - Studies In Genre  
Black Satire and Humor, Black Speculative Fiction
- ENGL 41400 - Studies In Literature And Culture  
Literature and Disability: Deaf & Blind Culture, The Black Male Image, War, Terrorism, Globalization, And The Role Of Literature, Witchcraft and Wonder in Early American Literature
- ENGL 43900 - Topics In Disability Studies ^  
Bodies & Cultures,&nbsp;Disability in Fiction & Memoir,&nbsp;Lit in the Age of Eugenics, Disability Literature
- ENGL 46000 - Studies In Women's Literature  
Modernist Women Writers, Studies in Women's Literature
- ENGL 46200 - The Bible As Literature: The Old Testament
- ENGL 46300 - The Bible As Literature: The New Testament
- ENGL 52800 - Medieval English Literature
- ENGL 53200 - The English Novel In The Nineteenth Century
- ENGL 53800 - English Drama From The Restoration To The Modern Period
- ENGL 54700 - British Romanticism
- ENGL 54800 - Victorian Literature
- ENGL 55700 - Nineteenth-Century African-American Narrative
- ENGL 57900 - Modern British Fiction
- ENGL 58300 - U S Ethnic/Multicultural Literature  
Contemporary African American Fiction
- ENGL 59200 - Postcolonial Studies
- ENGL 59600 - Advanced Studies In Literature Or Language  
ModEuroRhetorc,Poetics,Narrativ
- ENTR 47000 - Gender, Diversity And Leadership ^
- FR 24100 - Introduction To The Study Of French Literature
- FR 33000 - French Cinema
- FR 34100 - French Literature I: From The Middle Ages To The Enlightenment
- FR 34200 - French Literature II: The 19th And 20th Centuries
- FR 38000 - Special Topics In French Culture And Civilization  
La Gastronomie

- FR 39400 - Special Topics In French Literature  
Out of Africa
- FR 44300 - Introduction To Francophone Literature
- FR 48000 - French Civilization
- FR 54100 - Renaissance French Literature
- FR 54900 - French Literature And Film
- FR 58100 - French Culture
- FR 59400 - Special Topics In French Literature  
Introduction to Francophone Literature, Literature Quebecoise, French Caribbean Literature
- FVS 29000 - Special Topics In Film/Video Studies  
Women in Film LC
- FVS 33000 - International Cinema
- FVS 49100 - Special Topics In Film/Video Studies  
Jewish Cinema, Mafia And The Movies, Feminist Prsp on Film & Camera, Post-Soviet Russian Cinema, Engaging Religious Diversity
- GER 23000 - German Literature In Translation  
German Fairy Tales, German Folk & Fairy Tales, Myths & Legends: Elves to Elvis, Nature and the Environment in German Literature and Thought, Supernatural & Uncanny Ger Lit
- GER 24100 - Introduction To The Study Of German Literature
- GER 28000 - German Special Topics  
Beer and Brewing in German Culture
- GER 33000 - German Cinema
- GER 34100 - German Literature I: From The Middle Ages To The 18th Century
- GER 34200 - German Literature II: From The 18th Century To The 21st Century
- GER 48000 - German Civilization
- GER 49800 - Advanced Topics In German The Cultures of Fascism
- GER 54400 - German Romanticism
- GER 54500 - German Prose From Naturalism To The Present
- GER 55100 - Lyric Poetry From Romanticism To The Present
- GER 55400 - German Drama Before Naturalism
- GER 55500 - German Drama From Naturalism To The Present
- GER 58100 - German Culture
- GER 59400 - Special Topics In German Literature  
German Novelle
- GSLA 10100 - Global Awareness
- GSLA 30100 - Theories Of Global Studies
- GSLA 39100 - Special Topics In Global Studies  
Engaging Religious Diversity
- HDFS 28000 - Diversity In Individual And Family Life ^
- HEBR 28400 - Ancient Near Eastern History And Culture
- HEBR 38000 - Israel And The Modern World: Cinema, Literature, History And Politics ^
- HIST 10300 - Introduction To The Medieval World
- HIST 10400 - Introduction To The Modern World
- HIST 10500 - Survey Of Global History ^
- HIST 20100 - Special Topics In History  
Ancient Near Eastern History & Culture
- HIST 21000 - The Making Of Modern Africa
- HIST 21100 - The Global Field: World Soccer And Global History
- HIST 22800 - English History To 1688

- HIST 23800 - History Of Russia From Medieval Times To 1861
- HIST 24000 - East Asia And Its Historic Tradition
- HIST 24100 - East Asia In The Modern World
- HIST 24300 - South Asian History And Civilizations ^
- HIST 24600 - Modern Middle East And North Africa
- HIST 25000 - United States Relations With The Middle East And North Africa
- HIST 27100 - Introduction To Colonial Latin American History (1492-1810)
- HIST 27200 - Introduction To Modern Latin American History (1810 To The Present)
- HIST 30200 - Historical Topics ^  
African American Women's Intellectual Tradition, Afro-American Athletes & Race, Ancient Judaism & Early Christianity, Arab-Israeli Conflict, Black Pop Culture&Civil Rghts, Controversies Contemp Korea, Creoles,Vampires,Quadroon Balls, Gender & Medieval Religion, Gender and War in the Time of Napoleon - Honors, History of Ireland: 1556-1921, History of Korea, Imperial Spain 1469-1714, Introduction to Jewish Studies, Modern Korean History, Religion in American History & Culture, Religion in American Society & Politics 1607-1877, The Bible & its Early Interpreters, Youth in Revolutionary China, Global 1960s Revolution, Global Hist Theory & Practice, AA Athletes & Problem of Race
- HIST 30505 - The United States In The World 1898-Present ^
- HIST 31205 - The Arab-Israeli Conflict
- HIST 31405 - Science, Technology, Engineering And Mathematics (STEM) And Gender ^
- HIST 31700 - A History Of The Christian Church And The Expansion Of Christianity I
- HIST 32105 - Spain: The First Global Empire, 1469-1713
- HIST 32300 - German History
- HIST 32400 - Modern France
- HIST 32900 - History Of Women In Modern Europe
- HIST 33505 - Nationalism And Socialism In East Central Europe
- HIST 33300 - Science And Society In Western Civilization I
- HIST 33400 - Science And Society In Western Civilization II
- HIST 33700 - Europe In The Age Of The Cold War
- HIST 33900 - Traditional China
- HIST 34000 - Modern China
- HIST 34300 - Traditional Japan
- HIST 34400 - History Of Modern Japan
- HIST 34505 - Arabs in American Eyes
- HIST 34705 - History Of Religion In America
- HIST 35100 - The Second World War
- HIST 35900 - Gender In East Asian History
- HIST 36600 - Hispanic Heritage Of The United States
- HIST 37700 - History And Culture Of Native America ^
- HIST 38400 - History Of Aviation
- HIST 38700 - History Of The Space Age ^
- HIST 39500 - Junior Research Seminar  
Afro Amer Athl & Civil Rights, Gender & War in Modern Europe, German-Occupied Europe, Indian Crossroads-Colonial City, Occupied Europe, Politics Mod Latin America, The Civil Rights Movement, Sex, Race, & Science, Northern Indian Removal
- HIST 39600 - African American History To 1877
- HIST 39800 - African American History Since 1877
- HIST 40300 - Europe In The Reformation
- HIST 40500 - The French Revolution And Napoleon
- HIST 40600 - Rebels And Romantics: Europe 1815-1870

- HIST 40700 - Road To World War I: Europe 1870-1919
- HIST 40800 - Dictatorship And Democracy: Europe 1919-1945
- HIST 41300 - Modern European Imperialism: Repression And Resistance
- HIST 42300 - Advanced Topics In Modern Germany  
Divided Germany,&nbsp;Divided Germany & the Cold War,&nbsp;Germany & France:War, Peace & Memry
- HIST 44100 - Africa In The Twentieth Century
- HIST 46900 - Black Civil Rights Movement
- HIST 47005 - Women And Health In America
- HIST 47700 - Native American Women's History
- HIST 48800 - History Of Sexual Regulation In The United States ^
- HIST 49200 - Seminar In Historical Topics  
18th-Century Pacific Worlds, Afro American & Amer Labor Movement, Catholic Priests & Nuns Movies, Gauchos and Cowboys on the Argentine Frontier, History Of Argentina, History of Argentina 1810-Present, Late Imperial China, Life & Career of Winston Churchill, Race, Gender, Culture US - Honors, Gender Revolution in Modern American, Indian Removal 19th Cent US, Interwar Jewish Experiences in E. Central Europe, Russia, and Middle East, Native America and Colonial Settlement, Rel & Pol In Mid Amer, Spain in American Southwest, War and Gender, Women Modern America 1950-Pres
- HIST 49500 - Research Seminar In Historical Topics  
Gender Revolution in Modern American, Indian Removal 19th Cent US, Interwar Jewish Experiences in E. Central Europe, Russia, and Middle East, Native America and Colonial Settlement, Rel & Pol In Mid Amer, Spain in American Southwest, War and Gender, Women Modern America 1950-Pres, Race & Civil Rights Movmnt, Race & Modern Civil Rights, Native American History, Gender and War, Decolonization and After, Gender and World War I
- HIST 51200 - England Under The Stuarts
- HIST 57600 - Problems In Latin American History
- HIST 59500 - The Holocaust And Genocide
- HONR 29900 - Interdisciplinary Honors - Experiential Learning  
Learning Across Differences
- HONR 39900 - Interdisciplinary Honors - Special Topics Seminar ^  
Introduction to Visual Studies, Disability and Technoscience, Beyond Afghanistan, Race in American Popular Music
- IDIS 49000 - Directed Reading In Interdisciplinary Studies  
Internship in Asian Am Stds
- IDIS 49100 - Special Topics In Interdisciplinary Studies  
Arabic Culture, British Literature, Cultural Orphans in Latin America, Gender & Medieval Religion, Intro to Islamic Civ & Cul, Jewish Cinema, Race & Religion in the US, • Religion & Violence, Two Koreas: Pol Econ Rivalry, Women Writers in Translation
- IE 49000 - Special Topics In Industrial Engineering  
Grnd Challngs in Accessibility
- ITAL 23100 - Dante's Divine Comedy
- ITAL 28100 - The Italian Renaissance And Its Scientific And Cultural Impact On Western Civilization
- ITAL 33000 - The Italian Cinema
- ITAL 33300 - The Spirit Of Italian Comedy
- ITAL 33500 - Italian-American Cinema
- ITAL 34100 - Italian Literature I: From The Middle Ages To The Enlightenment
- ITAL 34200 - Italian Literature II: From Romanticism To The Present
- ITAL 39300 - Special Topics In Italian Literature Or Cinema  
Italian Women Writers in Translation, Mafia and the Movies

- ITAL 49300 - Advanced Topics In Italian Literature Or Cinema  
Mafia & the Movies
- JPNS 24100 - Introduction To The Study Of Japanese Literature
- JPNS 28000 - Introduction To Modern Japanese Civilization ^
- JPNS 33000 - Japanese Cinema
- JPNS 34100 - Japanese Literature I: Modern Japanese Literature
- JPNS 36300 - Relationship Of Japanese Language And Society ^
- JPNS 48500 - Culinary Culture Of Japan ^
- JPNS 49000 - Special Topics In Japanese Language  
Contemporary Japanese Popular Literature & Culture, Japanese Society Through Songs, JPNS Cinema II:Enter & Othr Fm, Japanese Visual Culture, Japanese Songs
- JPNS 59400 - Special Topics In Japanese Literature  
Modern Japanese Fiction
- JWST 33000 - Introduction To Jewish Studies ^
- KOR 38000 - Special Topics In Korean Culture  
Intro to Korean Cinema  
Introduction to Korean Culture,  
Dating, Sex & Marriage - Korea
- KOR 48000 - Special Topics In Korean Studies ^  
KPop: Gen, Iden, Indus & Fan
- LALS 25000 - Introduction To Latin American And Latino Studies
- LALS 26000 - U S Latino Culture
- LALS 30100 - Latin American Literary And Cultural Studies  
Hispanic Lit I
- LALS 40100 - Special Topics In Latin American/Latino Studies ^  
Latin Amer Civiliztn, Latin American Culture, Latina Feminisms
- LATN 34300 - Roman Oratory
- LATN 34400 - Roman Epic
- LATN 34500 - Roman Elegy
- LATN 34700 - Roman Comedy
- LATN 44300 - Roman Satire
- LATN 44400 - Roman Philosophers
- LATN 44600 - Roman Historians
- LC 23000 - Crossing Borders: Introduction To Comparative Literature  
Intro to Islami Civ & Cul, Arabic Culture, Arabic Literature in Translati
- LC 23500 - East Asian Literature In Translation ^
- LC 23700 - Our Common Bond: Languages And Cultures In A Global Context
- LC 33800 - Language Through Films
- LC 23900 - Women Writers In Translation
- LC 33100 - Comparative Literature In Translation  
Kabbalah and Jewish Mysticism, Topics in Brazilian Culture, The Middle Ages on Film
- LC 33300 - The Middle Ages On Film
- LC 49000 - Special Topics In Foreign Languages And Literatures  
Korean Language in Culture & Society, BTS and Kpop Culture, Bible & Early Interp, The Hispanic World, Cold War Cultures in Korea, Food Culture in Russia
- LC 59300 - Special Topics In Literature  
ModEuroRhetorc,Poetcs,Narrativ
- LING 39800 - Special Topics In Linguistics I  
Language & Society

- LING 49800 - Special Topics In Linguistics II  
History Spanish Lang, Intro Langua Culture
- MARS 22000 - Introduction To Medieval And Renaissance Studies  
The Tudors, Renaissance Mind: Florence 1300-1600, The Bible as Literature: The New Testament, Tudors in Literature and Film
- MARS 42000 - Medieval And Renaissance Studies Seminar  
Tudors in Literature and Film
- MGMT 42210 - International Marketing
- MGMT 45900 - International Management
- MUS 37600 - World Music
- MUS 49000 - Guided Reading In Music  
History of Rock Music
- OLS 45400 - Gender And Diversity In Management
- OLS 45600 - Leadership In A Global Environment
- PHIL 11000 - The Big Questions: Introduction To Philosophy
- PHIL 11400 - Global Moral Issues ^
- PHIL 20600 - Introduction To Philosophy Of Religion
- PHIL 20700 - Ethics For Technology, Engineering, And Design
- PHIL 20800 - Ethics Of Data Science
- PHIL 22500 - Philosophy And Gender
- PHIL 23000 - Religions Of The East ^
- PHIL 23100 - Religions Of The West ^
- PHIL 24200 - Philosophy, Culture, And The African American Experience ^
- PHIL 27000 - Biomedical Ethics
- PHIL 28000 - Ethics And Animals
- PHIL 29000 - Environmental Ethics
- PHIL 29300 - Selected Topics In Philosophy  
Science and Religion
- PHIL 30100 - History Of Ancient Philosophy
- PHIL 30200 - History Of Medieval Philosophy
- PHIL 30300 - History Of Modern Philosophy
- PHIL 40200 - Studies In Medieval Christian Thought
- PHIL 40600 - Intermediate Philosophy Of Religion
- PHIL 49000 - Advanced Topics In Philosophy  
Early Greek Philosophy, Philosophy of Race
- PHIL 50100 - Studies In Greek Philosophy
- PHIL 50500 - Islamic And Jewish Philosophy And The Classical Tradition
- PHIL 50600 - Advanced Philosophy Of Religion
- POL 13000 - Introduction To International Relations
- POL 14100 - Governments Of The World
- POL 22200 - Women, Politics, And Public Policy ^
- POL 22900 - Emerging Problems In Political Science  
The US, Cuba & Latin America
- POL 23100 - Introduction To United States Foreign Policy
- POL 23500 - International Relations Among Rich And Poor Nations ^
- POL 32300 - Comparative Environmental Policy
- POL 32600 - Black Political Participation In America ^
- POL 33500 - China And The Challenges Of Globalization ^

- POL 34500 - West European Democracies In The Post-Industrial Era
- POL 34700 - Introduction To Latin American Politics
- POL 34800 - East Asian Politics
- POL 35100 - Foundations Of Western Political Theory: From Plato To The Reformation
- POL 36000 - Women And The Law
- POL 42900 - Contemporary Political Problems  
LGBTQ+ Politics, Pol & Econ Dev in Latin Amer
- POL 43000 - Selected Problems In International Relations  
IR: The Iraq Wars, Theories of IR
- POL 43801 - International Human Rights
- POL 49100 - Political Science Senior Seminar  
American Race Relations, Public Policy: Race, Class, Gender; Race, Class and Political Representation; Race, Gender & Political Representation, The Iraq Wars, Politics of Japan and China, The Rise and Fall of Dictators, Global Governance
- POL 49300 - Interdisciplinary Undergraduate Seminar  
Introduction to Jewish Studies
- POL 52000 - Special Topics In Public Policy  
Diversity Equity Inclusion; Gender, Race, And Class: Public Policy
- PSY 23900 - The Psychology Of Women
- PSY 33500 - Stereotyping And Prejudice
- PSY 39200 - Special Topics In Psychology  
Diversity and Inclusion, Belonging and Exclusion, Cultural Psychology, Psychology of Gender
- PSY 43600 - Foods And Behavior
- PSY 59100 - Topics In Psychology  
Acceptance and Inclusion, Cross Cultural Social Psy, Ethnic Minority Issues in Psy
- PTGS 33000 - Brazilian, Portuguese, And African Cinema
- PTGS 55100 - Brazilian Poetry
- PTGS 55500 - Brazilian Drama
- PTGS 55700 - Brazilian Fiction
- PTGS 59400 - Special Topics In Luso-Brazilian Literature  
Clarice Lispector, Latin American Short Story, Luso-Brazilian Literature, Machado De Assis
- PUBH 22500 - Contemporary Women's Health
- REL 20000 - Introduction To The Study Of Religion
- REL 20100 - Interpretation Of The New Testament
- REL 20200 - Interpretation Of The Old Testament
- REL 20300 - Theology Of Paul
- REL 20400 - Introduction To Christian Theology
- REL 23000 - Religions Of The East
- REL 23100 - Religions Of The West
- REL 25000 - A History Of The Christian Afterlife
- REL 31700 - Ancient Judaism And Early Christianity
- REL 31800 - The Bible And Its Early Interpreters
- REL 35100 - Christian Mysticism
- REL 45000 - Christian Ethics
- REL 45100 - Christology
- REL 45200 - Systematic Theology
- REL 49100 - Special Topics In Religious Studies  
Engaging Religious Diversity, Rhetorics of Religion
- RUSS 29800 - Special Topics In Russian



Russian Fairy Tales, Russian and Slavic Fairy Tales, Food Culture in Russia

- RUSS 33000 - Russian And East European Cinema
- RUSS 34100 - Russian Literature In The Nineteenth Century
- RUSS 34200 - Revolution, Repression, Renewal: Soviet Literature And Beyond
- RUSS 38000 - Russian Culture And Civilization I
- RUSS 38100 - Russian Culture And Civilization II
- RUSS 49700 - Topics In Russian Literature ^  
Dostoevsky and His Age, Tolstoy and His Age
- RUSS 49800 - Topics In Russian Culture  
Post-Soviet Russian Cinema
- SFS 41200 - Colonialism, Globalization, And Food Justice ^
- SOC 22000 - Social Problems ^
- SOC 31000 - Race And Ethnicity ^
- SOC 33800 - Global Social Movements
- SOC 33900 - Sociology Of Global Development ^
- SOC 35200 - Drugs, Culture, And Society
- SOC 35600 - Hate And Violence ^
- SOC 36700 - Religion In America ^
- SOC 36900 - Religion And Chinese Society
- SOC 39100 - Selected Topics In Sociology  
Sociology of Policing, Analyzing Culture on TV
- SOC 40900 - Social Networks
- SOC 41100 - Social Inequality ^
- SOC 45000 - Gender Roles In Modern Society ^
- SPAN 23100 - Cervantes' Don Quixote
- SPAN 23500 - Spanish American Literature In Translation
- SPAN 24100 - Introduction To The Study Of Hispanic Literature
- SPAN 28000 - Second-Year Spanish: Special Topics  
Intro Latin Am & Latino Study
- SPAN 33000 - Spanish And Latin American Cinema
- SPAN 33500 - The Literature Of The Spanish-Speaking Peoples In The United States
- SPAN 34100 - Hispanic Literature I: Poetry And Drama
- SPAN 34200 - Hispanic Literature II: Prose ^
- SPAN 38000 - Spanish Language And Culture Abroad
- SPAN 39800 - Special Topics In Spanish  
The Hispanic World
- SPAN 48000 - Spanish Civilization ^
- SPAN 48100 - Spanish Culture
- SPAN 48200 - Latin American Civilization
- SPAN 48300 - Latin American Culture
- SPAN 48500 - Food And Culture In The Hispanic World
- SPAN 49800 - Advanced Topics In Spanish  
Chicana/o & Latina/o Lit Trans, Food Culture Hispanic World, Hispanic Film in Spanish, Spanglish in Ling  
& Cul, Don Quixote
- SPAN 54000 - Spanish Literature Of The Middle Ages
- SPAN 54100 - Spanish Literature Of The Golden Age
- SPAN 54200 - Cervantes Don Quijote
- SPAN 54300 - Spanish Literature Of The 18th And 19th Centuries

- SPAN 54500 - Spanish Literature Of The 20th Century
- SPAN 55000 - Spanish American Literature Of The Colonial Period
- SPAN 55100 - Spanish American Literature Of The 19th Century
- SPAN 55200 - Spanish American Literature From 1900 To 1970
- SPAN 55300 - Spanish American Literature From 1970 - Present
- SPAN 55500 - Latino/a Literature
- SPAN 59000 - Directed Reading In Spanish  
Spanish American Novel
- SPAN 59400 - Special Topics In Hispanic Literature  
Hispanic Film in Spani Part II, Modern Spanish Comic Theater, Spanish Literature of the Middle Ages, Borders and Borderlands
- THTR 39000 - Directed Study Of Special Theatre Problems  
Black Drama
- WGSS 28000 - Women's, Gender, And Sexuality Studies: An Introduction ^
- WGSS 28100 - Variable Topics In Women's, Gender, And Sexuality Studies ^  
Arab Women Writers, Contemporary Foreign Women Writers In Translation, Spanish American Literature in Translation, Wom Pol and Publ Pol, Women Writers in Translation, Women, Gender, And Leadership, 20th Century Women Artists, Intro to Study of Religion
- WGSS 28200 - Introduction To LGBTQ Studies ^
- WGSS 38000 - Comparative Studies In Gender And Culture
- WGSS 38100 - Women Of Color In The United States
- WGSS 38200 - Love, Sex And Sexuality
- WGSS 38300 - Women, Work, And Labor ^
- WGSS 39000 - Variable Topics In Women's, Gender And Sexuality Studies  
Gender and Politics in Early Modern Europe, Literature, Queer Studies & Disability, Queens & Empresses in Early Modern Europe, Sports & Popular Feminism, STEM and Gender, US Women Since 1870, Women and Health in America, Women and Leadership, Women and the Law, Hist of Sexual Regul in US, Gender and Literature, Feminist Technoscience Studies, Latina Feminisms
- WGSS 48000 - Feminist Theory ^
- WGSS 48200 - Interdisciplinary Studies In Sexuality
- WGSS 48300 - Feminisms In Global Perspective
- WGSS 48500 - Feminist Perspectives On Film
- WGSS 49900 - Independent Study In Women's, Gender And Sexuality Studies  
African American Women and Activism, Black Women, Gender Revolution in Modern America, Women and Health in America
- WGSS 59900 - Selected Topics In Women's Gender And Sexuality Studies  
Bad Mothers in American Literature, Gender & Sexuality in Sport, Native Amer Women Writers, Public Pol and Family

## College of Science Core: General Education

**Curricular Outcome:** Demonstrated breadth of knowledge and cultural appreciation. College of Science students will gain insights in the Humanities, Social Sciences, and/or Management to deepen their awareness of other disciplines of thought which complements and informs their scientific understanding of the world. The General Education requirement is met through completion of three courses (9 credits total) that have been approved to meet requirement. Students are encouraged to speak with their academic advisors about course options that expand their perspective and further develop analytical and critical thinking skills.

## Curricular Notices

- Students may use only ONE course (3 credits) from the following subjects: AGECE, MGMT, OBHR, ECON, or ENTR to meet their general education requirement.
- Approved courses may be used in any combination to satisfy the General Education requirement. Note: Presence of a course on the list does not guarantee that the course will be available during all terms.
- Some courses on the General Education approved course list share the same course subject and number, however, they have different variable titles. Only those titles listed are approved. Consult with your advisor if you have a question about the suitability of a course.
- Courses which have been taken to meet the General Education requirement **may not** also be used to meet a student's Culture/Diversity (Language and Culture) or Great Issues requirement.
- College of Science students are invited to nominate courses for the general education requirement. Please submit course suggestions to your academic advisor.

\*Fall, 2013 students and forward only.

## Approved Courses by Subject

### African American Studies (AAS)

- AAS 27100 - Introduction To African American Studies
- AAS 27700 - African American Popular Culture
- AAS 35900 - Black Women Writers
- AAS 37000 - Black Women Rising
- AAS 37100 - The African American Experience The Black Athlete, African American Health, Anthropology and Blackness, Blackness & Culture, Issues in Contemporary Africa, Racism and Prejudice in America, African American Music, Black Leisure & Recreation, African American Athletes and the Problem of Race, Black Politics, Black Women in Politics
- AAS 37300 - Issues In African American Studies Afr Diaspora Caribbn&LtnAmer, African American Women and Activism, Black Male Youth Culture in the Wire, Black Speculative Fiction, Blackness and Culture, History of Injustice in the US, Issues in African American Studies, Lit of the African Diaspora, Phil, Cult, African, American, Race and Religion in the U.S., Race, Religion & Popular Culture in the U.S.; America, Studies in African Diaspora, The Harlem Renaissance, Toni Morrison, The Black Community, North African Lit & Culture, Post Sout Black Lit Pos 1960, Philosophy and Culture
- AAS 37500 - The Black Family
- AAS 37600 - The Black Male
- AAS 39200 - Caribbean History And Culture
- AAS 47300 - Blacks In Hollywood Film
- AAS 49100 - Special Topics In African American Studies African-American Protest Lit, Afro Borinquen Cult&Identity, Black Satire and Humor, Carnival:Re-member Diasp Trad, Contemporary Issues in Black Education, Identity in the Midst of Differences, Teaching the Wire, The Classics and Black Literature, W.E.B. DuBois, African American Chorl Foundtns, Cultural Heritage, Africa in 20th Century
- AAS 57500 - Theories Of African American Studies

### Art & Design (AD)

- AD 12500 - Introduction To Interior Design
- AD 22600 - History Of Art To 1400
- AD 22700 - History Of Art Since 1400
- AD 25100 - History Of Photography I
- AD 25500 - Art Appreciation
- AD 31100 - Ancient Greek Art

- AD 31200 - Ancient Roman Art
- AD 33400 - New Media Culture
- AD 33900 - Women Artists In The 20th Century
- AD 34300 - Northern Renaissance Art
- AD 34400 - Latin American Art In The 20th Century
- AD 34600 - Italian Renaissance Art
- AD 34800 - History Of Islamic Art
- AD 35900 - Medieval European Art
- AD 38000 - Baroque Art
- AD 38200 - A Global History Of Modern Art
- AD 38300 - Modern Art
- AD 38400 - Contemporary Art
- AD 38500 - History Of Interior Design
- AD 39100 - History Of Chinese Art
- AD 39500 - History Of Design
- AD 45400 - Modern Architecture

## Agricultural Economics (AGEC)

- AGEC 21700 - Economics (*satisfies BSS for core*)

## American Studies (AMST)

- AMST 10100 - America And The World
- AMST 20100 - Interpreting America African American Pop Culture, American Social Movements - Honors, Asian American Pop Culture, Automobiles in America, Fan Users and Games, Global Habitats, Community Development & Sustainability, Electronic Music & Pop Culture, Fashion & Technology, Interpreting America, Intro Asian American Studies, Intro to American Studies: Arab-American Literature, Global habitats, Community Development & Sustainability, Asian American Pop Culture, Interpreting America: Arab-American Lit (select options may satisfy HUM for core)
- AMST 30100 - Perspectives On America 1960's America, African-American Protest Lit, American Beauty, American Representations of the Middle East and North Africa, American Studies/Global Studies, American Virgin, Arabic Lit in Translation, Beat Generation and American Culture, Civil War Memory, Contemporary Issues in Asian American Studies, Cultures of Beauty, Democracy and Education, Diversity in American University, Food in Modern America, Gender & Revolution in Modern America, Gender, Media & Pop Culture, Gender, Science & Technology, Global Health Sustainability & ComDev, Intro Asian American Studies, Living History, Muslims in America, New Media Culture, Race, Religion, and Popular Culture in America, Sex, Race, and Science, Sport/Gender, Technology, Culture & Society, The Color Line, The Other Great Depression - Honors, Virtual Reality, Women and Health in America, Zora Neale Hurston, Understanding the NFL, Social Issues Immigration, Spanish American Literature in Translation, Theories of Global Studies, Electronic Music & Pop Culture, New Media, Data Viz For Societal Problems, The 1960's Rock to Revolution, North African Lit & Culture, Asian American Popular Culture, Global History Theory & Practice, Afro-Asia Pol & Cul Alli, Perspectives on America, Post Soul Black Lit Post 1960, Sports & Popular Feminisms, Sports & Popular Feminisms, Contemporary Issue ASAM: Disney
- AMST 31000 - Invention, Innovation, And Design
- AMST 32000 - Understanding The National Football League
- AMST 32500 - Sports, Technology, And Innovation

## Animal Sciences (ANSC)

- ANSC 33100 - The Role Of Horses In Human History, Culture, And Society

## Anthropology (ANTH)

- ANTH 10000 - Being Human: Introduction To Anthropology
- ANTH 20100 - Introduction To Archaeology And World Prehistory
- ANTH 20300 - Biological Bases Of Human Social Behavior
- ANTH 20400 - Human Origins
- ANTH 20500 - Human Cultural Diversity
- ANTH 21000 - Technology And Culture
- ANTH 21200 - Culture, Food And Health
- ANTH 23000 - Gender Across Cultures
- ANTH 23500 - The Great Apes
- ANTH 25400 - Archaeological Hoaxes, Myths And Frauds
- ANTH 25600 - Archaeology Of Beer
- ANTH 28200 - Introduction To LGBTQ Studies
- ANTH 30700 - The Development Of Contemporary Anthropological Theory
- ANTH 31000 - Mortuary Practices Across Cultures
- ANTH 31100 - The Archaeology Of The Ancient Andes
- ANTH 31200 - The Archaeology Of Ancient Egypt And The Near East
- ANTH 31300 - Archaeology Of North America
- ANTH 32000 - Ancient States And Empires
- ANTH 32700 - Environment And Culture
- ANTH 33500 - Primate Behavior
- ANTH 33600 - Human Variation
- ANTH 33700 - Human Diet: Origins And Evolution
- ANTH 34000 - Global Perspectives On Health
- ANTH 34100 - Culture And Personality
- ANTH 35800 - African Cultures
- ANTH 37000 - Ethnicity And Culture
- ANTH 37300 - Anthropology Of Religion
- ANTH 37700 - Anthropology Of Hunter-Gatherer Societies
- ANTH 37800 - Archaeology And Cultural Anthropology Of Mesoamerica (Mexico, Belize And Guatemala)
- ANTH 37900 - Native American Cultures
- ANTH 38000 - Using Anthropology In The World
- ANTH 38400 - Designing For People: Anthropological Approaches
- ANTH 39200 - Selected Topics In Anthropology Anthropology of Water: Development & Justice, Anthropology and Blackness, Anthropology of Reproductive Health, Anthropology of Tourism & Global Culture, Anthropology of Violence, Archaeology of Religion and Ritual, Blackness and Culture, Community Engagement, Cult Shaping Violence, Emcees & Jihadis Race & Pop Cult, Ethnicity & Culture, People & Parks: Anthropology of Conservation, Pregnancy Birth & Babies, Race & Religion in the U.S., Race, Religion and Popular Culture in America, Sustain Dev & Govern Africa - Honors, The African Amer Experience, Urban-Rural Change in Latin America, Anthropology of Beer Craft, Visual Anthropology, Myths & Hoaxes in Archaeology, Evidence: How Things Become True, Amazonia and Film, Archaeology of Beer, Critical Approach to Sci&Tech, Intro to Forensic Anthropology
- ANTH 40400 - Comparative Social Organization
- ANTH 41400 - Introduction To Language And Culture

- ANTH 42500 - Archaeological Method And Theory
- ANTH 43600 - Human Evolution
- ANTH 48200 - Sexual Diversity In Global Perspectives
- ANTH 50400 - Archaeological Theory
- ANTH 50500 - Culture And Society
- ANTH 50700 - History Of Theory In Anthropology
- ANTH 53400 - Human Osteology
- ANTH 53500 - Foundations Of Biological Anthropology
- ANTH 53600 - Primate Ecology
- ANTH 57500 - Economic Anthropology
- ANTH 59200 - Selected Topics In Anthropology Anth Ed: Race, Gender, Class & Idnt, Applied Anthropology, Developmental Anthropology, Evidence and Expertise, Human Genitals and Cultures, Medical Anthropology, Anthropology of Aging, Climate Change in Antiquity

## Arabic (ARAB)

- ARAB 23000 - Arabic Literature In Translation
- ARAB 23900 - Arab Women Writers
- ARAB 28000 - Arabic Culture (*satisfies HUM for core*)
- ARAB 28100 - Introduction To Islamic Civilization And Culture
- ARAB 33400 - North African Literature And Culture
- ARAB 58700 - Modern Arab Thought

## Asian American Studies (ASAM)

- ASAM 24000 - Introduction To Asian American Studies
- ASAM 34000 - Contemporary Issues In Asian American Studies Afro-Asia Pol & Cul Alli, Introduction To Asian American Studies, Asian American PopCult, Contemporary Issues In Asian American Studies, Contmp Issue ASAM: Disney, Social Issues in Immigration

## Agricultural Sciences, Education, & Communication (ASEC)

- ASEC 33100 - The Role Of Horses In Human History, Culture And Society
- ASEC 49100 - Special Topics In Agricultural Science And Education Communication Consequences of Race and Privilege in Today's American

## American Sign Language (ASL)

- ASL 28000 - American Deaf Community: Language, Culture, And Society

## Chinese (CHNS)

- CHNS 24100 - Introduction To The Study Of Chinese Literature
- CHNS 28000 - Topics In Chinese Civilization And Culture Chinese Culture
- CHNS 28100 - Introduction To Chinese Food Culture
- CHNS 33000 - Introduction To Chinese Cinema

- CHNS 34100 - Chinese Literature I: Traditional Chinese Literature
- CHNS 34200 - Chinese Literature II: Modern Chinese Literature
- CHNS 49000 - Special Topics In Chinese Language Food Culture Drinks and Snacks, Intro to Chinese Food Culture, Introductions to Chinese Films
- CHNS 59400 - Special Topics In Chinese Literature Chinese Classical Tales, Chinese Lit and Culture, Chinese Poetry & Painting, Dream of Red Chamber, Modern Chinese Theatre, Poetry of Li Bai and Du Fu, Special Topics in Chinese Literature, Tang Dynasty Poetry

## Classics (CLCS)

- CLCS 18100 - Classical World Civilizations
- CLCS 23010 - Survey Of Greek Literature In Translation
- CLCS 23100 - Survey Of Latin Literature
- CLCS 23300 - Comparative Mythology
- CLCS 23500 - Introduction To Classical Mythology
- CLCS 23700 - Gender And Sexuality In Greek And Roman Antiquity
- CLCS 23800 - The Tragic Vision
- CLCS 23900 - The Comic Vision
- CLCS 28000 - Topics In Classical Civilization Ancient Near Eastern History & Culture, Culture and Society in the Age of Pericles, Studies in Greek Warfare
- CLCS 33700 - The Ancient Epic
- CLCS 38000 - Alexander The Great And Hellenistic World
- CLCS 38100 - Julius Caesar: Statesman, Soldier, Citizen
- CLCS 38300 - The Roman Empire
- CLCS 38400 - Ancient Western Medicine
- CLCS 38500 - Science, Medicine And Magic In The Ancient West
- CLCS 38600 - Ancient Greek Religion
- CLCS 38700 - Roman Religion
- CLCS 48000 - Potters And Society In Antiquity
- CLCS 48100 - Culture And Society In The Age Of Pericles
- CLCS 48300 - Republican Rome
- CLCS 59300 - Special Topics In Classical Literature The Classics and Black Literature

## Comparative Literature (CMPL)

- CMPL 23000 - Crossing Borders: Introduction To Comparative Literature Arab Women Writers, Arab-American Literature, Arabic Culture, Arthurian Lit: Medieval to Mod, Brit Lit thru 18 Ct, Dragons, Intro to Comparative and Arabic Literature, Intro to Comparative Literature, Intro to Islamic Civ & Cul, Israel & the Modern World, Italian Women Writers in Translation, Myths & Legends: Elves to Elvis, Nature in German Literature, Philosophy of Art, Russian Literature II, Soviet Literature and Beyond, Spanish American Literature in Translation, Women Writers in Translation, North African Lit & Culture, The Comic Vision, A Brief History of Doom, & German Literature in Translation
- CMPL 26600 - World Literature: From The Beginnings To 1700 A D
- CMPL 26700 - World Literature: From 1700 A D To The Present

## Communication (COM)

- COM 22400 - Communicating In The Global Workplace

- COM 25000 - Mass Communication And Society
- COM 25100 - Communication, Information, And Society
- COM 31200 - Rhetoric In The Western World
- COM 31400 - Advanced Presentational Speaking
- COM 31500 - Speech Communication Of Technical Information
- COM 31800 - Principles Of Persuasion
- COM 32000 - Small Group Communication
- COM 35100 - Mass Communication Ethics

## Dance (DANC)

- DANC 37800 - Survey Of Concert Dance History

## Economics (ECON)

- ECON 21000 - Principles Of Economics
- ECON 25100 - Microeconomics
- ECON 25200 - Macroeconomics

## Educational and Psychology Studies (EDPS)

- EDPS 23500 - Learning And Motivation
- EDPS 31500 - Collaborative Leadership: Interpersonal Skills
- EDPS 31600 - Collaborative Leadership: Cross-Cultural Settings
- EDPS 31700 - Collaborative Leadership: Mentoring

## English (ENGL)

- ENGL 20200 - Engaging English
- ENGL 21700 - Figures Of Myth And Legend I: Monsters
- ENGL 21800 - Figures Of Myth And Legends II: Heroes And Villains
- ENGL 21900 - Figures Of Myth And Legend III: Magic And Marvels
- ENGL 22300 - Literature And Technology
- ENGL 22400 - Literature, Money, And Markets
- ENGL 22500 - Literature, Inequality, And Injustice
- ENGL 22600 - Narrative Medicine
- ENGL 22800 - Language And Social Identity
- ENGL 23000 - Great Narrative Works
- ENGL 23200 - Thematic Studies In Literature Arab Women Writers, Arab-American Literature, Arabic Culture, Arabic Lit in Translation, Arthurian Literature: Medieval to Mod, Contemporary Foreign Women Writers, Dragons, German Folk & Fairy Tales, Intro to Islamic Civ & Cul, Italian Women Writers in Translation, Math, Science, & Literature, Nature in German Literature, Pirates!, Span Am Lit in Trans, The Novels of Stephen King, Tolkein, Vikings!, Women Writers in Translation, Interpreting the Play Script, Sports & Literature, Russian and Slavic Fairy Tales, Intro to Disability Studies, North African Lit & Culture, The Tragic Vision
- ENGL 23400 - Literature And The Environment
- ENGL 23700 - Introduction To Poetry



- ENGL 23800 - Introduction To Fiction
- ENGL 24000 - British Literature Before 1789
- ENGL 24100 - British Literature After 1789
- ENGL 24900 - Great British Books
- ENGL 25000 - Great American Books
- ENGL 25700 - Literature Of Black America
- ENGL 26200 - Greek And Roman Classics In Translation
- ENGL 26400 - The Bible As Literature
- ENGL 26600 - World Literature: From The Beginnings To 1700 A.D.
- ENGL 26700 - World Literature: From 1700 A.D. To The Present
- ENGL 27600 - Shakespeare On Film
- ENGL 27900 - The American Short Story In Print And Film
- ENGL 28000 - Games, Narrative, Culture
- ENGL 28600 - The Movies
- ENGL 32200 - Word, Image, Media
- ENGL 33000 - Games And Diversity
- ENGL 33100 - Medieval English Literature
- ENGL 34100 - Topics In Science, Literature, And Culture Exploring Nature, Genetic Engineering & Literature, Human Env & End of Nature, Lit & Scientific Paradigm - Honors, Literature, Nature and Travel, Oil & Water: Science, Literature, Disaster, Science Literature & Climate Change - Honors, The Invention of Nature, COVID Conspiracy Apocalyp Lit
- ENGL 34200 - Legal Fictions
- ENGL 34300 - Labor And Literature
- ENGL 34400 - Environmental Ethics, Policy, And Sustainability
- ENGL 34500 - Games And World Building
- ENGL 35000 - American Literature Before 1865
- ENGL 35100 - American Literature After 1865
- ENGL 35200 - Native American Literature
- ENGL 35400 - Asian American Literature
- ENGL 35800 - Black Drama
- ENGL 35900 - Black Women Writers
- ENGL 36000 - Gender And Literature
- ENGL 36500 - Literature And Imperialism
- ENGL 36600 - Postcolonial Literatures
- ENGL 36700 - Mystery And Detective Fiction
- ENGL 37300 - Science Fiction And Fantasy
- ENGL 37700 - Modern And Contemporary Poetry
- ENGL 37900 - The Short Story
- ENGL 38000 - Issues In Rhetoric And Public Life
- ENGL 38100 - The British Novel
- ENGL 38200 - The American Novel
- ENGL 38600 - History Of Film To 1950
- ENGL 38700 - History Of Film Since 1950
- ENGL 38900 - Literature For Children
- ENGL 39200 - Young Adult Literature
- ENGL 39300 - Interdisciplinary Approaches To Environmental And Sustainability Studies
- ENGL 39600 - Studies In Literature And Language African-American Protest Lit, Bad Film, Film Noir, Games, Narrative, & Culture, Latina/o Literature, Latina/o of the US, Living History, Maghrebi Literature &

Culture, Spirit of Italian Comedy, Theories of Global Studies, Intro to Disability Studies, Games & Narrative, Games & World Building, Women & Games: Design Dev & Play, International Cinema, Language & Humor, Cinematic Shakespeare, Post SoulBlack Lit Post 1960, Teaching for Social Justice

- ENGL 41100 - Studies In Major Authors Hurston, Herman Melville, Jane Austen, Mark Twain, Octavia Butler, Tolkein, Toni Morrison, Virginia Woolf, W.E.B. Du Bois, William Faulkner, Zora Neale Hurston, Chaucer, Chaucer and Subjectivity; Be Yourself, But Also Don't
- ENGL 41200 - Studies In Genre Literary Modernism, American Women Poets, Black Satire and Humor, Black Speculative Fiction, The Literary Gothic, The Modern Novel, Twenty-First Century Novel, Twenty First Century Fiction, American Autobiography, American Short Story, Digital Humanities
- ENGL 41300 - Studies In Literature And History Florence & the Renaissance, Beowulf to Shakespeare, Children & Literature in Historical Perspective, Harlem Renaissance, History of the Book, Renaissance Mind: Florence 1250-1550, Studies in African Diaspora, Tudors in Literature & Film, Vikings and Literature, Tudors Queens in Lit & Film, Early American Networks, Lit in the Age of Eugenics, Gilded Age, The Heavens to Outer Space
- ENGL 41400 - Studies In Literature And Culture New England Literary Journeys, 19th Century New England Literary Journey, Ecocriticism, Science, and Lit, Environment Studies, Climate Change & Film, Literature and Disability, Literature and Disability: Deaf & Blind Culture, Postmodern Lit & Culture, The Black Male Image, The Hum & Higher Ed - Honors, The Nature of Nature, War, Terrorism, Globalization, and the Role of Literature, Witchcraft and Wonder in Early American Literature, Word, Image, Media, Sci & Wonder in Early Amer Lit
- ENGL 43900 - Topics In Disability Studies Topics in Disability Studies: Bodies & Cultures, Disability in Fiction & Memoir, Eugenics Then & Now, Lit in the Age of Eugenics, Topics in Disability Studies
- ENGL 44100 - Chaucer's Canterbury Tales
- ENGL 44200 - Shakespeare
- ENGL 46000 - Studies In Women's Literature
- ENGL 46200 - The Bible As Literature: The Old Testament
- ENGL 46300 - The Bible As Literature: The New Testament
- ENGL 52800 - Medieval English Literature
- ENGL 53100 - The Rise Of The Novel
- ENGL 53200 - The English Novel In The Nineteenth Century
- ENGL 53400 - Seventeenth-Century Literature
- ENGL 53500 - Restoration And Early Eighteenth-Century Literature
- ENGL 53800 - English Drama From The Restoration To The Modern Period
- ENGL 54100 - Studies In Chaucer's Canterbury Tales
- ENGL 54300 - Shakespeare In Critical Perspective
- ENGL 54400 - Milton
- ENGL 54700 - British Romanticism
- ENGL 54800 - Victorian Literature
- ENGL 55200 - Studies In Major American Authors Toni Morrison & Louise Erdrich
- ENGL 55300 - Colonial And Early American Literature
- ENGL 55400 - American Literary Culture 1820-1860
- ENGL 55700 - Nineteenth-Century African-American Narrative
- ENGL 55800 - American Literature In The Later Nineteenth Century
- ENGL 56000 - Modern American Poetry
- ENGL 57300 - Tragedy
- ENGL 57900 - Modern British Fiction
- ENGL 58300 - U S Ethnic/Multicultural Literature
- ENGL 59200 - Postcolonial Studies
- ENGL 59300 - Contemporary British Fiction
- ENGL 59400 - Contemporary Poetry

- ENGL 59500 - Contemporary American Fiction
- ENGL 59600 - Advanced Studies In Literature Or Language Bad Film, Environmental Ethics, Games & UX, Games, Narrative, & Culture, History of Alt Film Making, Modern Arab Thought, Mod Euro Rhetoric, Poetics, Narrative, Postculturalism, Stephen King's Short Stories, The Continental Novel, Women&Games: Design Dev & Play, Young Adult Literature, Tragedy & Phil, Writing the Divine, Magic & Realism, Revolutionary Poetics, Philosophy & Lit Theory, American Poetry's Great Debuts, Early American Networks, Literature for Children
- ENGL 59700 - Contemporary Black Feminist Literature

## Entrepreneurship (ENTR)

- ENTR 20000 - Introduction To Entrepreneurship And Innovation
- ENTR 31000 - Marketing And Management For New Ventures
- ENTR 47000 - Gender, Diversity And Leadership

## French (FR)

- FR 24100 - Introduction To The Study Of French Literature
- FR 33000 - French Cinema
- FR 34100 - French Literature I: From The Middle Ages To The Enlightenment
- FR 34200 - French Literature II: The 19th And 20th Centuries
- FR 38000 - Special Topics In French Culture And Civilization French Food Culture, Special Topics in French Culture and Civilization: La Gastronomie, Sport/Spectacle Berlin/Paris
- FR 39400 - Special Topics In French Literature French Caribbean Literatures, Out of Africa
- FR 44300 - Introduction To Francophone Literature
- FR 48000 - French Civilization
- FR 54100 - Renaissance French Literature
- FR 54900 - French Literature And Film
- FR 55800 - French Novel Of The Twentieth Century
- FR 58100 - French Culture
- FR 58200 - Francophone Cultures
- FR 59400 - Special Topics In French Literature Conte Francais, Introduction to Francophone Literature, Litterature Quebecoise, The Continental Novel, Contemporary Fiction, French Caribbean Literature

## Food Science (FS)

- FS 47000 - Wine Appreciation

## Film and Video Studies (FVS)

- FVS 49100 - Special Topics In Film/Video Studies Films of Martin Scorsese, Jewish Cinema, Mafia and The Movies, Terrorism & The Movies, Cinematic Shakespeare, Feminist Prsp on Film & Camera, Post-Soviet Russian Cinema, Spirit of Ital Comedy

## German (GER)

- GER 23000 - German Literature In Translation German Fairy Tales, German Folk & Fairy Tales, Myth, Legend, & Folklore, Myths & Legends: Elves to Elvis, Nature and the Environment in German Literature and Thought, Nature in German Literature, Supernatural & Uncanny Ger Lit, Vikings, Monsters, Grimm & God, A Brief History or Doom, German Lit in Translation (select courses satisfy Humanities for core)
- GER 24100 - Introduction To The Study Of German Literature
- GER 28000 - German Special Topics Beer and Brewing in German Culture
- GER 33000 - German Cinema (satisfies Human Cultures Humanities for core)
- GER 34100 - German Literature I: From The Middle Ages To The 18th Century
- GER 34200 - German Literature II: From The 18th Century To The 21st Century
- GER 48000 - German Civilization
- GER 49800 - Advanced Topics In German The Cultures of Fascism
- GER 54400 - German Romanticism
- GER 54500 - German Prose From Naturalism To The Present
- GER 55100 - Lyric Poetry From Romanticism To The Present
- GER 55400 - German Drama Before Naturalism
- GER 55500 - German Drama From Naturalism To The Present
- GER 58100 - German Culture
- GER 59400 - Special Topics In German Literature Nietzsche: Literature & Values, Orientalism in German Literature, The Continental Novel, German Novelle

## Global Studies Liberal Arts (GSLA)

- GSLA 10100 - Global Awareness

## Human Development and Family Sciences (HDFS)

- HDFS 21000 - Introduction To Human Development
- HDFS 33000 - Sexuality And Family Life

## Hebrew (HEBR)

- HEBR 28400 - Ancient Near Eastern History And Culture
- HEBR 38000 - Israel And The Modern World: Cinema, Literature, History And Politics

## History (HIST)

- HIST 10300 - Introduction To The Medieval World
- HIST 10400 - Introduction To The Modern World
- HIST 10500 - Survey Of Global History
- HIST 15100 - American History To 1877
- HIST 15200 - United States Since 1877
- HIST 20100 - Special Topics In History Ancient Judaism & Early Christianity, Ancient Near Eastern History & Culture, History of Globalization, History of the Military Art
- HIST 21000 - The Making Of Modern Africa
- HIST 21100 - The Global Field: World Soccer And Global History
- HIST 22100 - History Behind The Headlines
- HIST 22800 - English History To 1688

- HIST 23005 - Hitler's Europe
- HIST 23800 - History Of Russia From Medieval Times To 1861
- HIST 23900 - History Of Russia From 1861 To The Present
- HIST 24000 - East Asia And Its Historic Tradition
- HIST 24100 - East Asia In The Modern World
- HIST 24300 - South Asian History And Civilizations
- HIST 24600 - Modern Middle East And North Africa
- HIST 25000 - United States Relations With The Middle East And North Africa
- HIST 27100 - Introduction To Colonial Latin American History (1492-1810)
- HIST 27200 - Introduction To Modern Latin American History (1810 To The Present)
- HIST 27800 - Money, Trade, And Power: The History Of Capitalism
- HIST 30000 - Eve Of Destruction: Global Crises And World Organization In The 20th Century
- HIST 30200 - Historical Topics African American Women's Intellectual Tradition, Amer & Territorial Empire, America 1914-1945, America in the 1970's, American Economic History, Ancient Judaism & Early Christianity, Arab-Israeli Conflict, Boxing in Culture, Conquistadors in Red, White, and Black, Controversies Contemp Korea, Creoles, Vampires, Quadroon Balls, Cultures of Beauty, Death, Disease & Medicine in 20th Century American History, Democracy and Education, Digital History, Flight Paths - Honors, Gender & Medieval Religion, Gender and War in the Time of Napoleon - Honors, Hamilton the Musical, History of Alchemy, History of Sports in America, History of U.S. Agriculture, History of US Presidential Debate, Hitler and Nazis, Imperial Spain 1469-1714, Introduction to Jewish Studies, Kennedy Assassination in Global Perspective, Korean History, Present-1945, Modern Warfare, Muslim Women in History, Nationalism and Socialism, Queens & Empresses, Race and Boxing, Religion in American History & Culture, Religion in American Society & Politics 1607-1877, Revolutions in the Atlantic World, ROMA History, Music & Culture, Sex, Race, and Science, Shakespeare's Kings: The History Plays, Sports in America, Technology, Innovation, and the US Civil War, The Bible & its Early Interpreters, The Traveler's Gaze, The US In The World, Warfare & Diplomacy, Youth in Revolutionary China, Black Pop Culture & Civil Rights, WWI and the Middle East, Afro-American Athletes & Race, Hitler's Europe, Muslim Americans, Witchcraft & Magic in History, Brewing & The American Expr, Early Modern Madness, History of Ireland: 1556-1921, Modern Korean History, American Colonies, Global 1960s Revolution, Global Hist Theory & Practice, AA Athletes & Problem of Race
- HIST 30305 - Food In Modern America
- HIST 30400 - America In The 1960s
- HIST 30505 - The United States In The World 1898-Present
- HIST 30605 - Technology And War In U.S. History
- HIST 31005 - The Civil War And Reconstruction, 1850 To 1877
- HIST 31205 - The Arab-Israeli Conflict
- HIST 31305 - Medical Devices And Innovation
- HIST 31405 - Science, Technology, Engineering And Mathematics (STEM) And Gender
- HIST 31505 - American Beauty
- HIST 31700 - A History Of The Christian Church And The Expansion Of Christianity I
- HIST 31905 - Christianity In The Global Age
- HIST 32105 - Spain: The First Global Empire, 1469-1713
- HIST 32300 - German History
- HIST 32400 - Modern France
- HIST 32501 - Twentieth Century Europe Through Autobiography
- HIST 32900 - History Of Women In Modern Europe
- HIST 33205 - The Nuclear Age
- HIST 33300 - Science And Society In Western Civilization I
- HIST 33400 - Science And Society In Western Civilization II
- HIST 33505 - Nationalism And Socialism In East Central Europe

- HIST 33700 - Europe In The Age Of The Cold War
- HIST 33805 - History Of Human Rights
- HIST 33900 - Traditional China
- HIST 34000 - Modern China
- HIST 34300 - Traditional Japan
- HIST 34400 - History Of Modern Japan
- HIST 34505 - Arabs in American Eyes
- HIST 34705 - History Of Religion In America
- HIST 34901 - The First World War
- HIST 35000 - Science And Society In The Twentieth Century World
- HIST 35100 - The Second World War
- HIST 35205 - Death, Disease And Medicine In Twentieth Century American History
- HIST 35305 - Sports In America
- HIST 35400 - Women In America To 1870
- HIST 35500 - History Of American Military Affairs
- HIST 35900 - Gender In East Asian History
- HIST 36305 - The History Of Medicine And Public Health
- HIST 36600 - Hispanic Heritage Of The United States
- HIST 37005 - Queens And Empresses In Early Modern Europe
- HIST 37100 - Society, Culture, And Rock And Roll
- HIST 37200 - History Of The American West
- HIST 37500 - Women In America Since 1870
- HIST 37600 - History Of Indiana
- HIST 37700 - History And Culture Of Native America
- HIST 38001 - History Of United States Agriculture
- HIST 38200 - American Constitutional History
- HIST 38300 - Recent American Constitutional History
- HIST 38400 - History Of Aviation
- HIST 38505 - Media, Politics And Popular Culture
- HIST 38605 - Land Of The Indians: Native Americans In Indiana
- HIST 38700 - History Of The Space Age
- HIST 39400 - Environmental History Of The United States
- HIST 39500 - Junior Research Seminar 1960s America, Air & Space: The Technology & Culture of Flight, Children's Literature, Conspiracy & Conspiracy Theory, Cultural Studies Children's Literature, Discover Your Roots, Gender and Politics, Gender & War in Modern Europe, German-Occupied Europe, Global History of Oceans, Hist of Medicine in Archives, History & Memory, History as Conspiracy, History of Human Rights, History of Race and Law, Indian Crossroads-Colonial City, Magic, Science, Faith, Medicine & Public Health in US, Misfits Castoffs Colonial Amer, Occupied Europe, Politics and Culture in Cold War America: The 1950s, Politics Mod Latin America, Politics of Popular Culture 20th Century U.S., Pop Culture Goes to War, Race And The Law In The U S, Sovereign Nations of Southwest, The Civil Rights Movement, The Gender Revolution in Modern America, The Global Cold War, The Politics of Popular Culture in 20th Century US, Witches, Wenches & Pirates, Women's Voices in Early Modern Europe, Writing Global American History, Foods, Fads & Fitness in America, Afro Amer Athl & Civil Rights, Dynasties & Intl Politics, The Moon Race, Roots of the Climate Crisis, American Environmental Hist, Purdue Changemakers:1940-2000, Capitalism&Democracy Erly Amer, America in the 1980s, Human Rights, Nrthn Indian Removal 1783-1850
- HIST 39600 - African American History To 1877
- HIST 39800 - African American History Since 1877
- HIST 40000 - Great Books And The Search For Meaning

- HIST 40300 - Europe In The Reformation
- HIST 40500 - The French Revolution And Napoleon
- HIST 40600 - Rebels And Romantics: Europe 1815-1870
- HIST 40700 - Road To World War I: Europe 1870-1919
- HIST 40800 - Dictatorship And Democracy: Europe 1919-1945
- HIST 41005 - History Of The American Presidency
- HIST 41300 - Modern European Imperialism: Repression And Resistance
- HIST 41505 - Gender And Politics In Early Modern Europe
- HIST 42300 - Advanced Topics In Modern Germany Divided Germany, German Business History, Germany & France: War, Peace & Memory
- HIST 43900 - Communist China
- HIST 44100 - Africa In The Twentieth Century
- HIST 46000 - American Colonial History
- HIST 46100 - The Revolutionary Era, 1763 To 1800
- HIST 46700 - The Emergence Of Modern America
- HIST 46800 - Recent American History
- HIST 46900 - Black Civil Rights Movement
- HIST 47005 - Women And Health In America
- HIST 47300 - History Of The South
- HIST 47600 - The Civil War In Myth And Memory
- HIST 47700 - Native American Women's History
- HIST 48005 - Madness And The Asylum In The United States
- HIST 48500 - Topics In American Political History History of Pres Comm, The American Presidency, Work & Labor in Modern America
- HIST 48800 - History Of Sexual Regulation In The United States
- HIST 49200 - Seminar In Historical Topics 18th-Century Pacific Worlds, Afro American & Amer Labor Movement, Americans in the World, Catholic Priests & Nuns Movies, Gauchos and Cowboys on the Argentine Frontier, Gender, Science & Technology, Great Trials in History, History Of Argentina, History of Argentina 1810-Present, Jefferson to Turner, Late Imperial China, Life & Career of Winston Churchill, Race, Gender, Culture US - Honors, Refuges and Statelessness, Slavery & Freedom in Fact, Fiction, and Film, Southern History at the Movies, Spain Under the Habsburgs, The Confederacy Hist & Myth, US Imperialism, Women and Health in America
- HIST 49400 - Science And Society In American Civilization
- HIST 49500 - Research Seminar In Historical Topics 1960s America, American Foreign Relations, American Imperialism, American Missionaries in East Asia, Autobiographies & Memoirs, Chilies to Chocolate: How the Americas Changed the World, Com at the Dawn of the Republic, Flight and Space, Gender Revolution in Modern American, History of Madness and the Asylum, Indian Removal 19th Cent US, Interwar Jewish Experiences in E. Central Europe, Russia, and Middle East, Madness and the Asylum, Modern Civil Rights Movement, Native America and Colonial Settlement, Persistent Myths in Amer Hist, Pol & Popular Music:1945-1969, Politics & Popular Culture of Cold War America-Honors, Rel & Pol In Mid Amer, Sectional Crisis And American Civil War, Seminar on Native America, Spain in American Southwest, The Age of Elvis: America in the 1950's, Trials and History, War and Gender, Witchcraft & Magic, Women Modern America 1950-Pres, Medicine and Madness, Rights & Revolution Eur & America, Race & Civil Rights Movmnt, Psychedlic Psychiatry, Modern US Protest Movements, Native American History, Decolonization and After, Famine in World History, Gender and War, World War I in the Middle East, Race & Modern Civil Rights, Writing the Age of Revolutions
- HIST 51200 - England Under The Stuarts
- HIST 57600 - Problems In Latin American History
- HIST 59500 - The Holocaust And Genocide

## Honors (HONR)

- HONR 19900 - Interdisciplinary Honors - Introductory Seminar Beyond Afghanistan
- HONR 29900 - Interdisciplinary Honors - Experiential Learning Underground Networks
- HONR 39900 - Interdisciplinary Honors - Special Topics Seminar Human Redesign Calendar, Beyond Afghanistan
- HONR 46000 - Technological Justice

## Interdisciplinary Studies (IDIS)

- IDIS 49100 - Special Topics In Interdisciplinary Studies Arab Women Writers, Arabic Culture, British Literature, Cultural Encounters, Cultural Orphans in Latin America, Evolutn of Bible Revol Effcts, Gender & Medieval Religion, Ghosts in Global Culture, Intro to Islamic Civ & Cul, Jewish Cinema, Milton, Muslim Women in History, Muslims in America, Myth, Legend, & Folklore, Myths & Legends: Elves to Elvis, Race & Religion in the US, Religion & Violence, The Icelandic Saga, Two Koreas: Pol Econ Rivalry, Women Writers in Translat, Intro to Global Urban Envrnmnt, German Literature in Translation
- IDIS 59100 - Selected Topics In Interdisciplinary Studies Seventeenth Century Lit, The Continental Novel, Bible & Early Inerpret

## Information & Library Science (ILS)

- ILS 23000 - Data Science And Society: Ethical Legal Social Issues

## Italian (ITAL)

- ITAL 23100 - Dante's Divine Comedy
- ITAL 28100 - The Italian Renaissance And Its Scientific And Cultural Impact On Western Civilization
- ITAL 33000 - The Italian Cinema
- ITAL 33300 - The Spirit Of Italian Comedy
- ITAL 33500 - Italian-American Cinema
- ITAL 34100 - Italian Literature I: From The Middle Ages To The Enlightenment
- ITAL 34200 - Italian Literature II: From Romanticism To The Present
- ITAL 39300 - Special Topics In Italian Literature Or Cinema Italian Fashion: History, Italian Women Writers in Translation, La Dolce Vita: Italian Food, Mafia and The Movies, The Films of Martin Scorsese, The Cultures of Facism
- ITAL 49300 - Advanced Topics In Italian Literature Or Cinema Mafia & the Movies

## Japanese (JPNS)

- JPNS 24100 - Introduction To The Study Of Japanese Literature
- JPNS 28000 - Introduction To Modern Japanese Civilization
- JPNS 33000 - Japanese Cinema
- JPNS 34100 - Japanese Literature I: Modern Japanese Literature
- JPNS 36300 - Relationship Of Japanese Language And Society
- JPNS 48500 - Culinary Culture Of Japan



- JPNS 49000 - Special Topics In Japanese Language Contemporary Japanese Popular Literature & Culture, Japanese Culinary Culture, JPNS B Movies Document Films, JPNS Cinema II: Enter & Othr Fm, Modern JPNS Masterpiece Novels, Japanese Visual Culture, Japanese Songs, Japanese Society Through Songs
- JPNS 59400 - Special Topics In Japanese Literature Contemp JPNS Women Writers, Modern Japanese Fiction, The Continental Novel

## Jewish Studies (JWST)

- JWST 33000 - Introduction To Jewish Studies

## Korean (KOR)

- KOR 38000 - Special Topics In Korean Culture Dating, Sex & Marriage - Korea

## Latina & Latino Studies (LALS)

- LALS 25000 - Introduction To Latin American And Latino Studies
- LALS 26000 - U S Latino Culture
- LALS 30100 - Latin American Literary And Cultural Studies Hispanic Lit I
- LALS 40100 - Special Topics In Latin American/Latino Studies Latin Amer Civiliztn, Latin American Culture, Latina Feminisms

## Latin (LATN)

- LATN 34300 - Roman Oratory
- LATN 34400 - Roman Epic
- LATN 34500 - Roman Elegy
- LATN 34700 - Roman Comedy
- LATN 44300 - Roman Satire
- LATN 44400 - Roman Philosophers
- LATN 44600 - Roman Historians
- LATN 49000 - Directed Reading In Latin Latin Paleography
- LATN 59000 - Directed Reading In Latin Latin Paleography

## Languages and Cultures (LC)

- LC 23000 - Crossing Borders: Introduction To Comparative Literature Intro to Islami Civ & Cul, Introduction To Comparative Literature, World Lit 1700 to Now
- LC 23100 - Fairytale, Folktale, Fable
- LC 23500 - East Asian Literature In Translation
- LC 23700 - Our Common Bond: Languages And Cultures In A Global Context
- LC 23900 - Women Writers In Translation Women Writers in Translation, Contemporary Foreign Women Writers in Translation, French Women Writers in Translation - Honors, Italian Women Writers in Translation(select courses satisfy Human Cultures Humanities for core)
- LC 33100 - Comparative Literature In Translation Kabbalah and Jewish Mysticism, Topics in Brazilian Culture

- LC 33300 - The Middle Ages On Film
- LC 33800 - Language Through Films
- LC 49000 - Special Topics In Foreign Languages And Literatures History of Chinese Art, Jewish Cinema, Leo Tolstoy His World and Art, Terrorism & The Movies, BTS and Kpop Culture, Bible & Early Interp, The Cultures of Facism, The Hispanic World, Cold War Cultures in Korea, Tolstoy and His Age
- LC 59300 - Special Topics In Literature Dostoevsky and His Age, Leo Tolstoy His World and Art, Mod Europ Narratv Theory Pract, Modern Arab Thought, ModEuroRhetorc,Poetcs,Narrativ, Nietzsche: Literature & Values, Stephen King's Short Stories, The Continental Novel, The Icelandic Saga, Theory of Creativity, Approaches to Narrative, Don Quixote and Cervantes, Borders and Borderlands, Tolstoy and His World

## Medieval & Renaissance Studies (MARS)

- MARS 22000 - Introduction To Medieval And Renaissance Studies Dragons, Arthurian Literature: Medieval to Modern, Love, Sex, and Gender in Western European Literature, Middle Ages on Film, Pirates!, The Tudors, Vikings!
- MARS 42000 - Medieval And Renaissance Studies Seminar Beowulf to Shakespeare, Chaucer's Troilus, Renaissance Mind: Florence 1300-1600, The Bible as Literature: The New Testament, Tudors in Literature and Film

## Management (MGMT)

- MGMT 20000 - Introductory Accounting
- MGMT 21200 - Business Accounting
- MGMT 24200 - Contemporary Problems In Personal Finance For Minorities
- MGMT 24300 - Contemporary Thought Of Minorities In Management
- MGMT 32300 - Principles Of Marketing
- MGMT 32400 - Marketing Management
- MGMT 45500 - Legal Background For Business I

## Music History & Theory (MUS)

- MUS 13200 - Music Theory I
- MUS 13300 - Music Theory II
- MUS 23200 - Music Theory III
- MUS 25000 - Music Appreciation
- MUS 37500 - Selected Topics In Music Beethoven, Brahms, Celebratory Baroque Music, Mozart, The Music of Handel, World Music
- MUS 37600 - World Music
- MUS 37800 - Jazz History
- MUS 38100 - Music History I: Antiquity To Mozart
- MUS 38200 - Music History II: Beethoven To The Present
- MUS 49000 - Guided Reading In Music History of Rock Music

## Naval Science (NS)

- NS 21300 - Sea Power And Maritime Affairs
- NS 33000 - Evolution Of Warfare

- NS 41300 - Naval Leadership And Ethics

## Organizational Behavior & Human Resources (OBHR)

- OBHR 33000 - Introduction To Organizational Behavior

## Philosophy (PHIL)

- PHIL 11000 - The Big Questions: Introduction To Philosophy
- PHIL 11005 - I Play, Therefore I Am: Introduction To Philosophy Through Video Games
- PHIL 11100 - Introduction To Ethics
- PHIL 11400 - Global Moral Issues
- PHIL 12000 - Critical Thinking
- PHIL 20600 - Introduction To Philosophy Of Religion
- PHIL 20700 - Ethics For Technology, Engineering, And Design
- PHIL 20800 - Ethics Of Data Science
- PHIL 21900 - Philosophy And The Meaning Of Life
- PHIL 22100 - Introduction To Philosophy Of Science
- PHIL 22300 - Fate And Free Will
- PHIL 22500 - Philosophy And Gender
- PHIL 23000 - Religions Of The East
- PHIL 23100 - Religions Of The West
- PHIL 24000 - Social And Political Philosophy
- PHIL 24200 - Philosophy, Culture, And The African American Experience
- PHIL 26000 - Philosophy And Law
- PHIL 27000 - Biomedical Ethics
- PHIL 27500 - The Philosophy Of Art
- PHIL 28000 - Ethics And Animals
- PHIL 29000 - Environmental Ethics
- PHIL 29300 - Selected Topics In Philosophy Global Ethics, Philosophy of Disability, Science and Religion
- PHIL 30100 - History Of Ancient Philosophy
- PHIL 30200 - History Of Medieval Philosophy
- PHIL 30300 - History Of Modern Philosophy
- PHIL 30400 - Nineteenth-Century Philosophy
- PHIL 30600 - Twentieth-Century Philosophy
- PHIL 32200 - Philosophy Of Technology
- PHIL 40200 - Studies In Medieval Christian Thought
- PHIL 40300 - Moral Psychology And Climate Change
- PHIL 40600 - Intermediate Philosophy Of Religion
- PHIL 41100 - Modern Ethical Theories
- PHIL 42100 - Philosophy Of Science
- PHIL 42400 - Recent Ethical Theory
- PHIL 42500 - Metaphysics
- PHIL 43200 - Theory Of Knowledge
- PHIL 43500 - Philosophy Of Mind
- PHIL 46500 - Philosophy Of Language

- PHIL 49000 - Advanced Topics In Philosophy Early Greek Philosophy, Ethics and Philosophy of Info, Minds and Morals, Personal Identity, Moral Psych & Environment, Philosophy of Race
- PHIL 50100 - Studies In Greek Philosophy
- PHIL 50200 - Studies In Medieval Philosophy
- PHIL 50300 - Studies In Early Modern Philosophy
- PHIL 50500 - Islamic And Jewish Philosophy And The Classical Tradition
- PHIL 50600 - Advanced Philosophy Of Religion
- PHIL 50700 - Recent American Philosophy
- PHIL 51000 - Phenomenology
- PHIL 51400 - Twentieth-Century Analytical Philosophy I
- PHIL 51500 - Twentieth-Century Analytical Philosophy II
- PHIL 52000 - Existentialism
- PHIL 52400 - Contemporary Ethical Theory
- PHIL 52500 - Studies In Metaphysics
- PHIL 53000 - Deconstructionist And Postmodernist Philosophy
- PHIL 53200 - Studies In Theory Of Knowledge
- PHIL 53500 - Studies In Philosophy Of Mind
- PHIL 54000 - Studies In Social And Political Philosophy
- PHIL 54500 - Recent Analytic Philosophy
- PHIL 55100 - Philosophy Of The Natural Sciences
- PHIL 55200 - Philosophy Of The Social Sciences
- PHIL 55500 - Critical Theory
- PHIL 56200 - Reading To Argue

## Pharmacy Practice (PHPR)

- PHPR 49000 - Special Topics Traditnl Chns Med In Shanghai

## Political Science (POL)

- POL 10100 - American Government And Politics
- POL 12000 - Introduction To Public Policy And Public Administration
- POL 13000 - Introduction To International Relations
- POL 14100 - Governments Of The World
- POL 15000 - Introduction To Political Thought
- POL 20000 - Introduction To The Study Of Political Science
- POL 22200 - Women, Politics, And Public Policy
- POL 22300 - Introduction To Environmental Policy
- POL 22800 - Data Science And Public Policy
- POL 22900 - Emerging Problems In Political Science Global Habitats, Cmnty Dev & Sust, Terrorism, The US, Cuba & Latin America, Social and Political Philosophy, State Borders and Disputes, Data Science and Public Policy, Spies and Lies
- POL 23000 - Introduction To The Study Of Peace
- POL 23100 - Introduction To United States Foreign Policy
- POL 23500 - International Relations Among Rich And Poor Nations
- POL 23700 - Modern Weapons And International Relations
- POL 30000 - Introduction To Political Analysis

- POL 31400 - The President And Policy Process
- POL 32300 - Comparative Environmental Policy
- POL 32600 - Black Political Participation In America
- POL 32700 - Global Green Politics
- POL 33500 - China And The Challenges Of Globalization
- POL 34500 - West European Democracies In The Post-Industrial Era
- POL 34700 - Introduction To Latin American Politics
- POL 34800 - East Asian Politics
- POL 35100 - Foundations Of Western Political Theory: From Plato To The Reformation
- POL 35300 - Current Political Ideologies
- POL 36000 - Women And The Law
- POL 37200 - Indiana Government And Politics
- POL 37300 - Campaigns And Elections
- POL 41000 - Political Parties And Politics
- POL 41100 - Congress: Structure And Functioning
- POL 41300 - The Human Basis Of Politics
- POL 41500 - US Politics And The Media
- POL 42300 - International Environmental Policy
- POL 42500 - Environmental Law And Politics
- POL 42800 - The Politics Of Regulation
- POL 42900 - Contemporary Political Problems Am Political Communication, Am Presidents & Com With Cspan, Bioethics, Building Democratic Institution, Community Resilience, CSPAN:Com Democracy Thru Media, Digital Democracy, Food Policy-Honors, Health, Sustainability, & the Built Environment, Issues/Interviews w/Brian Lamb, It&rsquo;s a Complex World, Media Influe Conflit Envir, Model United Nations, Political Communication, Politics and Media, Politics Media & Pres Elect, Public Opinion & Elections, Public Opinion Polling, Science Technology and Policy, Supreme Ct & Const Law, The Politics of NASCAR Nation, Contemporary Political Problems, Intro to Nuc & Rad Security, Understand Fed Sci Pol & F, LGBTQ+ Politics, Black Women in Politics, Modeling for Public Policy, Pres COM in Election Yr
- POL 43000 - Selected Problems In International Relations Bargaining & Diplomacy, Causes & Consequences of War, International Human Rights, IR: The Iraq Wars, Selected Problems in International Relations, Theories of IR, War, Public Opinion, and US Foreign Policy, Spies & Lies Studies Intel & Secur, Nation-building and War, Conf & Devl: US in Afghanistan, Terrorism and Intl Security, Select Topics In Diplomacy, Terrorism and Intl Security
- POL 43200 - Selected Problems In World Order Selected Problems in World Order: Human Transformations
- POL 43300 - International Organization
- POL 43500 - International Law
- POL 43801 - International Human Rights
- POL 46000 - Judicial Politics
- POL 46100 - Constitutional Law I
- POL 46200 - Constitutional Law II
- POL 49100 - Political Science Senior Seminar American Race Relations, Contemporary Political Problems, Contemporary Power Relations, Democracy & Democratization, Democracy & Its Critics, Environmental Federalism, Hard Decisions, Health Care Policy and Politics, International Cooperation, Moving Across Borders, NIMBY Politics, Parliamnts Promote DemcrCy?, Power and Interest, Power, Bargaining, & Conflict, Public Opinion & Elections, Public Policy: Race, Class, Gender, Race, Class and Political Representation, Race, Gender & Political Representation, Southern Politics, SrSemr Congress Age of TV, SrSemr Conservatism, SrSemr DemcrCy & Critics, Terrorism And Media, The Iraq Wars, Comp Pol of Renewable Energy, Powers & International Order, Senior Seminar Env Policy, Politics of Japan and

China, The Rise and Fall of Dictators, Global Governance, Conservatism&US Foreign Policy, The Politics of Immigration, Con Law Death Pen & Privacy

- POL 49300 - Interdisciplinary Undergraduate Seminar Data Driven Apprch/Polcy Mking, Introduction to Jewish Studies, Seminar in Global Policy Issues
- POL 51700 - The Politics Of Capital And Labor In The United States
- POL 52000 - Special Topics In Public Policy Policy Analysis Climate Change, Gender, Race, and Class: Public Policy, Health, Built Env & Sustain, Race Ethnicity Representation, World Food Problems, Nuclear Strategy/Proliferation, Dem Deliberation Participation, Diversity Equity Inclusion
- POL 52300 - Environmental Politics And Public Policy
- POL 52400 - Public Policy And The Family
- POL 53200 - Nuclear Strategy And Proliferation
- POL 59000 - Directed Reading In Political Science Holocaust and Genocide

## Psychological Sciences (PSY)

- PSY 12000 - Elementary Psychology
- PSY 12300 - Beyond Mental Health: The Science Of Well-Being
- PSY 20000 - Introduction To Cognitive Psychology
- PSY 22200 - Introduction To Behavioral Neuroscience
- PSY 23500 - Child Psychology
- PSY 23900 - The Psychology Of Women
- PSY 24000 - Introduction To Social Psychology
- PSY 24400 - Introduction To Human Sexuality
- PSY 27200 - Introduction To Industrial-Organizational Psychology
- PSY 29200 - Topics In Psychology Intro to Clinical Psych, Intro to Neuropsychology, Neurobiology of Disease, Science of Well Being
- PSY 31000 - Sensory And Perceptual Processes
- PSY 31100 - Human Memory
- PSY 31400 - Introduction To Learning
- PSY 32400 - Introduction Cognitive Neuroscience
- PSY 32700 - Psychology Of Helping
- PSY 33500 - Stereotyping And Prejudice
- PSY 33600 - Issues In Developmental Psychology
- PSY 33700 - Social Cognition
- PSY 34200 - Introduction To Psychology Of Personality
- PSY 35000 - Abnormal Psychology
- PSY 35200 - Introduction To Neuropsychology
- PSY 35400 - Close Relationships
- PSY 36700 - Adult Development And Aging
- PSY 37600 - Attention And Cognitive Control
- PSY 38000 - Behavior Change Methods
- PSY 39200 - Special Topics In Psychology Attention & Cognitive Control, Close Relationships, Foods and Behavior, Language & The Brain, Neurobiology of Disease, Neurodevelopmental Disorders, Neuroscience, Alcohol Abuse & Alcoholism, Parapsyc & Psychic Claims, Psychology of Emotions, Psychology of Helping, Research Ethics in Psychology, Robot & Human Vision, Science of Happiness, Social Cognition, Social Image And Self-Identity, Social Psychology & Film, Social Psychology of Film-Honors, Understanding Autism, Diversity and Inclusion, Cognitive Neurosci of Vision, Psychology of Trauma, Eating Disorderes & Obesity, Lifespan Development, Intro to Clinical Psychology, Beh/Neural Sys Learn & Mem

- PSY 41800 - Understanding Autism
- PSY 42100 - Alcohol Use And Disorders
- PSY 42200 - Genes and Behavior
- PSY 42600 - Language Development
- PSY 42800 - Drugs And Behavior
- PSY 42900 - Hormones And Behavior
- PSY 43200 - Social Psychology In Film
- PSY 43600 - Foods And Behavior
- PSY 43800 - Introduction To Clinical Psychology
- PSY 44300 - Aggression And Violence
- PSY 46400 - Research Ethics In Psychological Sciences
- PSY 47300 - Selection And Performance Appraisal In Organizations
- PSY 47500 - Work Motivation And Job Satisfaction
- PSY 48400 - The Psychology Of Consciousness
- PSY 51500 - Neuroscience Of Consciousness
- PSY 59100 - Topics In Psychology Cross Cultural Social Psy, Current Readings in Social Psychology, Developmental Cognitive Neuroscience, Ethnic Minority Issues in Psy, Evolutionary Cognitive Psychology, Hormones & Behavior, Intro to Compu/Cog Neurosci, Neuroethics, Neuroscience of Consciousness, Acceptance and Inclusion, Foundations of Clinical Psych, Ostracism

## Portuguese (PTGS)

- PTGS 33000 - Brazilian, Portuguese, And African Cinema
- PTGS 55100 - Brazilian Poetry
- PTGS 55500 - Brazilian Drama
- PTGS 55700 - Brazilian Fiction
- PTGS 59400 - Special Topics In Luso-Brazilian Literature Latin American Short Story, Clarice Lispector, Luso-Brazilian Literature, Machado De Assis, Machado & Borges

## Religious Studies (REL)

- REL 20000 - Introduction To The Study Of Religion
- REL 20100 - Interpretation Of The New Testament
- REL 20200 - Interpretation Of The Old Testament
- REL 20300 - Theology Of Paul
- REL 20400 - Introduction To Christian Theology
- REL 23000 - Religions Of The East
- REL 23100 - Religions Of The West
- REL 25000 - A History Of The Christian Afterlife
- REL 31700 - Ancient Judaism And Early Christianity
- REL 31800 - The Bible And Its Early Interpreters
- REL 35100 - Christian Mysticism
- REL 45000 - Christian Ethics
- REL 45100 - Christology
- REL 45200 - Systematic Theology
- REL 49100 - Special Topics In Religious Studies Rhetorics of Religion, Engaging Religious Diversity

## Russian (RUSS)

- RUSS 29800 - Special Topics In Russian Russian Fairy Tales, Russian and Slavic Fairy Tales
- RUSS 33000 - Russian And East European Cinema
- RUSS 34100 - Russian Literature In The Nineteenth Century
- RUSS 34200 - Revolution, Repression, Renewal: Soviet Literature And Beyond
- RUSS 38000 - Russian Culture And Civilization I
- RUSS 38100 - Russian Culture And Civilization II
- RUSS 49700 - Topics In Russian Literature Dostoevsky and His Age, Tolstoy and His Age
- RUSS 49800 - Topics In Russian Culture Post-Soviet Russian Cinema, The Caucasus

## Sociology (SOC)

- SOC 10000 - Introductory Sociology
- SOC 22000 - Social Problems
- SOC 27500 - Sociology Of Aging And The Life Course
- SOC 31000 - Race And Ethnicity
- SOC 32400 - Criminology
- SOC 32600 - Social Conflict And Criminal Justice
- SOC 32700 - Crime, Deviance And Mass Media
- SOC 32800 - Criminal Justice
- SOC 33400 - Urban Sociology
- SOC 33500 - Political Sociology
- SOC 33800 - Global Social Movements
- SOC 33900 - Sociology Of Global Development
- SOC 34000 - General Social Psychology
- SOC 34400 - Environmental Sociology
- SOC 35000 - Sociology Of Family
- SOC 35200 - Drugs, Culture, And Society
- SOC 35600 - Hate And Violence
- SOC 36700 - Religion In America
- SOC 36800 - The Social Significance Of Religion
- SOC 36900 - Religion And Chinese Society
- SOC 37400 - Medical Sociology
- SOC 39100 - Selected Topics In Sociology Sociology of Mental Health, Employment and Law, Sociology of Gaming, Sociology of Policing
- SOC 40200 - Sociological Theory
- SOC 40900 - Social Networks
- SOC 41100 - Social Inequality
- SOC 41900 - Sociology Of Law
- SOC 42100 - Juvenile Delinquency
- SOC 42600 - Social Deviance And Control
- SOC 42900 - Sociology Of Protest
- SOC 43200 - Work In Contemporary America
- SOC 45000 - Gender Roles In Modern Society
- SOC 46100 - Health And Social Behavior
- SOC 52500 - Social Movements



- SOC 53100 - Community Organization
- SOC 57000 - Sociology Of Education
- SOC 57200 - Comparative Healthcare Systems
- SOC 57300 - The Human Side Of Medicine
- SOC 57400 - The Social Organization Of Healthcare
- SOC 57600 - Health And Aging In Social Context
- SOC 59100 - Selected Topics In Sociology Sociology ProSeminar, Social Psychology of Mental Disorders

## Spanish (SPAN)

- SPAN 23100 - Cervantes' Don Quixote
- SPAN 23500 - Spanish American Literature In Translation Food/Culture in Hispanic World, Latin American Short Stories, Spanish American Literature in Translation (select courses satisfy Human Cultures Humanities for core)
- SPAN 24100 - Introduction To The Study Of Hispanic Literature
- SPAN 28000 - Second-Year Spanish: Special Topics Intro Latin Am & Latino Study
- SPAN 33000 - Spanish And Latin American Cinema
- SPAN 33500 - The Literature Of The Spanish-Speaking Peoples In The United States
- SPAN 34100 - Hispanic Literature I: Poetry And Drama
- SPAN 34200 - Hispanic Literature II: Prose
- SPAN 39800 - Special Topics In Spanish The Hispanic World
- SPAN 48000 - Spanish Civilization
- SPAN 48100 - Spanish Culture
- SPAN 48200 - Latin American Civilization
- SPAN 48300 - Latin American Culture
- SPAN 48500 - Food And Culture In The Hispanic World
- SPAN 49800 - Advanced Topics In Spanish Chicana/o & Latina/o Lit Trans, Food Culture Hispanic World, Hispanic Film in Spanish
- SPAN 54000 - Spanish Literature Of The Middle Ages
- SPAN 54100 - Spanish Literature Of The Golden Age
- SPAN 54200 - Cervantes Don Quijote
- SPAN 54300 - Spanish Literature Of The 18th And 19th Centuries
- SPAN 54500 - Spanish Literature Of The 20th Century
- SPAN 55000 - Spanish American Literature Of The Colonial Period
- SPAN 55100 - Spanish American Literature Of The 19th Century
- SPAN 55200 - Spanish American Literature From 1900 To 1970
- SPAN 55300 - Spanish American Literature From 1970 - Present
- SPAN 55400 - Hispanic Caribbean Literature
- SPAN 55500 - Latino/a Literature
- SPAN 55600 - Mexican Literature
- SPAN 59400 - Special Topics In Hispanic Literature Spanish Literature of the Middle Ages, The Continental Novel, Transatlantic Poetry, Hispanic Film in Span Part II, Modern Spanish Comic Theater, Borders and Borderlands
- SPAN 59000 - Directed Reading In Spanish Spanish American Novel

## Sustainable Food & Farm Systems (SFS)

- SFS 41100 - Structural Racism In US Agriculture
- SFS 41200 - Colonialism, Globalization, And Food Justice
- SFS 41300 - The Cultures And Agricultures Of The United States

## Theatre (THTR)

- THTR 20100 - Theatre Appreciation
- THTR 38000 - History Of Theatre I
- THTR 38100 - History Of Theatre II
- THTR 39000 - Directed Study Of Special Theatre Problems Hamilton the Musical, Black Drama

## Women, Gender, & Sexuality Studies (WGSS)

- WGSS 28000 - Women's, Gender, And Sexuality Studies: An Introduction
- WGSS 28100 - Variable Topics In Women's, Gender, And Sexuality Studies Arab Women Writers, Contemporary Foreign Women Writers in Translation, Spanish American Literature in Translation, Women Writers in Translation, Women, Gender, and Leadership, 20th Century Women Artists, Intro to Study of Religion, Wom Pol and Publ Pol
- WGSS 28200 - Introduction To LGBTQ Studies
- WGSS 38000 - Comparative Studies In Gender And Culture
- WGSS 38100 - Women Of Color In The United States
- WGSS 38200 - Love, Sex And Sexuality
- WGSS 38300 - Women, Work, And Labor
- WGSS 39000 - Variable Topics In Women's, Gender And Sexuality Studies American Beauty, Gender Revolution in Mod Amer, Gender and Politics in Early Modern Europe, Literature, Queer Studies & Disability, Queens and Empresses in Early Modern Europe, Women & Games: Design Dev & Play, Understanding the NFL, Women and Leadership, Hist of Sexual Regul in US, Gender and Literature, Feminist Technoscience Studies, Latina Feminisms, Sports & Popular Feminisms, US Women Since 1870, Women and the Law, STEM and Gender, Women and Health in America
- WGSS 48000 - Feminist Theory
- WGSS 48200 - Interdisciplinary Studies In Sexuality
- WGSS 48300 - Feminisms In Global Perspective
- WGSS 48500 - Feminist Perspectives On Film
- WGSS 49900 - Independent Study In Women's, Gender And Sexuality Studies Black Women Writers, African American Women and Activism, Black Women, Gender Revolution in Modern America, Women and Health in America
- WGSS 59900 - Selected Topics In Women's Gender And Sexuality Studies Bad Mothers in American Literature, Gender & Sexuality in Sport, Native American Women Writers, Public Pol and Family

## College of Science Core: Great Issues in Science

**Curricular Outcomes: ability to think and function as a scientist and demonstrated breadth of knowledge**

This important core requirement challenges College of Science students to apply their critical thinking and analytical abilities gained from engagement in their major area of study to the global conversation regarding the impact of Science on society and the ramifications of scientific advances.

## Curriculum Notes

- Courses which have been taken to meet the Great Issues requirement **may not** also be used to meet a student's Culture/Diversity or General Education requirement.
- AP, IB, and A LEVEL credit will **not** be approved to meet the Great Issues requirement.
- Transfer courses from accredited institutions may be submitted to as student's advisor for review by the Associate Dean of Undergraduate Education.

## Great Issues in Science

Choose one course from the list below; all courses must be taken as 3.00 credit hours.

- BIOL 31200 - Great Issues Genomics And Society
- BIOL 39500 - Special Assignments The COVID-19 Pandemic (3.00 credits)
- BIOL 48300 - Great Issues: Environmental And Conservation Biology
- BIOL 49500 - Special Assignments  
Data Science: Good Versus Bad, Energy Transduction
- CHM 49000 - Selected Topics In Chemistry For Upper-Division Students The Nuclear Age
- CNIT 49900 - Topics In Computer And Information Technology Seminar Global Policy Issues
- EAPS 30100 - Oil!
- EAPS 32700 - Climate, Science And Society
- EAPS 36000 - Great Issues In Science And Society
- EAPS 36400 - Natural Hazards: Science And Society
- EAPS 37500 - Great Issues - Fossil Fuels, Energy And Society
- EAPS 59100 - Advanced Topics In Earth And Atmospheric Sciences Models in Climate Change  
Science & Policy
- HIST 31305 - Medical Devices And Innovation
- HIST 35205 - Death, Disease And Medicine In Twentieth Century American History
- HONR 29900 - Interdisciplinary Honors - Experiential Learning Food Security
- HONR 31000 - Space-Time!
- HONR 39900 - Interdisciplinary Honors - Special Topics Seminar Human Redesign, Biotechnology:  
Social & Ethical Issues, Haolocene, Rise & Fall of American Empire, The Nucelar Age: Its Science, History,  
and Ethics, Spacetime!
- MA 27900 - Modern Mathematics In Science And Society
- MA 49000 - Topics In Mathematics For Undergraduates History of Math
- ME 49200 - Technology And Values
- PHYS 31700 - Special Nuclear Materials
- PHYS 49000 - Special Assignments Sustain Energy Source, Data Science: Good Versus Bad
- POL 32700 - Global Green Politics
- POL 42900 - Contemporary Political Problems Climate, Science and Society
- STAT 49000 - Topics In Statistics For Undergraduates Data Science: Good Versus Bad

## College of Science Core: Laboratory Science

**Curricular Outcome:** Ability to think and function as a scientist

College of Science students will complement critical thinking and analytical abilities gained within their major area of study by completing an approved two-course sequence and related laboratory experience in a science outside of their major.

## Laboratory Science

College of Science students must take a minimum of a one-year sequence of laboratory science.

## Biology Sequences

### Sequence 1 (for life scientists who are not Biology majors)

- BIOL 11000 - Fundamentals Of Biology I
- BIOL 11100 - Fundamentals Of Biology II

### Sequence 2

- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior
- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms
- BIOL 13500 - First Year Biology Laboratory

## Chemistry Sequences

### Sequence 1

- CHM 11500 - General Chemistry
- CHM 11600 - General Chemistry or
- CHM 12901 - General Chemistry With A Biological Focus

### Sequence 2

- CHM 12500 - Introduction To Chemistry I
- CHM 12600 - Introduction To Chemistry II

## Earth, Atmospheric, and Planetary Sciences Sequence

### Sequence 1

- EAPS 11100 - Physical Geology
- EAPS 11200 - Earth Through Time

## Physics Sequences (8.0 credits required for a sequence)

PHYSICS I - Physics I AND Physics II are required for a sequence.

Physics I courses

- PHYS 22000 - General Physics
- PHYS 17200 - Modern Mechanics

- PHYS 23300 - Physics For Life Sciences I

PHYSICS II - Physics I AND Physics II are required for a sequence.

Physics II courses

- PHYS 22100 - General Physics
- PHYS 27200 - Electric And Magnetic Interactions
- PHYS 23400 - Physics For Life Sciences II
- PHYS 24100 - Electricity And Optics  
AND
- PHYS 25200 - Electricity And Optics Laboratory

## College of Science Core: Mathematics

**Curricular Outcome:** Ability to think and function as a scientist

College of Science students will complement critical thinking and analytical abilities gained within their major area of study by completing an approved one-year sequence of single variable calculus.

### Mathematics

College of Science students must take a minimum of a one-year sequence of single variable calculus.

The following sequences are acceptable:

Sequence I

- MA 16100 - Plane Analytic Geometry And Calculus I
  - MA 16200 - Plane Analytic Geometry And Calculus II
- OR

Sequence II

- MA 16500 - Analytic Geometry And Calculus I
- MA 16600 - Analytic Geometry And Calculus II
- Or an approved two-course mathematics sequence for a particular major

## College of Science Core: Science Technology and Society Requirement

**Curricular Outcome:** Ability to function in a multidisciplinary setting.

### Requirement

The Science Technology and Society requirement is met by completing a Science, Technology and Society course, excluding courses on the College of Science No Count List.

Note: Students completing the Statewide General Transfer Course will not meet the Science Technology and Society UCORE outcome and therefore, must complete an STS course.

# College of Science Core: Statistics

**Curricular Outcome:** Ability to think and function as a scientist

College of Science students will complement critical thinking and analytical abilities gained within their major area of study by completing an approved Statistics course.

## Statistics

The Statistics requirement is met by completion of an approved statistics course in a student's program of study (major). Check specific department and major requirements for approval of the following courses:

- STAT 30100 - Elementary Statistical Methods
- STAT 35000 - Introduction To Statistics
- STAT 35500 - Statistics For Data Science
- STAT 50300 - Statistical Methods For Biology
- STAT 51100 - Statistical Methods

# College of Science Core: Teambuilding and Collaboration

**Curricular Outcome:** ability to collaborate as **part of a team**. Students will learn the concepts involved in Teaming and Collaboration, such as leadership, developing shared goals, and utilizing strengths of team members. These foundations will allow them to then enter collaborative situations fully prepared to maximize the value of their educational experiences as well as develop positive working relationships with their fellow students.

**The Teaming and Collaboration core requirement is met through completion of coursework or an approved experiential learning contract.**

## Teambuilding & Collaboration

*Note: Transfer Credit (including AP, IB, and A LEVEL credit) will not meet the Teaming Experience Requirement.*

- BIOL 32800 - Principles Of Physiology
- CS 17700 - Programming With Multimedia Objects
- CS 18000 - Problem Solving And Object-Oriented Programming
- CS 30700 - Software Engineering I
- CS 40800 - Software Testing
- EAPS 32700 - Climate, Science And Society
- EAPS 36000 - Great Issues In Science And Society
- EAPS 36400 - Natural Hazards: Science And Society
- EDCI 49800 - Supervised Teaching
- ENGR 13100 - Transforming Ideas To Innovation I
- ENGR 13300 - Transforming Ideas To Innovation, EPICS
- ENGR 14100 - Honors Creativity And Innovation In Engineering Design I
- ENGR 16100 - Honors Introduction To Innovation And The Physical Science Of Engineering Design I
- ENTR Courses (Exceptions: ENTR46000 is not approved for Teamwork and Collaboration; Variable Title courses must be approved by the Director of Undergraduate Education)

- ENTR Capstone Course
  - EPCS 10000-40000 Engineering Projects in Community Service
  - EPCS 49000 - EPICS Special Topics Course Camp Riley
  - PHYS 17200 - Modern Mechanics
  - ROTC
  - STAT 47201 - Actuarial Models-Life Contingencies
  - TECH 39900 - Special Topics In Technology III The Science and Practice of Complex Collaboration
  - Approved Co-op, Internships, Undergraduate Research
- Three (3) of the following one (1) credit courses:
  - MA 29000 - Topics In Mathematics For Undergraduates The Data Science Labs in Multivariate Calculus
  - MA 39000 - Topics In Mathematics For Undergraduates The Data Science Labs in in Fourier Analysis
  - MA 49000 - Topics In Mathematics For Undergraduates The Data Science Labs in on Probability
- TDM Course Sequence - students can use a **4.0 credit hour combination** of TWO Data Mine Seminar courses and TWO Corporate Partner courses to meet the Teambuilding and Collaboration requirement. TDM Seminar courses (TWO courses are required)
  - TDM 10100 - The Data Mine Seminar I
  - TDM 10200 - The Data Mine Seminar II
  - TDM 20100 - The Data Mine Seminar III
  - TDM 20200 - The Data Mine Seminar IV
  - TDM 30100 - The Data Mine Seminar V
  - TDM 30200 - The Data Mine Seminar VI
  - TDM 40100 - The Data Mine Seminar VII
  - TDM 40200 - The Data Mine Seminar VIII
- AND**
- TDM Corporate Partners courses (TWO courses are required)
  - TDM 11100 - Corporate Partners I
  - TDM 11200 - Corporate Partners II
  - TDM 21100 - Corporate Partners III
  - TDM 21200 - Corporate Partners IV
  - TDM 31100 - Corporate Partners V
  - TDM 31200 - Corporate Partners VI
  - TDM 41100 - Corporate Partners VII
  - TDM 41200 - Corporate Partners VIII

## College of Science: No Count Course List

### College of Science: No Count Course List

The College of Science has identified courses that do not meet any College of Science degree requirement. While similar, No Count course lists vary between departments.

To review your department's No Count list, click on the departmental link below. Students pursuing more than one program should consult each department's No count course list.

Duplicate course policy. A course will become a no count or duplicate course when a student completes two courses of similar content. This situation can occur when a transfer course (Ex. AP/IB/dual credit) shares significant content with a Purdue course. Students should consult with their advisors to ensure they are not completing duplicate coursework.

UCORE outcomes may be met with No Count coursework.

## Actuarial Science and Actuarial Science Honors Majors

- AGEC 21700 - Economics
- ASTR 26300 - Descriptive Astronomy: The Solar System (if taken after ASTR 36300)
- ASTR 26400 - Descriptive Astronomy: Stars And Galaxies (if taken after ASTR 36400)
- BIOL 20500 - Biology For Elementary School Teachers
- BIOL 20600 - Biology For Elementary School Teachers
- CHM 10000 - Preparation For General Chemistry
- CHM 11100 - General Chemistry
- CHM 11200 - General Chemistry
- CHM 20000 - Fundamentals Of Chemistry
- CNIT 10000 Level (except CNIT 17500)
- CPT 10000 Level
- ECON 21000 - Principles Of Economics
- MA 13700 - Mathematics For Elementary Teachers I
- MA 13800 - Mathematics For Elementary Teachers II
- MA 13900 - Mathematics For Elementary Teachers III
- MA 15300 - College Algebra
- MA 15555 - Quantitative Reasoning
- MA 15800 - Precalculus - Functions And Trigonometry
- MA 16010 - Applied Calculus I \*
- MA 16020 - Applied Calculus II \*
- Retired Courses
- MA 15400
- MA 15500
- MA 15900
- MA 15910
- MA 19000 - Quantitative Reasoning
- MA 21900
- MA 22000
- MA 22100
- MA 22200
- MA 22300
- MA 22400
- MA 23100
- MA 23200
- MGMT 30500 - Business Statistics
- MGMT 21200 - Business Accounting
- PHIL 35000 - Philosophy And Probability
- PHYS 21400 - The Nature Of Physics
- PHYS 21500 - Physics For Elementary Education
- PSY 20100 - Introduction To Statistics In Psychology



- SOC 38200 - Introduction To Statistics In Sociology
  - STAT 11300 - Statistics And Society
  - STAT 22500 - Introduction To Probability Models
  - STAT 30100 - Elementary Statistical Methods
  - STAT 31100 - Introductory Probability
- \* Students that take MA 16010/MA 16020 BEFORE changing to a major in Actuarial Science area are allowed to use the courses in place of MA 16100. Please see an advisor for more information.

## Biology Majors

Biology, Cell Molecular & Developmental Biology, Chemical Biology and Biochemistry, Ecology Evolution & Environmental Biology, Genetics, Health and Disease, Microbiology, Neurobiology & Physiology, or Science Education (Biology Concentration)

- ASTR 26300 - Descriptive Astronomy: The Solar System (if taken after ASTR 36300)
- ASTR 26400 - Descriptive Astronomy: Stars And Galaxies (if taken after ASTR 36400)
- BIOL 20100 - Human Anatomy And Physiology
- BIOL 20200 - Human Anatomy And Physiology
- BIOL 20500 - Biology For Elementary School Teachers
- BIOL 20600 - Biology For Elementary School Teachers
- BIOL 22100 - Introduction To Microbiology
- CHM 10000 - Preparation For General Chemistry
- CHM 11100 - General Chemistry
- CHM 11200 - General Chemistry
- CHM 20000 - Fundamentals Of Chemistry
- CNIT 10000 Level
- CPT 10000 Level
- MA 13700 - Mathematics For Elementary Teachers I
- MA 13800 - Mathematics For Elementary Teachers II
- MA 13900 - Mathematics For Elementary Teachers III
- MA 15300 - College Algebra
- MA 15555 - Quantitative Reasoning
- MA 15800 - Precalculus - Functions And Trigonometry
- Retired Courses
- MA 15400
- MA 15500
- MA 15900
- MA 15910
- MA 19000 - Quantitative Reasoning
- MA 21900
- MA 22000
- MA 22200
- MGMT 30500 - Business Statistics
- PHYS 21400 - The Nature Of Physics
- PHYS 21500 - Physics For Elementary Education
- PHYS 21800 - General Physics
- PHYS 21900 - General Physics II
- STAT 11300 - Statistics And Society

- STAT 30100 - Elementary Statistical Methods

## Chemistry Majors

Biochemistry, Chemistry, Chemistry (ACS), Science Education (Chemistry Concentration)

- ASTR 26300 - Descriptive Astronomy: The Solar System (if taken after ASTR 36300)
- ASTR 26400 - Descriptive Astronomy: Stars And Galaxies (if taken after ASTR 36400)
- BIOL 20500 - Biology For Elementary School Teachers
- BIOL 20600 - Biology For Elementary School Teachers
- CHM 10000 - Preparation For General Chemistry
- CHM 11100 - General Chemistry
- CHM 11200 - General Chemistry
- CHM 20000 - Fundamentals Of Chemistry
- CHM 25700 - Organic Chemistry
- CNIT 10000 Level
- CPT 10000 Level
- MA 13700 - Mathematics For Elementary Teachers I
- MA 13800 - Mathematics For Elementary Teachers II
- MA 13900 - Mathematics For Elementary Teachers III
- MA 15300 - College Algebra
- MA 15555 - Quantitative Reasoning
- MA 15800 - Precalculus - Functions And Trigonometry
- Retired Courses
- MA 15400
- MA 15500
- MA 15900
- MA 15910
- MA 19000 - Quantitative Reasoning
- MA 21900
- MA 22000
- MA 22100
- MA 22200
- MA 23100
- MA 23200
- MGMT 30500 - Business Statistics
- MA 19000 - Topics In Mathematics For Undergraduates
- PHYS 21400 - The Nature Of Physics
- PHYS 21500 - Physics For Elementary Education
- STAT 11300 - Statistics And Society

## Computer Science Majors

Computer Science, Computer Science Honors, Data Science Computer Science

- ASTR 26300 - Descriptive Astronomy: The Solar System (if taken after ASTR 36300)
- ASTR 26400 - Descriptive Astronomy: Stars And Galaxies (if taken after ASTR 36400)
- BIOL 20500 - Biology For Elementary School Teachers

- BIOL 20600 - Biology For Elementary School Teachers
- CHM 10000 - Preparation For General Chemistry
- CHM 11100 - General Chemistry
- CHM 11200 - General Chemistry
- CHM 20000 - Fundamentals Of Chemistry
- CNIT 10000 Level
- CIS 20400
- CPT 10000 Level
- HTML All Courses
- CS 15900 - C Programming
- CS 17700 - Programming With Multimedia Objects (if taken after CS 18000)
- CS 23500 - Introduction To Organizational Computing
- MA 13700 - Mathematics For Elementary Teachers I
- MA 13800 - Mathematics For Elementary Teachers II
- MA 13900 - Mathematics For Elementary Teachers III
- MA 15300 - College Algebra
- MA 15555 - Quantitative Reasoning
- MA 15800 - Precalculus - Functions And Trigonometry
- MA 16010 - Applied Calculus I
- MA 16020 - Applied Calculus II
- Retired Courses
- MA 15400
- MA 15500
- MA 15900
- MA 15910
- MA 19000 - Quantitative Reasoning
- MA 21900
- MA 22000
- MA 22100
- MA 22200
- MA 22300
- MA 22400
- MA 23100
- MA 23200
- MGMT 30500 - Business Statistics
- PHIL 15000 - Principles Of Logic
- PHIL 35000 - Philosophy And Probability
- PHYS 21400 - The Nature Of Physics
- PHYS 21500 - Physics For Elementary Education
- STAT 11300 - Statistics And Society
- STAT 30100 - Elementary Statistical Methods

## Data Science Majors

Data Science Computer Science, Data Science Statistics, Data Science Mathematics, Data Science First Year

- ASTR 26300 - Descriptive Astronomy: The Solar System (if taken after ASTR 36300)
- ASTR 26400 - Descriptive Astronomy: Stars And Galaxies (if taken after ASTR 36400)

- BIOL 14600 - Introduction To Biology (Not offered at PWL)
- BIOL 14700 - The Ins And Outs Of The Human Body (Not offered at PWL)
- BIOL 20500 - Biology For Elementary School Teachers
- BIOL 20600 - Biology For Elementary School Teachers
- BIOL 21100 - The Social Impact Of The Biological Sciences (RETIRED)
- BIOL 21200 - The Social Impact Of The Biological Sciences (Not offered at PWL)
- CHM 10000 - Preparation For General Chemistry
- CHM 11100 - General Chemistry
- CHM 11200 - General Chemistry
- CHM 20000 - Fundamentals Of Chemistry
- CIS 20400 - Introduction To Computer-Based Systems (Not offered at PWL)
- CNIT 10000-level courses
- CPT 10000-level courses
- CS 11000 - Introduction To Computers (RETIRED)
- CS 15800 - C Programming (RETIRED)
- CS 15900 - C Programming
- CS 17700 - Programming With Multimedia Objects
- CS 23500 - Introduction To Organizational Computing
- HTML - all courses
- MA 13700 - Mathematics For Elementary Teachers I
- MA 13800 - Mathematics For Elementary Teachers II
- MA 13900 - Mathematics For Elementary Teachers III
- MA 15300 - College Algebra
- MA 15400 - Algebra And Trigonometry II
- MA 15500 - Quantitative Reasoning
- MA 15555 - Quantitative Reasoning
- MA 15800 - Precalculus - Functions And Trigonometry
- MA 15900 - Precalculus
- MA 15910 - Introduction To Calculus
- MA 16010 - Applied Calculus I
- MA 16020 - Applied Calculus II
- MA 19000 - Topics In Mathematics For Undergraduates - Quantitative Reasoning
- MA 21900 - Calculus For Technology I
- MA 22000 - Calculus For Technology I
- MA 22100 - Calculus For Technology I
- MA 22200 - Calculus For Technology I
- MA 22300 - Introductory Analysis I
- MA 22400 - Introductory Analysis II
- MA 23100 - Calculus For The Life Sciences I
- MA 23200 - Calculus For The Life Sciences II
- MGMT 30500 - Business Statistics
- PHIL 15000 - Principles Of Logic
- PHIL 35000 - Philosophy And Probability
- PHYS 21400 - The Nature Of Physics
- PHYS 21500 - Physics For Elementary Education
- PSY 20100 - Introduction To Statistics In Psychology
- SOC 38200 - Introduction To Statistics In Sociology

- STAT 11300 - Statistics And Society
- STAT 22500 - Introduction To Probability Models
- STAT 30100 - Elementary Statistical Methods
- STAT 31100 - Introductory Probability

## Earth, Atmospheric, & Planetary Science Majors

Atmospheric Science, Environmental Geosciences, &nbsp;Geology & Geophysics, Planetary Sciences, Science Education (Earth Space Concentration)

- ASTR 26300 - Descriptive Astronomy: The Solar System (if taken after ASTR 36300)
- ASTR 26400 - Descriptive Astronomy: Stars And Galaxies (if taken after ASTR 36400)
- BIOL 20500 - Biology For Elementary School Teachers
- BIOL 20600 - Biology For Elementary School Teachers
- CHM 10000 - Preparation For General Chemistry
- CHM 11100 - General Chemistry
- CHM 11200 - General Chemistry
- CHM 20000 - Fundamentals Of Chemistry
- CPT 10000 Level
- CNIT 10000 Level
- EAPS 22100 - Survey Of Atmospheric Science  
and
- EAPS 22500 - Science Of The Atmosphere
- MA 13700 - Mathematics For Elementary Teachers I
- MA 13800 - Mathematics For Elementary Teachers II
- MA 13900 - Mathematics For Elementary Teachers III
- MA 15300 - College Algebra
- MA 15555 - Quantitative Reasoning
- MA 15800 - Precalculus - Functions And Trigonometry
- MA 16010 - Applied Calculus I \*
- MA 16020 - Applied Calculus II \*
- Retired Courses
- MA 15400
- MA 15500
- MA 15900
- MA 15910
- MA 19000 - Quantitative Reasoning
- MA 21900
- MA 22000
- MA 22100
- MA 22200
- MA 22300
- MA 22400
- MA 23100
- MA 23200
- MGMT 30500 - Business Statistics
- PHYS 21400 - The Nature Of Physics
- PHYS 21500 - Physics For Elementary Education

- PHYS 21800 - General Physics \*\*
  - PHYS 21900 - General Physics II \*\*
  - STAT 11300 - Statistics And Society
- \* Students that take MA 16010/MA 16020 BEFORE changing to a major in Earth, Atmospheric, and Planetary Sciences are allowed to use the courses in place of MA 16100.
- \*\* GEOP and ENVG majors can use PHYS 21800/PHYS 21900 for a substitute for PHYS 22000/PHYS 22100.

## Interdisciplinary Science Majors

(all concentrations)

- ASTR 26300 - Descriptive Astronomy: The Solar System (if taken after ASTR 36300)
  - ASTR 26400 - Descriptive Astronomy: Stars And Galaxies (if taken after ASTR 36400)
  - BIOL 20500 - Biology For Elementary School Teachers
  - BIOL 20600 - Biology For Elementary School Teachers
  - CHM 10000 - Preparation For General Chemistry
  - CHM 11100 - General Chemistry
  - CHM 11200 - General Chemistry
  - CHM 20000 - Fundamentals Of Chemistry
  - CPT 10000 Level
  - CNIT 10000 Level
  - MA 13700 - Mathematics For Elementary Teachers I
  - MA 13800 - Mathematics For Elementary Teachers II
  - MA 13900 - Mathematics For Elementary Teachers III
  - MA 15300 - College Algebra
  - MA 15555 - Quantitative Reasoning
  - MA 15800 - Precalculus - Functions And Trigonometry
- Retired Courses
- MA 15400
  - MA 15500
  - MA 15900
  - MA 15910
  - MA 19000 - Quantitative Reasoning
  - MA 21900
  - MA 22000
  - MA 22100
  - MA 22200
  - MGMT 30500 - Business Statistics
  - PHYS 21400 - The Nature Of Physics
  - PHYS 21500 - Physics For Elementary Education
  - STAT 11300 - Statistics And Society
  - STAT 30100 - Elementary Statistical Methods

## Mathematics Education Majors

- ASTR 26300 - Descriptive Astronomy: The Solar System (if taken after ASTR 36300)
- ASTR 26400 - Descriptive Astronomy: Stars And Galaxies (if taken after ASTR 36400)

- BIOL 20500 - Biology For Elementary School Teachers
- BIOL 20600 - Biology For Elementary School Teachers
- CHM 10000 - Preparation For General Chemistry
- CHM 11100 - General Chemistry
- CHM 11200 - General Chemistry
- CHM 20000 - Fundamentals Of Chemistry
- CNIT 10000 Level
- CPT 10000 Level
- MA 13700 - Mathematics For Elementary Teachers I
- MA 13800 - Mathematics For Elementary Teachers II
- MA 13900 - Mathematics For Elementary Teachers III
- MA 15300 - College Algebra
- MA 15555 - Quantitative Reasoning
- MA 15800 - Precalculus - Functions And Trigonometry
- MA 16010 - Applied Calculus I
- MA 16020 - Applied Calculus II

#### Retired Courses

- MA 15400
- MA 15500
- MA 15900
- MA 15910
- MA 19000 - Quantitative Reasoning
- MA 21900
- MA 22000
- MA 22100
- MA 22200
- MA 22300
- MA 22400
- MA 23100
- MA 23200
- MGMT 30500 - Business Statistics
- PHIL 35000 - Philosophy And Probability
- PHYS 21400 - The Nature Of Physics
- PHYS 21500 - Physics For Elementary Education
- PSY 20100 - Introduction To Statistics In Psychology
- SOC 38200 - Introduction To Statistics In Sociology
- STAT 11300 - Statistics And Society
- STAT 22500 - Introduction To Probability Models
- STAT 30100 - Elementary Statistical Methods

## Math/Statistics Majors

Applied Mathematics, Mathematics/Business or Business Math, Mathematics-Computer Science, Mathematics Honors, Mathematics/Statistics, Core Mathematics, Applied Statistics, Statistics Honors, Statistics - Math Emphasis, Data Science Statistics, Data Science Mathematics

- ASTR 26300 - Descriptive Astronomy: The Solar System (if taken after ASTR 36300)
- ASTR 26400 - Descriptive Astronomy: Stars And Galaxies (if taken after ASTR 36400)

- BIOL 20500 - Biology For Elementary School Teachers
  - BIOL 20600 - Biology For Elementary School Teachers
  - CHM 10000 - Preparation For General Chemistry
  - CHM 11100 - General Chemistry
  - CHM 11200 - General Chemistry
  - CHM 20000 - Fundamentals Of Chemistry
  - CPT 10000 Level
  - CNIT 10000 Level
  - MA 13700 - Mathematics For Elementary Teachers I
  - MA 13800 - Mathematics For Elementary Teachers II
  - MA 13900 - Mathematics For Elementary Teachers III
  - MA 15300 - College Algebra
  - MA 15555 - Quantitative Reasoning
  - MA 15800 - Precalculus - Functions And Trigonometry
  - MA 16010 - Applied Calculus I \*
  - MA 16020 - Applied Calculus II \*
  - Retired Courses
  - MA 15400
  - MA 15500
  - MA 15900
  - MA 15910
  - MA 19000 - Quantitative Reasoning
  - MA 21900
  - MA 22000
  - MA 22100
  - MA 22200
  - MA 22300
  - MA 22400
  - MA 23100
  - MA 23200
  - MGMT 30500 - Business Statistics
  - PHIL 35000 - Philosophy And Probability
  - PHYS 21400 - The Nature Of Physics
  - PHYS 21500 - Physics For Elementary Education
  - PSY 20100 - Introduction To Statistics In Psychology
  - SOC 38200 - Introduction To Statistics In Sociology
  - STAT 11300 - Statistics And Society
  - STAT 22500 - Introduction To Probability Models
  - STAT 30100 - Elementary Statistical Methods
  - STAT 31100 - Introductory Probability
- \* Students that take MA 16010/MA 16020 BEFORE changing to a major in the Mathematics Department are allowed to use the courses in place of MA 16100. Please see an advisor for more information.

## Physics Majors

Applied Physics, Applied Physics Honors, Science Education (Physics Concentration), Physics, Physics Honors

- ASTR 26300 - Descriptive Astronomy: The Solar System (if taken after ASTR 36300)



- ASTR 26400 - Descriptive Astronomy: Stars And Galaxies (if taken after ASTR 36400)
- BIOL 20500 - Biology For Elementary School Teachers
- BIOL 20600 - Biology For Elementary School Teachers
- CHM 10000 - Preparation For General Chemistry
- CHM 11100 - General Chemistry
- CHM 11200 - General Chemistry
- CHM 20000 - Fundamentals Of Chemistry
- CNIT 10000 Level
- CPT 10000 Level
- MA 13700 - Mathematics For Elementary Teachers I
- MA 13800 - Mathematics For Elementary Teachers II
- MA 13900 - Mathematics For Elementary Teachers III
- MA 15300 - College Algebra
- MA 15555 - Quantitative Reasoning
- MA 15800 - Precalculus - Functions And Trigonometry
- Retired Courses
- MA 15400
- MA 15500
- MA 15900
- MA 15910
- MA 19000 - Quantitative Reasoning
- MA 21900
- MA 22000
- MA 22100
- MA 22200
- MA 22300
- MA 22400
- MA 23100
- MA 23200
- MGMT 30500 - Business Statistics
- PHYS 21400 - The Nature Of Physics
- PHYS 21500 - Physics For Elementary Education
- PHYS 21800 - General Physics
- PHYS 21900 - General Physics II
- PHYS 22000 - General Physics
- PHYS 22100 - General Physics
- PHYS 23300 - Physics For Life Sciences I
- PHYS 23400 - Physics For Life Sciences II
- STAT 11300 - Statistics And Society

## College of Science Overlapping Course Content

### Overlapping Course Content List

These Courses are considered to have overlapping course content. Only one instance of an overlapping content course will apply toward graduation requirements. Courses listed in the individual blocks by group are representative of the overlapping relationship. Check your online degree audit or consult an advisor for further questions.

Major	Subject	Courses	Purdue Regional Courses
ACSC	Investments	MGMT 41100, MGMT 51100	
All Majors	Statistics	STAT 30100, STAT 30301, STAT 35000, STAT 35500, STAT 50100, IE 33000, MGMT 30500	STAT 345 PNW
All Majors	Statistics	STAT 50300, STAT 51100	
All Majors	Physics I	PHYS 17200, PHYS 22000, PHYS 23300	
All Majors	Physics II	PHYS 27200, 22100, 23400, 24100+25200	
All Majors	Physics I	PHYS 22000, PHYS 15200, PHYS 17200, PHYS 21800, PHYS 23300, PHYS 17200 (Honors)	PHYS P2010 IUPUI, PHYS 20100 PFW
All Majors	Physics II	PHYS 22100, PHYS 27200, PHYS 21900, PHYS 23400, PHYS 27200(honors), PHYS 24100	PHYS P2020 IUPUI
All Majors	Intermediate Mechanics	PHYS 31000, PHYS 41000	
All Majors	Intermediate Optics	PHYS 32200, PHYS 42200	
All Majors	Modern Physics	PHYS 34200, PHYS 34400	
All Majors	Interm Elect & Magnet	PHYS 33000, PHYS 43000	
All Majors	Quantum Mechanics	PHYS 36000, PHYS 46000, PHYS 55000	
All Majors	Thermal & Stat Physics	PHYS 51500, PHYS 41600	
All Majors	Linear Algebra	MA 35100, MA 26500	
All Majors	Differential Equations	MA 26600, MA 36600	
MA	Linear Algebra	MA 35100, MA 26500	
MA	Advanced Algebra	MA 45300, MA 45000	
MA	Probability	STAT 31100, MA/STAT 41600	

MA	Programming C	ECE 26400, CS 24000	
MA	Data Structures	ECE 36800, CS 25100	
MA	Computing	CS 15900, CS 18000	
STAT	Probability	MA/STAT 41600, ECE 30200, IE 23000	STAT 519 IUPUI
STAT	Regression	STAT 51200, AGRY 55300	
STAT	Statistical Theory - Graduate Level	STAT 52800, STAT 51700	
STAT	Probability - Graduate Level	STAT 51600, STAT 51900	

## Department of Biological Sciences

### About the Biological Sciences Program

Discovery. This word captures our purpose, commitment, and vision. As a leading department in a major research university, our mission is to effectively integrate learning, discovery, and engagement **in an inclusive environment**. The best learning is experiential, and leads to a clear understanding of how discoveries are made, how science is conducted, and how ideas are communicated. The best learning is facilitated by faculty who are active in research and who can **all** engage students in the excitement of biology. And the best learning results in alumni who are well-prepared to successfully pursue their chosen careers.

As we discover the many facets of biocomplexity, from vast ecosystems to the structure and function of individual molecules, we remain committed to our mission. Our faculty, staff, and students are engaged with the communities of science and education, the worlds of industry and business, and our alumni and friends. To each individual who joins us, we promise opportunities to experience the excitement of discovery in biology. We welcome and encourage you to become a part of our team-as a student, alumnus, corporate partner, scientific collaborator, or a member of our faculty and staff. Join us on our journey of learning, discovery, and engagement. Discover Biology at Purdue!

Department of Biological Sciences Website

#### Faculty

## Contact Information

The Department of Biological Sciences address is:  
915 W. State Street West Lafayette, IN 47907-2054

#### Main Office

**Contact person:** Amanda Jenkins  
Phone Number: (765) 494-4408  
Fax No. is: (765) 494-0876

## Graduate Information

For Graduate Information please see Biological Sciences Graduate Program Information.

### Baccalaureate

### Biology, BS

#### About the Program

The Biology major allows a student to pursue a general curriculum with the bachelor of science as a terminal degree or as preparation for graduate work or professional school. This major is designed to give a student maximum flexibility in designing a plan of study suited to individual needs and interests. This curriculum is excellent preparation for a number of careers in both academic and industrial research and professions in medicine, dentistry, and veterinary medicine.

Biology Website

Biological Sciences Major Change (CODO) Requirements

#### Degree Requirements

## 120 Credits Required

### Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### Earning Core Curricular Requirements through Experience

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click here.

## Departmental/Program Major Courses (33-35 credits)

**Biology 2.0 Major GPA:** A minimum 2.0 average is required in all courses used to meet major requirements. A maximum of 3 credits of undergraduate research (BIOL 29400/49400/49900) may be factored into the Biology GPA calculation. Any excess Biology courses and research credits are "free electives" and not included in this calculation.

**BIOL 500-level course:** Each student must take at least one 2-3 credit 500-level BIOL lecture course (excluding lab-only courses such as BIOL 54200 or BIOL 59500 lab modules). This selection may double-dip with other major requirements. Note: BCHM 52100 is currently the only non-"BIOL" subject area course approved for this requirement.

## Biology Core (19 credits)

- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior ♦ (fulfills STS for UCC and Science cores)
- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms ♦
- BIOL 13500 - First Year Biology Laboratory or
- BIOL 19500 - Special Assignments
  - Diet, Dis & Immune Sys-Honors - Credit Hours: 2.00 **Credit Hours:** 2.00
  - Year 1 Bio Lab Disease Ecology - Credit Hours: 2.00 **Credit Hours:** 2.00
  - Yr 1 Bio Lab Phges Flds-Honors - Credit Hours: 2.00 **Credit Hours:** 2.00
- BIOL 23100 - Biology III: Cell Structure And Function ♦

- BIOL 23200 - Laboratory In Biology III: Cell Structure And Function
- BIOL 24100 - Biology IV: Genetics And Molecular Biology ♦
- BIOL 24200 - Laboratory In Biology IV: Genetics And Molecular Biology
- BIOL 28600 - Introduction To Ecology And Evolution

## Upper-Level Biology Coursework (14-16 credits)

*Must have at least 14 credits of coursework, including courses which meet each of the following categories: "Intermediate," "Group A," "Group B," "BIOL 500-level," and "Base Lab Requirement."*

*Courses may double-dip among requirements; if used multiple places, course credits will only count once towards the required 14 credits of Upper-Level Biology Coursework. Any excess Upper-Level Biology Coursework beyond 16 credits will count as "free electives."*

## Intermediate Selective (0-4 credits)

*Choose one of the options below. All options are also listed under either Group A or Group B selective. A course may double-dip among requirements; if used multiple places, course credits will only count once towards the required 14 credits of Upper-Level Biology Coursework.*

- BIOL 32800 - Principles Of Physiology
- BIOL 36700 - Principles Of Development
- BIOL 39500 - Special Assignments -Macromolecules - Credit Hours: 2.00 Credit Hours: 2.00
- BIOL 41500 - Introduction To Molecular Biology
- BIOL 41600 - Viruses And Viral Disease
- BIOL 42000 - Eukaryotic Cell Biology
- BIOL 43600 - Neurobiology
- BIOL 43800 - General Microbiology

## Group A Selective (at least 2 credits)

*Course may overlap with other major requirements.*

- BIOL 39500 - Special Assignments -Macromolecules - Credit Hours: 2.00
- BIOL 41500 - Introduction To Molecular Biology
- BIOL 41600 - Viruses And Viral Disease
- BIOL 42000 - Eukaryotic Cell Biology
- BIOL 43600 - Neurobiology
- BIOL 43800 - General Microbiology
- BIOL 44400 - Human Genetics
- BIOL 44600 - Molecular Bacterial Pathogenesis
- BIOL 47800 - Introduction To Bioinformatics
- BIOL 48100 - Eukaryotic Genetics
- BIOL 49500 - Special Assignments  
-RNA World:CRISPR & Coronavirus - Credit Hours: 2.00
- BIOL 51600 - Molecular Biology Of Cancer
- BIOL 51700 - Molecular Biology: Proteins
- BIOL 52900 - Bacterial Physiology
- BIOL 53300 - Medical Microbiology

- BIOL 53601 - Biological And Structural Aspects Of Drug Design And Action
- BIOL 53800 - Molecular, Cellular, And Developmental Neurobiology
- BIOL 54100 - Molecular Genetics Of Bacteria
- BIOL 54900 - Microbial Ecology
- BIOL 56200 - Neural Systems
- BIOL 56310 - Protein Bioinformatics
- BIOL 59500 - Special Assignments
  - Cell Biology Of Plants - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - CRISPR Mechanism & App - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - CryoEM 3D Reconstruction - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Immun Of Cancer & Infect Dis - Credit Hours: 2.00 **Credit Hours:** 2.00-3.00
  - Meth Meas Biophys Chem - Credit Hours: 2.00 **Credit Hours:** 2.00-3.00
  - Neural Mech Health & Disease - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Neurobiol Learning & Memory - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Pathwys Human Health & Disease - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Practical Bio Comput - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Theory Of Molecular Methods - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - X-Ray Crystallography - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00  
**Credit Hours:** 2.00-3.00
- BCHM 43400 - Medical Topics In Biochemistry
- BCHM 56200 - General Biochemistry II

### Group B Selective (at least 2 credits)

*Course may overlap with other major requirements.*

- BIOL 20400 - Human Anatomy And Physiology
- BIOL 32800 - Principles Of Physiology
- BIOL 36700 - Principles Of Development
- BIOL 39500 - Special Assignments
  - Exp Dsgn& Quant Analys I-Honors - Credit Hours: 3.00
- BIOL 48300 - Great Issues: Environmental And Conservation Biology
- BIOL 49500 - Special Assignments
  - Biodiversity & Museum Research - Credit Hours: 3.00 **Credit Hours:** 3.00
  - Data Science For Biologists - Credit Hours: 3.00 **Credit Hours:** 3.00
- BIOL 53700 - Immunobiology
- BIOL 58000 - Evolution
- BIOL 58210 - Ecological Statistics
- BIOL 58705 - Animal Communication
- BIOL 59100 - Field Ecology
- BIOL 59200 - The Evolution Of Behavior
- BIOL 59500 - Special Assignments
  - Building The Tree Of Life - Credit Hours: 3.00 **Credit Hours:** 3.00
  - Disease Ecology - Credit Hours: 3.00 **Credit Hours:** 3.00
  - Ecology - Credit Hours: 3.00 **Credit Hours:** 3.00  
**Credit Hours:** 3.00
- HORT 30100 - Plant Physiology

### BIOL 500-level Selective (0 or 2-3 credits)

Select one 2-3 credit BIOL 500-level course from Group A or Group B. Note: BCHM 52100 (in "Additional Selective Courses" below) is currently the only non-"BIOL" subject area course approved for this requirement.

A course may double-dip among requirements; if used multiple places, course credits will only count once towards the required 14 credits of Upper-Level Biology Coursework.

## Base Lab Requirement (0-4 credits)

Click Base Lab Requirements for all Biology majors for additional lists. Courses used for the Base Lab Requirement may also count for other major requirements.

## Additional Selective Courses (1-9 credits)

Additional courses if needed to reach 14 credits total Upper Level Biology Coursework.

Can either be additional courses from Groups A or B or the 'Base Lab Requirement' above, or from the lists below.

## Undergraduate Research (0-3 credits)

A maximum of 3 credits total (combined BIOL 49400/49900) can count towards the "Upper-Level Biology Coursework" tally (any credits beyond three count as free "electives").

NOTE: if using Undergraduate Research towards the "Base Lab Requirement": Objectives A and/or B, FOUR credits must be accumulated, plus the Research Mentor's approval as one or both Objectives. However, only THREE credits (the equivalent of a single typical course) contribute to the "Upper-Level Biology Coursework" minimum of 14 credits.

- BIOL 49400 - Biology Research
- BIOL 49900 - Biology Honors Thesis Research

## Academic Seminars/Other Courses

- BIOL 44100 - Biology Senior Seminar In Genetics
- BCHM 52100 - Comparative Genomics

## Other Departmental Requirements: (51-73 credits)

### Chemistry (17 credits)

#### General Chemistry (5 credits)

- CHM 12901 - General Chemistry With A Biological Focus ♦

#### Organic Chemistry (8 credits)

- CHM 25500 - Organic Chemistry For The Life Sciences I ♦
- CHM 25501 - Organic Chemistry For The Life Sciences Laboratory I
- CHM 25600 - Organic Chemistry For The Life Sciences II ♦



- CHM 25601 - Organic Chemistry For The Life Sciences Laboratory II

### Biochemistry (4 credits)

- CHM 33900 - Biochemistry: A Molecular Approach
- CHM 33901 - Biochemistry Laboratory

### College Of Science Core Requirements

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation (3-10 credits)

#### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

#### Technical Writing And Presentation\* (0 or 3 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found [here](#) . (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

### Computing (2-4 credits)

If CS 17700 or CS 18000 is selected and taken *at Purdue University*, these courses would also meet the College of Science: 'Team-Building & Collaboration' requirement.

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦ or
- TDM 10100 - The Data Mine Seminar I and TDM 10200 - The Data Mine Seminar II.

### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from the list [HERE](#) to fulfill each Option below (select courses can also satisfy University Core: 'Humanities').

- Language & Culture Option I

- Language & Culture Option II
- Language & Culture Option III

## General Education^ (9 credits)

Choose courses from the list [HERE](#) to fulfill each Option below (select courses can also satisfy University Core: 'Behavioral/Social Sciences').

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from the list [HERE](#).

## Laboratory Science (8 credits)

Choose one Physics I and one Physics II option.

### Physics I

- PHYS 23300 - Physics For Life Sciences I or
- PHYS 17200 - Modern Mechanics

### Physics II

- PHYS 23400 - Physics For Life Sciences II or
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory

## Mathematics (6-10 credits)

Choose one Calculus I course and one Calculus II course. (fulfills QR for core)

### Calculus I

- MA 16010 - Applied Calculus I or
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I

### Calculus II

- MA 16020 - Applied Calculus II or
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Multidisciplinary Experience

*Met with required major coursework (BIOL 12100).*

## Statistics (3 credits)

- STAT 50300 - Statistical Methods For Biology

## Team-Building and Collaboration\* (0 or 3 credits)

This requirement can double-dip with other degree requirements *if taken at Purdue University*, such as BIOL 32800 (Departmental/Program Major Requirements), or CS 17700 or 18000 (College of Science Core: Computing).

For the full list of options, click [HERE](#).

## Electives (12-36 credits)

## GPA Requirements

- **Biology 2.0 Major GPA:** A minimum 2.0 average is required in all courses used to meet major requirements. A maximum of 3 credits of undergraduate research (BIOL 29400/49400/49900) may be factored into the Biology GPA calculation. Any excess Biology courses and research credits are "free electives" and not included in this calculation.
- 2.0 Graduation GPA required for Bachelor of Science degree.

## Course Requirements and Notes

- **BIOL 500-level course:** Each student must take at least one 2-3 credit 500-level BIOL lecture course (excluding: lab-only courses such as BIOL 54200 or BIOL 59500 lab modules). This selection may double-dip with other major requirements. Note: BCHM 52100 is currently the only non-"BIOL" subject area course approved for this requirement.
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.
- Students may earn no more than nine credits of graded (grades of A-F) research. This rule applies regardless of the subject under which credit was earned (BIOL, CHM, BTNY, etc.). Any additional research credits beyond nine must be pass/not pass grade mode. (Research courses include but are not limited to: ANSC 49100, ANTH 39000, ASL 39000, BCHM 49800, BIOL 29400, BIOL 49400, BIOL 49900, BTNY 49800, CHM 49900, EDPS 59000, ENTM 49700, FNR 49800, FS 49100, HDFS 39000, HORT 49100, NUTR 39000, PHRM 49500, PSY 39000, PUBH 49000, and SLHS 49800)

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.

- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

### Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior ♦
- CHM 12901 - General Chemistry With A Biological Focus ♦
- BIOL 13500 - First Year Biology Laboratory or
- BIOL 19500 - Special Assignments (See above for specific titles.) or
- MA 16010 - Applied Calculus I or
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00

### 16-18 Credits

### Spring 1st Year

- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms ♦
- CHM 25500 - Organic Chemistry For The Life Sciences I ♦
- CHM 25501 - Organic Chemistry For The Life Sciences Laboratory I
- MA 16020 - Applied Calculus II or
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00
- Elective - Credit Hours: 3.00

### 16-19 Credits

### Fall 2nd Year

- BIOL 23100 - Biology III: Cell Structure And Function ♦
- BIOL 23200 - Laboratory In Biology III: Cell Structure And Function
- COM 21700 - Science Writing And Presentation
- CHM 25600 - Organic Chemistry For The Life Sciences II
- CHM 25601 - Organic Chemistry For The Life Sciences Laboratory II
- Science Core Selection - Credit Hours: 3.00 - 4.00

### 15-16 Credits

## Spring 2nd Year

- BIOL 24100 - Biology IV: Genetics And Molecular Biology ♦
- BIOL 24200 - Laboratory In Biology IV: Genetics And Molecular Biology
- BIOL 28600 - Introduction To Ecology And Evolution
- CHM 33900 - Biochemistry: A Molecular Approach
- CHM 33901 - Biochemistry Laboratory
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 1.00

15 Credits

## Fall 3rd Year

- PHYS 17200 - Modern Mechanics or
- PHYS 23300 - Physics For Life Sciences I
- Intermediate Biology Selective - Credit Hours: 2.00 - 3.00
- Group A Selective - Credit Hours: 2.00 - 3.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

14-16 Credits

## Spring 3rd Year

- PHYS 23400 - Physics For Life Sciences II or
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory Credit Hours: 1.00
- Group B Selective - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 1.00

14-15 Credits

## Fall 4th Year

- STAT 50300 - Statistical Methods For Biology
- Base Lab Requirement - Credit Hours: 2.00 - 4.00
- Great Issues in Science - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 2.00

## 16-18 Credits

### Spring 4th Year

- Science Core Computing Selection - Credit Hours: 2.00-4.00 ♦
- Science Core Team-Building & Collaboration - Credit Hours: 0.00 - 3.00
- Biology Selective 50000 Level - Credit Hours: 3.00
- Biology Selective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 14-16 Credits

### Prerequisite Information

For current pre-requisites for courses, click [here](#).

### World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

### Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

### Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## **Cell, Molecular, and Developmental Biology, BS**

### About the Program

Understanding how eukaryotic cells process information from their environment and initiate programs of gene expression leading to growth, development, and functional specification is the essence of a cell, molecular, and developmental (CMD) biology major. Students enrolled in this curriculum will take courses providing a solid foundation in the molecular biology of cells and gain a full appreciation of how molecular complexes interact to make a cell function. This fundamental knowledge in cell and molecular biology will be applied through further coursework in genetics and developmental biology to examine how eukaryotic organisms function and how specific aspects of that function are perturbed by disease. Within the CMD major, students have the option of focusing their studies on animal systems, plant systems, or both. Graduates with a CMD major are well-prepared to pursue careers in academic or industrial research, biotechnology, genetic engineering, medicine, veterinary medicine, and other health-related professions.

Cell, Molecular, and Developmental Biology Website

Biological Sciences Major Change (CODO) Requirements

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation



- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

#### Earning Core Curricular Requirements through Experience

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## Departmental/Program Major Courses (39-41 credits)

**Biology 2.0 Major GPA:** A minimum 2.0 average is required in all courses used to meet major requirements. A maximum of 3 credits of undergraduate research (BIOL 29400/49400/49900) may be factored into the Biology GPA calculation. Any excess Biology courses and research credits are "free electives" and not included in this calculation.

**BIOL 500-level course:** Each student must take at least one 2-3 credit 500-level BIOL lecture course (excluding: lab-only courses such as BIOL 54200 or BIOL 59500 lab modules). This selection may double-dip with other major requirements. Note: BCHM 52100 is currently the only non-"BIOL" subject area course approved for this requirement.

## Biology Core (19 credits)

- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior ♦ (fulfills STS for UCC and Science cores)
- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms ♦
- BIOL 13500 - First Year Biology Laboratory or
- BIOL 19500 - Special Assignments
  - Diet, Dis & Immune Sys-Honors - Credit Hours: 2.00 **Credit Hours:** 2.00
  - Year 1 Bio Lab Disease Ecology - Credit Hours: 2.00 **Credit Hours:** 2.00
  - Yr 1 Bio Lab PhgesFlds-Honors - Credit Hours: 2.00 **Credit Hours:** 2.00
- BIOL 23100 - Biology III: Cell Structure And Function ♦
- BIOL 23200 - Laboratory In Biology III: Cell Structure And Function
- BIOL 24100 - Biology IV: Genetics And Molecular Biology ♦
- BIOL 24200 - Laboratory In Biology IV: Genetics And Molecular Biology
- BIOL 28600 - Introduction To Ecology And Evolution

## Upper-Level Biology Coursework (13-19 credits)

### Intermediate Biology Selective (3 credits)

Choose one option below; cannot overlap with CMDB Selectives or Biology Selectives.

- BIOL 41500 - Introduction To Molecular Biology

- BIOL 42000 - Eukaryotic Cell Biology

### CMDB Selective I (5-6 credits)

Choose TWO courses from the following list. Neither course may overlap with Intermediate Biology or Biology Selective requirements.

- BIOL 36700 - Principles Of Development
- BIOL 41500 - Introduction To Molecular Biology
- BIOL 42000 - Eukaryotic Cell Biology
- BIOL 48100 - Eukaryotic Genetics

### CMDB Selective II: BIOL 500-level (3 credits)

This course may not overlap with the Biology Selective requirements. Options listed here also meet the departmental "500-level BIOL course."

- BIOL 51600 - Molecular Biology Of Cancer
- BIOL 59500 - Special Assignments
  - Cell Biology Of Plants - Credit Hours: 3.00 **Credit Hours: 3.00**
  - CRISPR Mechanism & App - Credit Hours: 3.00 **Credit Hours: 3.00**
  - Pathways Human Health & Disease - Credit Hours: 3.00 **Credit Hours: 3.00**
  - Theory of Molecular Methods - Credit Hours: 3.00 **Credit Hours: 3.00**

### Biology Selective (for CMDB) (2-3 credits)

This course may not overlap with the Intermediate or CMDB Selectives.

- BIOL 39500 - Special Assignments
  - Exp Dsgn&Quant Analys I-Honors - Credit Hours: 3.00 **Credit Hours: 2.00-3.00**
  - Macromolecules - Credit Hours: 2.00 **Credit Hours: 2.00-3.00**
- BIOL 41600 - Viruses And Viral Disease
- BIOL 43600 - Neurobiology
- BIOL 43800 - General Microbiology
- BIOL 44400 - Human Genetics
- BIOL 44600 - Molecular Bacterial Pathogenesis
- BIOL 47800 - Introduction To Bioinformatics
- BIOL 48100 - Eukaryotic Genetics
- BIOL 48300 - Great Issues: Environmental And Conservation Biology
- BIOL 49500 - Special Assignments
  - RNA World:CRISPR & Coronavirus - Credit Hours: 2.00
  - Tpcs In Endocrinology & Cancer - Credit Hours: 2.00
- BIOL 51600 - Molecular Biology Of Cancer
- BIOL 51700 - Molecular Biology: Proteins
- BIOL 53300 - Medical Microbiology
- BIOL 53601 - Biological And Structural Aspects Of Drug Design And Action
- BIOL 53700 - Immunobiology
- BIOL 53800 - Molecular, Cellular, And Developmental Neurobiology
- BIOL 56200 - Neural Systems

- BIOL 56310 - Protein Bioinformatics
- BIOL 58000 - Evolution
- BIOL 58210 - Ecological Statistics
- BIOL 58705 - Animal Communication
- BIOL 59200 - The Evolution Of Behavior
- BIOL 59500 - Special Assignments
  - Building The Tree Of Life - Credit Hours: 3.00 **Credit Hours: 3.00**
  - Cell Biology Of Plants - Credit Hours: 3.00 **Credit Hours: 3.00**
  - CRISPR Mechanism & App - Credit Hours: 3.00 **Credit Hours: 3.00**
  - CryoEM 3D Reconstruction - Credit Hours: 3.00 **Credit Hours: 3.00**
  - Disease Ecology - Credit Hours: 3.00 **Credit Hours: 3.00**
  - Ecology - Credit Hours: 3.00 **Credit Hours: 3.00**
  - Introduction To Bioinformatics - Credit Hours: 3.00 **Credit Hours: 3.00**
  - Meth Meas Biophys Chem - Credit Hours: 3.00 **Credit Hours: 3.00**
  - Neurobiol Learning & Memory - Credit Hours: 3.00 **Credit Hours: 3.00**
  - Pathwys Human Health & Disease - Credit Hours: 3.00 **Credit Hours: 3.00**
  - Practical Bio Comput - Credit Hours: 3.00 **Credit Hours: 3.00**
  - Theory Of Molecular Methods - Credit Hours: 3.00 **Credit Hours: 3.00**
  - X-Ray Crystallography - Credit Hours: 3.00 **Credit Hours: 3.00**
- BCHM 43400 - Medical Topics In Biochemistry
- BCHM 52100 - Comparative Genomics

## Base Lab Requirement (0-4 credits)

Click Base Lab Requirements for all Biology majors for additional lists. Courses used for the Base Lab Requirement may also count for other major requirements.

## Other Departmental Requirements: (49-73 credits)

### Chemistry (17 credits)

#### General Chemistry (5 credits)

- CHM 12901 - General Chemistry With A Biological Focus ♦

#### Organic Chemistry (8 credits)

- CHM 25500 - Organic Chemistry For The Life Sciences I ♦
- CHM 25501 - Organic Chemistry For The Life Sciences Laboratory I
- CHM 25600 - Organic Chemistry For The Life Sciences II ♦
- CHM 25601 - Organic Chemistry For The Life Sciences Laboratory II

### Biochemistry (4 credits)

- CHM 33900 - Biochemistry: A Molecular Approach
- CHM 33901 - Biochemistry Laboratory

## College of Science Core Requirements (32-56 credits)

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

#### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

#### Technical Writing And Presentation\* (0 or 3 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **HERE**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

#### Computing (2-4 credits)

If CS 17700 or CS 18000 is selected and taken *at Purdue University*, these courses would also meet the College of Science: 'Team-Building & Collaboration' requirement.

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦ or
- TDM 10100 - The Data Mine Seminar I and TDM 10200 - The Data Mine Seminar II

#### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from the list **HERE** to fulfill each Option below (select courses can also satisfy University Core: 'Humanities').

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

#### General Education^ (9 credits)

Choose courses from the list **HERE** to fulfill each Option below (select courses can also satisfy University Core: 'Behavioral/Social Sciences').

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from the list **HERE**.

## Laboratory Science (8 credits)

Choose one Physics I and one Physics II option.

### Physics I

- PHYS 23300 - Physics For Life Sciences I or
- PHYS 17200 - Modern Mechanics

### Physics II

- PHYS 23400 - Physics For Life Sciences II or
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory

## Mathematics (6-10 credits)

Choose one Calculus I course and one Calculus II course. (satisfies QR for core)

### Calculus I

- MA 16010 - Applied Calculus I or
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I

### Calculus II

- MA 16020 - Applied Calculus II or
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society

*Met with required major coursework (BIOL 12100).*

## Statistics (3 credits)

- STAT 50300 - Statistical Methods For Biology

## Team-Building and Collaboration\* (0 or 3 credits)

This requirement can double-dip with other degree requirements *if taken at Purdue University*, such as BIOL 32800 (Departmental/Program Major Requirements), or CS 17700 or 18000 (College of Science Core: Computing).

For the full list of options, click [HERE](#).

## Electives (9-39 credits)

## GPA Requirements

- **Biology 2.0 Major GPA:** A minimum 2.0 average is required in all courses used to meet major requirements. A maximum of 3 credits of undergraduate research (BIOL 29400/49400/49900) may be factored into the Biology GPA calculation. Any excess Biology courses and research credits are "free electives" and not included in this calculation.
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- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
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- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

### Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior ♦
- CHM 12901 - General Chemistry With A Biological Focus ♦

- BIOL 13500 - First Year Biology Laboratory or
- BIOL 19500 - Special Assignments -see above for specific titles
- MA 16010 - Applied Calculus I or
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00

## 16-19 Credits

### Spring 1st Year

- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms ♦
- CHM 25500 - Organic Chemistry For The Life Sciences I
- CHM 25501 - Organic Chemistry For The Life Sciences Laboratory I
- MA 16020 - Applied Calculus II or
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 16-19 Credits

### Fall 2nd Year

- BIOL 23100 - Biology III: Cell Structure And Function ♦
- BIOL 23200 - Laboratory In Biology III: Cell Structure And Function
- CHM 25600 - Organic Chemistry For The Life Sciences II
- CHM 25601 - Organic Chemistry For The Life Sciences Laboratory II
- COM 21700 - Science Writing And Presentation
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15-16 Credits

### Spring 2nd Year

- BIOL 24100 - Biology IV: Genetics And Molecular Biology ♦
- BIOL 24200 - Laboratory In Biology IV: Genetics And Molecular Biology
- BIOL 28600 - Introduction To Ecology And Evolution
- CHM 33900 - Biochemistry: A Molecular Approach
- CHM 33901 - Biochemistry Laboratory
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00

## 15-16 Credits



## Fall 3rd Year

### *Intermediate Biology Selective*

- BIOL 36700 - Principles Of Development or
- BIOL 41500 - Introduction To Molecular Biology or
- BIOL 42000 - Eukaryotic Cell Biology
- PHYS 17200 - Modern Mechanics or
- PHYS 23300 - Physics For Life Sciences I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

## Spring 3rd Year

### *CMBD Selective I (1 of 2)*

- BIOL 36700 - Principles Of Development or
- BIOL 41500 - Introduction To Molecular Biology or
- BIOL 42000 - Eukaryotic Cell Biology or
- BIOL 48100 - Eukaryotic Genetics
- PHYS 23400 - Physics For Life Sciences II or
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory Credit Hours: 1.00
- Biology Selective - Credit Hours: 2.00 - 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 14-17 Credits

## Fall 4th Year

- STAT 50300 - Statistical Methods For Biology
- *CMBD Selective I (2 of 2)*
- BIOL 36700 - Principles Of Development or
- BIOL 41500 - Introduction To Molecular Biology or
- BIOL 42000 - Eukaryotic Cell Biology or
- BIOL 48100 - Eukaryotic Genetics
- Base Lab Requirement - Credit Hours: 0.00-4.00
- Great Issues In Science - Credit Hours: 3.00
- Elective - Credit Hours: 3.00-6.00

## 14-16 Credits

## Spring 4th Year

### *CMBD Selective II*

- BIOL 51600 - Molecular Biology Of Cancer or
- BIOL 59500 - Special Assignments -see above for specific titles
- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Team-Building & Collaboration - Credit Hours: 0.00 - 3.00
- Elective - Credit Hours: 3.00 - 6.00
- Elective - Credit Hours: 1.00

## 16-18 Credits

## Prerequisite Information

For current pre-requisites for courses, click [here](#).

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## **Chemical Biology & Biochemistry, BS**

### About the Program

Biochemistry investigates the chemical and molecular foundations of life processes. A student may study the transfer of genetic information into biological structures, the conversion of nutrients into cell constituents and their utilization as sources of energy, the storage of memory, and the chemical nature of neural processes. Laboratory techniques include electrophoresis, chromatography, Western blotting, protein sequence analysis, and peptide mapping. Understanding the development and application of enzymatic assays is fundamental to this field of study. This rigorous curriculum is excellent preparation for a number of careers in both academic and industrial research, including cancer and AIDS research, medicine, veterinary medicine, dentistry, structural biology, genetics, and medicinal chemistry and drug development.

Biochemistry Website

Chemical Biology & Biochemistry Major Change (CODO) Requirements

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)

- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

#### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## Departmental/Program Major Courses (64-65 credits)

**Biology/Chemistry 2.0 Major GPA:** A minimum 2.0 average is required in all courses used to meet major requirements. A maximum of 3 credits of undergraduate research (BIOL 29400/49400/49900 and CHM 49900) may be factored into the Major GPA calculation. Any excess Biology and Chemistry courses/research credits are "free electives" and not included in this calculation.

**BIOL 500-level course:** Each student must take at least one 2-3 credit 500-level BIOL lecture course (excluding: lab-only courses such as BIOL 54200 or BIOL 59500 lab modules). This selection may double-dip with other major requirements.

### Biology Core (19 credits)

- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior ♦ (fulfills STS for UCC and Science cores)
- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms ♦
- BIOL 13500 - First Year Biology Laboratory or
- BIOL 19500 - Special Assignments
  - Diet, Dis & Immune Sys-Honors - Credit Hours: 2.00 **Credit Hours:** 2.00
  - Year 1 Bio Lab Disease Ecology - Credit Hours: 2.00 **Credit Hours:** 2.00
  - Yr 1 Bio Lab Phges Flds-Honors - Credit Hours: 2.00 **Credit Hours:** 2.00
- BIOL 23100 - Biology III: Cell Structure And Function ♦
- BIOL 23200 - Laboratory In Biology III: Cell Structure And Function
- BIOL 24100 - Biology IV: Genetics And Molecular Biology ♦
- BIOL 24200 - Laboratory In Biology IV: Genetics And Molecular Biology
- BIOL 28600 - Introduction To Ecology And Evolution

### Chemistry Core (13 credits)

#### General Chemistry (5 credits)

- CHM 12901 - General Chemistry With A Biological Focus ♦

## Organic Chemistry (8 credits)

- CHM 25500 - Organic Chemistry For The Life Sciences I ♦
- CHM 25501 - Organic Chemistry For The Life Sciences Laboratory I
- CHM 25600 - Organic Chemistry For The Life Sciences II
- CHM 25601 - Organic Chemistry For The Life Sciences Laboratory II

## Upper-Level Biology and Chemistry Coursework (32-33 credits)

### Intermediate Biology Selective (3 credits)

- BIOL 41500 - Introduction To Molecular Biology

### Required coursework (17 credits)

- BIOL 42000 - Eukaryotic Cell Biology
- CHM 33900 - Biochemistry: A Molecular Approach
- CHM 33901 - Biochemistry Laboratory
- CHM 34800 - Bioinorganic Chemistry
- CHM 37200 - Physical Chemistry
- CHM 49000 - Selected Topics In Chemistry For Upper-Division Students -Bioanalytical Chemistry (3 credits) Credit Hours: 3.00

### CBB-related research (2-3 credits, across 2+ semesters)

At least TWO semesters of research performed after successful completion of BIOL 23100 and BIOL 24100. This research is in addition to the CBB Capstone, and must be with approved faculty.

- BIOL 49400 - Biology Research
- BIOL 49900 - Biology Honors Thesis Research
- CHM 49900 - Special Assignments

### CBB Research Capstone (4 credits)

*Take twice, 2 credits each time. Fulfills Base Lab Requirement.*

- BIOL 49500 - Special Assignments -CBB Research Capstone
- CHM 49000 - Selected Topics In Chemistry For Upper-Division Students -CBB Research Capstone

### CBB Selective I (3 credits)

- BIOL 59500 - Special Assignments -Methods & Measurements in Biophysical Chemistry Credit Hours: 3.00
- CHM 56000 - Organic Spectroscopic Analysis

### CBB Selective II: BIOL 500-level (3 credits)

These courses also meet the departmental "BIOL 500-level" requirement.

- BIOL 53601 - Biological And Structural Aspects Of Drug Design And Action
- BIOL 59500 - Special Assignments -CryoEM 3D Reconstruction - Credit Hours: 3.00 -X-Ray Crystallography - Credit Hours: 3.00 Credit Hours: 3.00

## Other Departmental Requirements (36-56 credits)

### College of Science Core Requirements (36-56 credits)

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

#### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

#### Technical Writing And Presentation\* (0 or 3 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

#### Computing (2-4 credits)

If CS 17700 or CS 18000 is selected and taken *at Purdue*, these courses would also meet the College of Science: 'Team-Building & Collaboration' requirement.

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦ or
- TDM 10100 - The Data Mine Seminar I and TDM 10200 - The Data Mine Seminar II

#### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from the list **HERE** to fulfill each Option below (select courses can also satisfy University Core: 'Humanities').

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

## General Education^ (9 credits)

Choose courses from the list [HERE](#) to fulfill each Option below (select courses can also satisfy University Core: 'Behavioral/Social Sciences').

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from the list [HERE](#).

## Laboratory Science (8 credits)

Choose one Physics I and one Physics II option.

### Physics I

- PHYS 23300 - Physics For Life Sciences I or
- PHYS 17200 - Modern Mechanics

### Physics II

- PHYS 23400 - Physics For Life Sciences II or
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory

## Mathematics (8-10 credits)

Choose one Calculus I course and one Calculus II course. (satisfies QR for core)

### Calculus I

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I

### Calculus II

- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society

Met with required major coursework (BIOL 12100).

## Statistics (3 credits)

- STAT 50300 - Statistical Methods For Biology

## Team-Building and Collaboration\* (0 or 3 credits)

This requirement can double-dip with other degree requirements *if taken at Purdue University*, such as CS 17700 or 18000 (College of Science Core: Computing).

For the full list of options, click [HERE](#).

## Electives (0-20 credits)

## GPA Requirements

- 2.0 Graduation GPA required for Bachelor of Science degree.
- **Biology/Chemistry 2.0 Major GPA:** A minimum 2.0 average is required in all courses used to meet major requirements. A maximum of 3 credits of undergraduate research (BIOL 29400/49400/49900 and CHM 49900) may be factored into the Major GPA calculation. Any excess Biology and Chemistry courses/research credits are "free electives" and not included in this calculation.

## Course Requirements and Notes

- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.
- Students may earn no more than nine credits of graded (grades of A-F) research. This rule applies regardless of the subject under which credit was earned (BIOL, CHM, BTNY, etc.). Any additional research credits beyond nine must be pass/not pass grade mode. (Research courses include but are not limited to: ANSC 49100, ANTH 39000, ASL 39000, BCHM 49800, BIOL 29400, BIOL 49400, BIOL 49900, BTNY 49800, CHM 49900, EDPS 59000, ENTM 49700, FNR 49800, FS 49100, HDFS 39000, HORT 49100, NUTR 39000, PHRM 49500, PSY 39000, PUBH 49000, and SLHS 49800)

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.



- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

## Fall 1st Year

- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior ♦
- CHM 12901 - General Chemistry With A Biological Focus ♦
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00
- Elective - Credit Hours: 1.00 (BIOL 11500 or CHM 19400 strongly recommended)

## 15-17 Credits

## Spring 1st Year

- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms ♦
- BIOL 13500 - First Year Biology Laboratory or
- BIOL 19500 - Special Assignments  
(*See titles above.*)
- CHM 25500 - Organic Chemistry For The Life Sciences I ♦
- CHM 25501 - Organic Chemistry For The Life Sciences Laboratory I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 16-18 Credits

## Fall 2nd Year

- BIOL 23100 - Biology III: Cell Structure And Function ♦
- BIOL 23200 - Laboratory In Biology III: Cell Structure And Function
- CHM 25600 - Organic Chemistry For The Life Sciences II
- CHM 25601 - Organic Chemistry For The Life Sciences Laboratory II
- Science Core Selection - Credit Hours: 3.00-4.00
- Science Core Selection - Credit Hours: 3.00-4.00

## 15 Credits

## Spring 2nd Year

- BIOL 24100 - Biology IV: Genetics And Molecular Biology ♦
- BIOL 24200 - Laboratory In Biology IV: Genetics And Molecular Biology
- BIOL 28600 - Introduction To Ecology And Evolution
- CHM 33900 - Biochemistry: A Molecular Approach
- CHM 33901 - Biochemistry Laboratory
- Computing Selective - Credit Hours: 3.00-4.00 ♦
- Science Core Selection - Credit Hours: 3.00-4.00

## 17-18 Credits

### Fall 3rd Year

- BIOL 42000 - Eukaryotic Cell Biology
- CHM 49000 - Selected Topics In Chemistry For Upper-Division Students -Bioanalytical Chemistry (3 credits)
- PHYS 23300 - Physics For Life Sciences I
- BIOL 49400 - Biology Research or
- BIOL 49900 - Biology Honors Thesis Research or
- CHM 49900 - Special Assignments
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15 Credits

### Spring 3rd Year

- BIOL 41500 - Introduction To Molecular Biology
- CHM 37200 - Physical Chemistry
- PHYS 23400 - Physics For Life Sciences II
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15 Credits

### Fall 4th Year

- CHM 34800 - Bioinorganic Chemistry
- BIOL 49500 - Special Assignments -CBB Research Capstone (2 credits) or
- CHM 49000 - Selected Topics In Chemistry For Upper-Division Students -CBB Research Capstone (2 credits)
- BIOL 59500 - Special Assignments - Methods & Measurements in Biophysical Chemistry (3 credits) or
- CHM 56000 - Organic Spectroscopic Analysis
- Science Core Selection - Credit hours: 3.00 - 4.00
- Science Core Selection - Credit hours: 3.00 - 4.00

## 14 Credits

### Spring 4th Year

- STAT 50300 - Statistical Methods For Biology
- BIOL 49500 - Special Assignments -CBB Research Capstone (2 credits) or
- CHM 49000 - Selected Topics In Chemistry For Upper-Division Students -CBB Research Capstone (2 credits)
- BIOL 53601 - Biological And Structural Aspects Of Drug Design And Action or
- BIOL 59500 - Special Assignments

- CryoEM 3D Reconstruction (3 credits)
- Science Core Selection - Credit hours: 3.00 - 4.00
- Elective - Credit hours: 3.00

## 14-15 Credits

## Prerequisite Information

For current pre-requisites for courses, click [here](#).

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## **Ecology, Evolution, and Environmental Biology, BS**

### **About the Program**

This major investigates how organisms interact with their physical environment and other organisms, from an evolutionary perspective. Ecologists' work includes research and/or teaching involving population genetics and evolution, adaptive strategies for survival, the nature of populations, and community ecology. Ecologists also offer technical services in connection with environmental impact decisions and regional planning, and environmental education at various levels as teacher, naturalist, or journalist. Common career paths for undergraduate students include graduate study leading to academic positions (research and teaching in small colleges and major universities), technical positions in industry (mostly dealing with environmental assessment), and employment in state and federal environmental agencies.

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### Earning Core Curricular Requirements through Experience

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click here.

## Departmental/Program Major Courses (33-36 credits)

**Biology 2.0 Major GPA:** A minimum 2.0 average is required in all courses used to meet major requirements. A maximum of 3 credits of undergraduate research (BIOL 29400/49400/49900) may be factored into the Biology GPA calculation. Any excess Biology courses and research credits are "free electives" and not included in this calculation.

**BIOL 500-level course:** Each student must take at least one 2-3 credit 500-level BIOL lecture course (excluding: lab-only courses such as BIOL 54200 or BIOL 59500 lab modules). This selection may double-dip with other major requirements.

## Biology Core (19 credits)

- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior & (fulfills University Core: 'Science, Technology, & Society'; also fulfills College of Science Core: 'Multidisciplinary Experience')
- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms ♦
- BIOL 13500 - First Year Biology Laboratory or
- BIOL 19500 - Special Assignments
  - Diet, Dis & Immune Sys-Honors - Credit Hours: 2.00 **Credit Hours: 2.00**
  - Year 1 Bio Lab Disease Ecology - Credit Hours: 2.00 **Credit Hours: 2.00**
  - Yr 1 Bio Lab Phges Flds-Honors - Credit Hours: 2.00 **Credit Hours: 2.00**
- BIOL 23100 - Biology III: Cell Structure And Function ♦
- BIOL 23200 - Laboratory In Biology III: Cell Structure And Function
- BIOL 24100 - Biology IV: Genetics And Molecular Biology ♦
- BIOL 24200 - Laboratory In Biology IV: Genetics And Molecular Biology
- BIOL 28600 - Introduction To Ecology And Evolution

## Upper-Level Biology Coursework (14-17 credits)

### Intermediate Biology Selective (2-4 credits)

Choose one of the options below.

- BIOL 32800 - Principles Of Physiology
- BIOL 36700 - Principles Of Development
- BIOL 39500 - Special Assignments Macromolecules - Credit Hours: 2.00 **Credit Hours: 2.00**
- BIOL 41500 - Introduction To Molecular Biology
- BIOL 41600 - Viruses And Viral Disease
- BIOL 42000 - Eukaryotic Cell Biology
- BIOL 43600 - Neurobiology
- BIOL 43800 - General Microbiology

## Required Coursework (6 credits)

These courses also meet the departmental "BIOL 500-level" requirement.

- BIOL 58000 - Evolution
- BIOL 59500 - Special Assignments -Ecology - 3 credits Credit Hours: 3.00

### Ecology Selective I (3 credits)

Select one; May not overlap with Ecology Selective II.

- BIOL 49500 - Special Assignments  
-Data Science For Biologists - Credit Hours: 3.00
- BIOL 58210 - Ecological Statistics
- BIOL 58705 - Animal Communication
- BIOL 59100 - Field Ecology
- BIOL 59200 - The Evolution Of Behavior
- BIOL 59500 - Special Assignments  
-Building The Tree Of Life - Credit Hours: 3.00 **Credit Hours: 3.00**  
-Disease Ecology - Credit Hours: 3.00 **Credit Hours: 3.00**

### Ecology Selective II (2-3 credits)

Select 1 course. May not overlap with Ecology Selective I.

- AGE 52500 - Environmental Policy Analysis
- ANTH 53500 - Foundations Of Biological Anthropology
- ANTH 53600 - Primate Ecology
- BIOL 39500 - Special Assignments  
-Exp Dsgn&Quant Analys I-Honors **Credit Hours: 3.00**
- BIOL 43800 - General Microbiology
- BIOL 43900 - Laboratory In General Microbiology
- BIOL 48300 - Great Issues: Environmental And Conservation Biology
- BIOL 49500 - Special Assignments  
-Data Science: Good Versus Bad **Credit Hours: 3.00**
- BIOL 58210 - Ecological Statistics
- BIOL 58705 - Animal Communication
- BIOL 59100 - Field Ecology
- BIOL 59200 - The Evolution Of Behavior
- BIOL 59500 - Special Assignments  
-Building The Tree Of Life - Credit Hours: 3.00 **Credit Hours: 3.00**  
-Disease Ecology - Credit Hours: 3.00 **Credit Hours: 3.00**
- BTNY 30200 - Plant Ecology
- BTNY 30500 - Plant Evolution And Taxonomy
- BTNY 56100 - Survey Of Mathematical Biology
- CE 35000 - Introduction To Environmental And Ecological Engineering
- EEE 35000 - Introduction To Environmental And Ecological Engineering
- FNR 44700 - Vertebrate Population Dynamics
- POL 52300 - Environmental Politics And Public Policy

### Base Lab Requirement (1 credit)

EEEB majors must use BIOL 59500 "Laboratory In Ecology" for this requirement.

See Base Lab Requirements for all Biology majors for additional course listings.

- BIOL 59500 - Special Assignments -Laboratory In Ecology - Credit Hours: 1.00 Credit Hours: 1.00

## Other Departmental /Program Course Requirements (51-73 credits)

### Chemistry (17 credits)

#### General Chemistry (5 credits)

- CHM 12901 - General Chemistry With A Biological Focus ♦

#### Organic Chemistry (8 credits)

- CHM 25500 - Organic Chemistry For The Life Sciences I ♦
- CHM 25501 - Organic Chemistry For The Life Sciences Laboratory I
- CHM 25600 - Organic Chemistry For The Life Sciences II ♦
- CHM 25601 - Organic Chemistry For The Life Sciences Laboratory II

#### Biochemistry (4 credits)

- CHM 33900 - Biochemistry: A Molecular Approach
- CHM 33901 - Biochemistry Laboratory

## College of Science Core Requirements (34-56 credits)

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation (3-10 credits)

#### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

#### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.



- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

## Computing (2-4 credits)

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦ or
- TDM 10100 - The Data Mine Seminar I and TDM 10200 - The Data Mine Seminar II.

## Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from the list **HERE** to fulfill each Option below (select courses can also satisfy University Core: 'Humanities').

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

## General Education^ (9 credits)

Choose courses from the list **HERE** to fulfill each Option below (select courses can also satisfy University Core: 'Behavioral/Social Sciences').

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from the list **HERE**.

## Laboratory Science (8 credits)

Choose one Physics I and one Physics II option.

### Physics I

- PHYS 23300 - Physics For Life Sciences I or
- PHYS 17200 - Modern Mechanics

### Physics II

- PHYS 23400 - Physics For Life Sciences II or

- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory

## Mathematics (6-10 credits)

Choose one Calculus I course and one Calculus II course. (fulfills QR for core)

### Calculus I

- MA 16010 - Applied Calculus I or
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I

### Calculus II

- MA 16020 - Applied Calculus II or
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society

*Met with required major coursework (BIOL 12100).*

## Statistics (3 credits)

- STAT 50300 - Statistical Methods For Biology

## Team-Building and Collaboration\* (0 or 3 credits)

This requirement can double-dip with other degree requirements *if taken at Purdue University*, such as BIOL 32800 (Departmental/Program Major Requirements), or CS 17700 or 18000 (College of Science Core: Computing).

For the full list of options, click [HERE](#).

## Electives (11-36 credits)

## GPA Requirements

- 2.0 Graduation GPA required for Bachelor of Science degree.
- **Biology 2.0 Major GPA:** A minimum 2.0 average is required in all courses used to meet major requirements. A maximum of 3 credits of undergraduate research (BIOL 29400/49400/49900) may be factored into the Biology GPA calculation. Any excess Biology courses and research credits are "free electives" and not included in this calculation.

## Course Requirements and Notes

- Students may earn no more than nine credits of graded (grades of A-F) research. This rule applies regardless of the subject under which credit was earned (BIOL, CHM, BTNY, etc.). Any additional research credits beyond nine must be pass/not pass grade mode. (Research courses include but are not limited to: ANSC 49100, ANTH 39000, ASL 39000, BCHM 49800, BIOL 29400, BIOL 49400, BIOL 49900, BTNY 49800, CHM 49900, EDPS 59000, ENTM 49700, FNR 49800, FS 49100, HDFS 39000, HORT 49100, NUTR 39000, PHRM 49500, PSY 39000, PUBH 49000, and SLHS 49800)
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the Civics Literacy Proficiency [website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior ♦
- CHM 12901 - General Chemistry With A Biological Focus
- BIOL 13500 - First Year Biology Laboratory or
- BIOL 19500 - Special Assignments -see title options above.
- MA 16010 - Applied Calculus I or
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (BIOL 11500 strongly recommended)

### 16-18 Credits

### Spring 1st Year

- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms ♦
- CHM 25500 - Organic Chemistry For The Life Sciences I ♦
- CHM 25501 - Organic Chemistry For The Life Sciences Laboratory I
- MA 16020 - Applied Calculus II or
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 16-19 Credits

### Fall 2nd Year

- BIOL 23100 - Biology III: Cell Structure And Function ♦
- BIOL 23200 - Laboratory In Biology III: Cell Structure And Function
- COM 21700 - Science Writing And Presentation
- CHM 25600 - Organic Chemistry For The Life Sciences II ♦
- CHM 25601 - Organic Chemistry For The Life Sciences Laboratory II
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15-16 Credits

### Spring 2nd Year

- BIOL 24100 - Biology IV: Genetics And Molecular Biology ♦
- BIOL 24200 - Laboratory In Biology IV: Genetics And Molecular Biology
- BIOL 28600 - Introduction To Ecology And Evolution
- CHM 33900 - Biochemistry: A Molecular Approach
- CHM 33901 - Biochemistry Laboratory
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (BIOL 29300 strongly recommended)
- Elective - Credit Hours: 1.00

## 16-17 Credits

### Fall 3rd Year

- BIOL 59500 - Special Assignments and  
- Ecology - Credit Hours: 3.0 **Credit Hours: 3.00**  
-Laboratory In Ecology - Credit Hours: 1.00 (Meets Base Lab Requirement) **Credit Hours: 1.00**
- STAT 50300 - Statistical Methods For Biology
- PHYS 17200 - Modern Mechanics or
- PHYS 23300 - Physics For Life Sciences I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 17 Credits

### Spring 3rd Year

- BIOL 58210 - Ecological Statistics or
- BIOL 58705 - Animal Communication or
- BIOL 59100 - Field Ecology or
- BIOL 59200 - The Evolution Of Behavior or
- BIOL 59500 - Special Assignments

-Building The Tree Of Life **Credit Hours:** 3.00

or

-Disease Ecology

- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 15900 - C Programming ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦
- PHYS 23400 - Physics For Life Sciences II or
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00

## 14-16 Credits

### Fall 4th Year

- Intermediate Biology Selective - Credit Hours: 3.00 - 4.00
- Biology Selective - Credit Hours: 2.00 - 4.00
- Great Issues Selective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 14-17 Credits

### Spring 4th Year

- BIOL 58000 - Evolution
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 2.00

## 14 Credits

## Prerequisite Information

For current pre-requisites for courses, [click here](#).

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Genetics, BS

### About the Program

Genetics is the science of information transfer from one generation to another. We learn the laws of inheritance in all creatures big and small, how they evolve and how they change. On the molecular level we learn about DNA and RNA, on the cellular level we discover what makes a cell cancerous, and on an organismal level we examine the reproductive habits of various organisms. Crucial principles include the structure, function, and transmission of genes. Laboratory techniques explore genetic engineering from the "inside." Genetics is crucial to all of biology, hence a genetics major has great flexibility. This is excellent preparation for advanced study in biological sciences, law, genetic counseling, and many health-related professions.

Genetic Biology Website

Biological Sciences Major Change (CODO) Requirements

### Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## **Degree Requirements**

# **120 Credits Required**

## **Departmental/Program Major Courses (30-37 credits)**

**Biology 2.0 Major GPA:** A minimum 2.0 average is required in all courses used to meet major requirements. A maximum of 3 credits of undergraduate research (BIOL 29400/49400/49900) may be factored into the Biology GPA calculation. Any excess Biology courses and research credits are "free electives" and not included in this calculation.

**BIOL 500-level course:** Each student must take at least one 2-3 credit 500-level BIOL lecture course (excluding: lab-only courses such as BIOL 54200 or BIOL 59500 lab modules). This selection may double-dip with other major requirements. Note: BCHM 52100 is currently the only non-"BIOL" subject area course approved for this requirement.

## **Biology Core (19 credits)**



- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior & diam; (fulfills University Core: 'Science, Technology, & Society'; also fulfills College of Science Core: 'Multidisciplinary Experience')
- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms ♦
- BIOL 13500 - First Year Biology Laboratory or
- BIOL 19500 - Special Assignments
  - Diet, Dis & Immune Sys-Honors - Credit Hours: 2.00 **Credit Hours: 2.00**
  - Year 1 Bio Lab Disease Ecology - Credit Hours: 2.00 **Credit Hours: 2.00**
  - Yr 1 Bio Lab Phges Flds-Honors - Credit Hours: 2.00 **Credit Hours: 2.00**
- BIOL 23100 - Biology III: Cell Structure And Function ♦
- BIOL 23200 - Laboratory In Biology III: Cell Structure And Function
- BIOL 24100 - Biology IV: Genetics And Molecular Biology ♦
- BIOL 24200 - Laboratory In Biology IV: Genetics And Molecular Biology
- BIOL 28600 - Introduction To Ecology And Evolution

## Upper-Level Biology Coursework (11-18 credits)

### Intermediate Biology Selective (2-4 credits)

Choose one of the following options.

- BIOL 32800 - Principles Of Physiology
- BIOL 36700 - Principles Of Development
- BIOL 39500 - Special Assignments -Macromolecules - Credit Hours: 2.00 Credit Hours: 2.00
- BIOL 41500 - Introduction To Molecular Biology
- BIOL 41600 - Viruses And Viral Disease
- BIOL 42000 - Eukaryotic Cell Biology
- BIOL 43600 - Neurobiology

### Required Coursework (4 credits)

- BIOL 44100 - Biology Senior Seminar In Genetics
- BIOL 48100 - Eukaryotic Genetics

### Genetics Selectives (5-6 credits)

Select 2 courses; at least one of the two courses must be a course approved to meet the "BIOL 500-level" requirement.

#### Genetics Selective I: BIOL 500-level (3 credits)

Courses approved to meet the departmental "500-level Biology course". Select one.

- BIOL 51600 - Molecular Biology Of Cancer
- BIOL 54100 - Molecular Genetics Of Bacteria
- BIOL 58000 - Evolution
- BIOL 59500 - Special Assignments
  - Building The Tree Of Life - Credit Hours: 3.00 **Credit Hours: 3.00**
  - CRISPR Mechanism & App - Credit Hours: 3.00 **Credit Hours: 3.00**
  - Pathways Human Health & Disease - Credit Hours: 3.00 **Credit Hours: 3.00**

- Theory Of Molecular Methods - Credit Hours: 3.00 **Credit Hours:** 3.00
- BCHM 52100 - Comparative Genomics

## Genetics Selective II (2-3 credits)

Select a 2nd course, either an additional course from "Genetics Selective I: BIOL 500 -level" above or one of the following options.

- BIOL 43800 - General Microbiology
- BIOL 44400 - Human Genetics
- BIOL 47800 - Introduction To Bioinformatics
- BIOL 49500 - Special Assignments
  - Biodiversity & Museum Research - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Data Science For Biologists - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - RNA World:CRISPR & Coronavirus - Credit Hours: 2.00 **Credit Hours:** 2.00-3.00
- AGRY 53000 - Advanced Plant Genetics

## Base Lab Requirement (0-4 credits)

Click Base Lab Requirements for all Biology majors for additional lists. Courses used for the Base Lab Requirement may also count for other major requirements.

## Other Departmental Requirements: (51-73 credits)

### Chemistry (17 credits)

#### General Chemistry (5 credits)

- CHM 12901 - General Chemistry With A Biological Focus ♦

#### Organic Chemistry (8 credits)

- CHM 25500 - Organic Chemistry For The Life Sciences I ♦
- CHM 25501 - Organic Chemistry For The Life Sciences Laboratory I
- CHM 25600 - Organic Chemistry For The Life Sciences II ♦
- CHM 25601 - Organic Chemistry For The Life Sciences Laboratory II

#### Biochemistry (4 credits)

- CHM 33900 - Biochemistry: A Molecular Approach
- CHM 33901 - Biochemistry Laboratory

## College of Science Core Requirements (34-56 credits)

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

## Composition & Presentation (3-10 credits)

### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

### Computing (2-4 credits)

If CS 17700 or CS 18000 is selected and taken *at Purdue University*, these courses would also meet the College of Science: 'Team-Building & Collaboration' requirement.

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦ or
- TDM 10100 - The Data Mine Seminar I and TDM 10200 - The Data Mine Seminar II

### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from the list **HERE** to fulfill each Option below (select courses can also satisfy University Core: 'Humanities').

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (9 credits)

Choose courses from the list **HERE** to fulfill each Option below (select courses can also satisfy University Core: 'Behavioral/Social Sciences').

- General Education Option I
- General Education Option II
- General Education Option III

### Great Issues In Science (3 credits)

Choose one from the list [HERE](#).

**\*\*PAM: link "HERE" to F23 CoS Great Issues page**

## Laboratory Science (8 credits)

Choose one Physics I and one Physics II option.

### Physics I

- PHYS 23300 - Physics For Life Sciences I or
- PHYS 17200 - Modern Mechanics

### Physics II

- PHYS 23400 - Physics For Life Sciences II or
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory

## Mathematics (6-10 credits)

Choose one Calculus I course and one Calculus II course. (satisfies QR for core)

### Calculus I

- MA 16010 - Applied Calculus I or
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I

### Calculus II

- MA 16020 - Applied Calculus II or
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society

*Met with required major coursework (BIOL 12100).*

## Statistics (3 credits)

- STAT 50300 - Statistical Methods For Biology

## Team-Building and Collaboration\* (0 or 3 credits)

This requirement can double-dip with other degree requirements *if taken at Purdue University*, such as BIOL 32800 (Departmental/Program Major Requirements), or CS 17700 or 18000 (College of Science Core: Computing).

For the full list of options, click [HERE](#).

## Electives (10-39 credits)

## GPA Requirements

- **Biology 2.0 Major GPA:** A minimum 2.0 average is required in all courses used to meet major requirements. A maximum of 3 credits of undergraduate research (BIOL 29400/49400/49900) may be factored into the Biology GPA calculation. Any excess Biology courses and research credits are "free electives" and not included in this calculation.
- 2.0 Graduation GPA required for Bachelor of Science degree.

## Course Requirements & Notes

- Students may earn no more than nine credits of graded (grades of A-F) research. This rule applies regardless of the subject under which credit was earned (BIOL, CHM, BTNY, etc.). Any additional research credits beyond nine must be pass/not pass grade mode. (Research courses include but are not limited to: ANSC 49100, ANTH 39000, ASL 39000, BCHM 49800, BIOL 29400, BIOL 49400, BIOL 49900, BTNY 49800, CHM 49900, EDPS 59000, ENTM 49700, FNR 49800, FS 49100, HDFS 39000, HORT 49100, NUTR 39000, PHRM 49500, PSY 39000, PUBH 49000, and SLHS 49800)

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior ♦
- CHM 12901 - General Chemistry With A Biological Focus ♦
- BIOL 13500 - First Year Biology Laboratory or
- BIOL 19500 - Special Assignments -see above for titles.
- MA 16010 - Applied Calculus I or
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00

## 16-18 Credits

### Spring 1st Year

- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms ♦
- CHM 25500 - Organic Chemistry For The Life Sciences I ♦
- CHM 25501 - Organic Chemistry For The Life Sciences Laboratory I
- MA 16020 - Applied Calculus II or
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 16-19 Credits

### Fall 2nd Year

- BIOL 23100 - Biology III: Cell Structure And Function ♦
- BIOL 23200 - Laboratory In Biology III: Cell Structure And Function
- COM 21700 - Science Writing And Presentation
- CHM 25600 - Organic Chemistry For The Life Sciences II ♦
- CHM 25601 - Organic Chemistry For The Life Sciences Laboratory II
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15 Credits

### Spring 2nd Year

- BIOL 24100 - Biology IV: Genetics And Molecular Biology ♦
- BIOL 24200 - Laboratory In Biology IV: Genetics And Molecular Biology
- BIOL 28600 - Introduction To Ecology And Evolution
- CHM 33900 - Biochemistry: A Molecular Approach
- CHM 33901 - Biochemistry Laboratory
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00

## 15-16 Credits

### Fall 3rd Year

- PHYS 17200 - Modern Mechanics or
- PHYS 23300 - Physics For Life Sciences I
- Genetics Selective II - Credit Hours: 2.00 - 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

- Elective - Credit Hours: 3.00

## 16 Credits

### Spring 3rd Year

- BIOL 48100 - Eukaryotic Genetics
- PHYS 23400 - Physics For Life Sciences II or
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory
- Computing Selective - Credit Hours: 3.00 - 4.00 ♦
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00

## 14-15 Credits

### Fall 4th Year

- BIOL 44100 - Biology Senior Seminar In Genetics
- STAT 50300 - Statistical Methods For Biology
- Intermediate Biology Selective - Credit Hours: 3.00
- Great Issue Course Option - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 16 Credits

### Spring 4th Year

- Genetics Selective I: BIOL 500-level - Credit Hours: 3.00
- Base Lab Requirement - Credit Hours: 2.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 14-17 Credits

## Prerequisite Information

For current pre-requisites for courses, [click here](#).

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language;



ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Health and Disease, BS

### About the Program

Health and disease is a biology program of study with an emphasis on disease-related upper-level biology courses and general education electives that relate to health. The major provides a rigorous curriculum for students interested in health careers, thus giving the student many career options after graduation.

Health and Disease Website

Biological Sciences Major Change (CODO) Requirements

### Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## **Degree Requirements**

# **120 Credits Required**

## **Departmental/Program Major Courses (40-41 credits)**

**Biology 2.0 Major GPA:** A minimum 2.0 average is required in all courses used to meet major requirements. A maximum of 3 credits of undergraduate research (BIOL 29400/49400/49900) may be factored into the Biology GPA calculation. Any excess Biology courses and research credits are "free electives" and not included in this calculation.

**BIOL 500-level course:** Each student must take at least one 2-3 credit 500-level BIOL lecture course (excluding: lab-only courses such as BIOL 54200 or BIOL 59500 lab modules). This selection may double-dip with other major requirements. Note: BCHM 52100 is currently the only non-"BIOL" subject area course approved for this requirement.

## **Biology Core (19 credits)**

- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior ♦ (fulfills STS for core)
- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms ♦
- BIOL 13500 - First Year Biology Laboratory or
- BIOL 19500 - Special Assignments
  - Diet, Dis & Immune Sys-Honors - Credit Hours: 2.00 **Credit Hours: 2.00**
  - Year 1 Bio Lab Disease Ecology - Credit Hours: 2.00 **Credit Hours: 2.00**
  - Yr 1 Bio Lab Phges Flds-Honors - Credit Hours: 2.00 **Credit Hours: 2.00**
- BIOL 23100 - Biology III: Cell Structure And Function ♦
- BIOL 23200 - Laboratory In Biology III: Cell Structure And Function
- BIOL 24100 - Biology IV: Genetics And Molecular Biology ♦
- BIOL 24200 - Laboratory In Biology IV: Genetics And Molecular Biology
- BIOL 28600 - Introduction To Ecology And Evolution

## Upper-Level Biology Coursework (21-22 credits)

### Intermediate Biology Selective (3 credits)

HLDS majors must use BIOL 43800 for this requirement.

- BIOL 43800 - General Microbiology

### Human Anatomy & Physiology (8 credits)

- BIOL 20300 - Human Anatomy And Physiology
- BIOL 20400 - Human Anatomy And Physiology

### Health & Disease Selective (3 credits)

Choose one; may not overlap with "Biology Selectives," but CAN double-dip with the "BIOL 500-level Selective" requirement.

- BIOL 41600 - Viruses And Viral Disease
- BIOL 53700 - Immunobiology

### Biology Selectives (for HLDS) (5-6 credits)

Select two options. At least one Lecture Course Option **MUST** be selected. May not overlap with "Health & Disease Selective," but CAN double-dip with the "BIOL 500-level Selective" requirement.

'Undergraduate Research' **or** 'Laboratory Modules' **may** be taken in lieu of a second lecture course. If selected, 2-3 credits in that category must be chosen.

### Lecture Course Options (2-6 credits)

If a BIOL 500-level Selective is NOT used for the "Health & Disease Selective" above, then at least one 2-3 credit BIOL 500-level Selective must be chosen here.

- BIOL 32800 - Principles Of Physiology
- BIOL 36700 - Principles Of Development

- BIOL 39500 - Special Assignments
  - Exp Dsgn&Quant Analys I-Honors - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Macromolecules - Credit Hours: 2.00 **Credit Hours:** 2.00-3.00
- BIOL 41500 - Introduction To Molecular Biology
- BIOL 41600 - Viruses And Viral Disease
- BIOL 42000 - Eukaryotic Cell Biology
- BIOL 43600 - Neurobiology
- BIOL 44400 - Human Genetics
- BIOL 44600 - Molecular Bacterial Pathogenesis
- BIOL 47800 - Introduction To Bioinformatics
- BIOL 48100 - Eukaryotic Genetics
- BIOL 48300 - Great Issues: Environmental And Conservation Biology
- BIOL 49500 - Special Assignments
  - Biodiversity & Museum Research - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Data Science For Biologists - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - RNA World:CRISPR & Coronavirus - Credit Hours: 2.00 **Credit Hours:** 2.00-3.00
  - Tpcs In Endocrinology & Cancer - Credit Hours: 2.00 **Credit Hours:** 2.00-3.00
- BIOL 51600 - Molecular Biology Of Cancer
- BIOL 51700 - Molecular Biology: Proteins
- BIOL 52900 - Bacterial Physiology
- BIOL 53300 - Medical Microbiology
- BIOL 53601 - Biological And Structural Aspects Of Drug Design And Action
- BIOL 53700 - Immunobiology
- BIOL 53800 - Molecular, Cellular, And Developmental Neurobiology
- BIOL 54100 - Molecular Genetics Of Bacteria
- BIOL 54900 - Microbial Ecology
- BIOL 56200 - Neural Systems
- BIOL 56310 - Protein Bioinformatics
- BIOL 58000 - Evolution
- BIOL 58210 - Ecological Statistics
- BIOL 58705 - Animal Communication
- BIOL 59100 - Field Ecology
- BIOL 59200 - The Evolution Of Behavior
- BIOL 59500 - Special Assignments
  - Building The Tree Of Life - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Cell Biology Of Plants - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - CRISPR Mechanism & App - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - CryoEM 3D Reconstruction - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Disease Ecology - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Ecology - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Immun Of Cancer & Infect Dis - Credit Hours: 2.00 **Credit Hours:** 2.00-3.00
  - Meth Meas Biophys Chem - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Neural Mech Health & Disease - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Neurobiol Learning & Memory - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Pathways Human Health & Disease - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Practical Bio Comput - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Theory Of Molecular Methods - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - X-Ray Crystallography - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
- BCHM 43400 - Medical Topics In Biochemistry
- BCHM 52100 - Comparative Genomics

- HORT 30100 - Plant Physiology

## Undergraduate Research (2-3 credits if selected)

If Undergraduate Research is selected: must take at least 2 credits to satisfy one "course" for the Biology Selectives requirement.

A maximum of 3 credits total (combined BIOL 49400/49900) can count towards the "Biology Selectives" tally (any credits beyond three count as free "electives")

- BIOL 49400 - Biology Research
- BIOL 49900 - Biology Honors Thesis Research

## Laboratory Modules (2-3 credits if selected)

If Laboratory Modules are selected: must take at least 2 credits to satisfy one "course" for the Biology Selectives requirement.

- BIOL 44212 - Microscopy And Cell Biology
- BIOL 54200 - Modular Upper-Division Laboratory Course -Lab In Neurophysiology - Credit Hours: 1.00  
Credit Hours: 1.00
- BIOL 59500 - Special Assignments  
-Data Analysis In Neuroscience - Credit Hours: 1.00  
-Structural Biology Lab - Credit Hours: 1.00

## Base Lab Requirement (2 credits)

HLDS majors must use BIOL 43900 for this requirement.

Click Base Lab Requirements for all Biology majors for additional lists.

- BIOL 43900 - Laboratory In General Microbiology

## BIOL 500-level Selective (0 credits)

Select one 2-3 credit course approved to meet the departmental "BIOL 500-level selective." This course will double-dip with either the "Health & Disease Selective" or the "Biology Selectives (for HLDS)".

If a 2-3 credit "BIOL 500-level" course is NOT selected for the "Health & Disease Selective," then select a 2-3 credit BIOL 500-level course from the "Biology Selectives (for HLDS): Lecture Course Options" list above.

## Other Departmental Requirements: (54-76 credits)

### Chemistry (17 credits)

#### General Chemistry (5 credits)

- CHM 12901 - General Chemistry With A Biological Focus ♦

## Organic Chemistry (8 credits)

- CHM 25500 - Organic Chemistry For The Life Sciences I ♦
- CHM 25501 - Organic Chemistry For The Life Sciences Laboratory I
- CHM 25600 - Organic Chemistry For The Life Sciences II ♦
- CHM 25601 - Organic Chemistry For The Life Sciences Laboratory II

## Biochemistry (4 credits)

- CHM 33900 - Biochemistry: A Molecular Approach
- CHM 33901 - Biochemistry Laboratory

## Pre-Professional Selective (3 credits)

Choose one. May not overlap with General Education or Culture/Diversity requirements.

- ANTH 21200 - Culture, Food And Health
- ANTH 34000 - Global Perspectives On Health
- HIST 36305 - The History Of Medicine And Public Health
- HIST 47005 - Women And Health In America
- PHIL 27000 - Biomedical Ethics
- PHIL 28000 - Ethics And Animals
- PUBH 40000 - Human Diseases And Disorders
- PUBH 40500 - Principles Of Epidemiology
- SOC 27500 - Sociology Of Aging And The Life Course
- SOC 35200 - Drugs, Culture, And Society
- SOC 37400 - Medical Sociology
- SOC 46100 - Health And Social Behavior

## College of Science Core Requirements (34-56 credits)

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

## Composition & Presentation (3-10 credits)

### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

## Computing (2-4 credits)

If CS 17700 or CS 18000 is selected and taken *at Purdue University*, these courses would also meet the College of Science: 'Team-Building & Collaboration' requirement.

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦ or
- TDM 10100 - The Data Mine Seminar I and TDM 10200 - The Data Mine Seminar II

## Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from the list [HERE](#) to fulfill each Option below (select courses can also satisfy University Core: 'Humanities').

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

## General Education^ (9 credits)

Choose courses from the list [HERE](#) to fulfill each Option below (select courses can also satisfy University Core: 'Behavioral/Social Sciences').

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from the list [HERE](#).

**\*\*PAM: link "HERE" to F23 CoS Great Issues page**

## Laboratory Science (8 credits)

Choose one Physics I and one Physics II option.

### Physics I

- PHYS 23300 - Physics For Life Sciences I or

- PHYS 17200 - Modern Mechanics

## Physics II

- PHYS 23400 - Physics For Life Sciences II or
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory

## Mathematics (6-10 credits)

Choose one Calculus I course and one Calculus II course. (satisfies QR for core)

### Calculus I

- MA 16010 - Applied Calculus I or
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I

### Calculus II

- MA 16020 - Applied Calculus II or
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society

*Met with required major coursework (BIOL 12100).*

## Statistics (3 credits)

- STAT 50300 - Statistical Methods For Biology

## Team-Building and Collaboration\* (0 or 3 credits)

This requirement can double-dip with other degree requirements *if taken at Purdue University*, such as BIOL 32800 (Departmental/Program Major Requirements), or CS 17700 or 18000 (College of Science Core: Computing).

For the full list of options, click [HERE](#).

## Electives (3-26 credits)

## GPA Requirements

- 2.0 Graduation GPA required for Bachelor of Science degree.
- **Biology 2.0 Major GPA:** A minimum 2.0 average is required in all courses used to meet major requirements. A maximum of 3 credits of undergraduate research (BIOL 29400/49400/49900) may be



factored into the Biology GPA calculation. Any excess Biology courses and research credits are "free electives" and not included in this calculation.

## Course Requirements & Notes

- Students may earn no more than nine credits of graded (grades of A-F) research. This rule applies regardless of the subject under which credit was earned (BIOL, CHM, BTNY, etc.). Any additional research credits beyond nine must be pass/not pass grade mode. (Research courses include but are not limited to: ANSC 49100, ANTH 39000, ASL 39000, BCHM 49800, BIOL 29400, BIOL 49400, BIOL 49900, BTNY 49800, CHM 49900, EDPS 59000, ENTM 49700, FNR 49800, FS 49100, HDFS 39000, HORT 49100, NUTR 39000, PHRM 49500, PSY 39000, PUBH 49000, and SLHS 49800)
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)

- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior ♦
- CHM 12901 - General Chemistry With A Biological Focus ♦
- BIOL 13500 - First Year Biology Laboratory or
- BIOL 19500 - Special Assignments (see above for titles)
- MA 16010 - Applied Calculus I or
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00

### 16-18 Credits

### Spring 1st Year

- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms ♦
- CHM 25500 - Organic Chemistry For The Life Sciences I ♦
- CHM 25501 - Organic Chemistry For The Life Sciences Laboratory I
- MA 16020 - Applied Calculus II or

- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 16-19 Credits

### Fall 2nd Year

- BIOL 23100 - Biology III: Cell Structure And Function ♦
- BIOL 23200 - Laboratory In Biology III: Cell Structure And Function
- COM 21700 - Science Writing And Presentation
- CHM 25600 - Organic Chemistry For The Life Sciences II ♦
- CHM 25601 - Organic Chemistry For The Life Sciences Laboratory II
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15 Credits

### Spring 2nd Year

- BIOL 24100 - Biology IV: Genetics And Molecular Biology ♦
- BIOL 24200 - Laboratory In Biology IV: Genetics And Molecular Biology
- BIOL 28600 - Introduction To Ecology And Evolution
- CHM 33900 - Biochemistry: A Molecular Approach
- CHM 33901 - Biochemistry Laboratory
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00

## 15-16 Credits

### Fall 3rd Year

- BIOL 20300 - Human Anatomy And Physiology
- PHYS 17200 - Modern Mechanics or
- PHYS 23300 - Physics For Life Sciences I
- Biology Selective - Credit Hours: 2.00 - 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 2.00

## 16-17 Credits

### Spring 3rd Year

- BIOL 20400 - Human Anatomy And Physiology
- PHYS 23400 - Physics For Life Sciences II or

- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory
- Computing Selective - Credit Hours: 3.00-4.00 ♦
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 3.00

## 17-18 Credits

### Fall 4th Year

- BIOL 43800 - General Microbiology
- BIOL 43900 - Laboratory In General Microbiology
- STAT 50300 - Statistical Methods For Biology
- Great Issues Course Option - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 17 Credits

### Spring 4th Year

- BIOL 41600 - Viruses And Viral Disease or
- BIOL 53700 - Immunobiology
- Biology Selective 500 Level - Credit Hours: 2.00 - 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Pre-Professional Selective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00

## 16 Credits

## Prerequisite Information

For current pre-requisites for courses, [click here](#).

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Microbiology, BS

### About the Program

Microbiology includes the study of viruses, bacteria, and fungi. A student can expect to study topics such as microbial growth, nutrition, metabolism, pathogenesis, morphogenesis, and production of antibiotics. Career opportunities are found in public health, medical laboratories, quality assurance, environmental toxicology, and related areas. A microbiology major provides excellent preparation for advanced study (or direct employment) in biological sciences, education, and many health-related professions.

Microbiology Website

Biological Sciences Major Change (CODO) Requirements

### Degree Requirements

## 120 Credits Required

### Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## **Departmental/Program Major Courses (36-37 credits)**

**Biology 2.0 Major GPA:** A minimum 2.0 average is required in all courses used to meet major requirements. A maximum of 3 credits of undergraduate research (BIOL 29400/49400/49900) may be factored into the Biology GPA calculation. Any excess Biology courses and research credits are "free electives" and not included in this calculation.

**BIOL 500-level course:** Each student must take at least one 2-3 credit 500-level BIOL lecture course (excluding lab-only courses such as BIOL 54200 or BIOL 59500 lab modules). This selection may double-dip with other major requirements.

## **Biology Core (19 credits)**

- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior ♦ (fulfills STS for core)
- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms ♦
- BIOL 13500 - First Year Biology Laboratory or
- BIOL 19500 - Special Assignments

-Diet, Dis & Immune Sys-Honors - Credit Hours: 2.00 **Credit Hours: 2.00**  
-Year 1 Bio Lab Disease Ecology - Credit Hours: 2.00 **Credit Hours: 2.00**  
-Yr 1 Bio Lab Phges Flds-Honors - Credit Hours: 2.00 **Credit Hours: 2.00**

- BIOL 23100 - Biology III: Cell Structure And Function ♦
- BIOL 23200 - Laboratory In Biology III: Cell Structure And Function
- BIOL 24100 - Biology IV: Genetics And Molecular Biology ♦
- BIOL 24200 - Laboratory In Biology IV: Genetics And Molecular Biology
- BIOL 28600 - Introduction To Ecology And Evolution

## Upper-Level Biology Coursework (17-18 credits)

### Intermediate Biology Selective (3 credits)

MICR majors must use BIOL 43800 for this requirement.

- BIOL 43800 - General Microbiology

### Required Courses (6 credits)

- BIOL 41600 - Viruses And Viral Disease
- BIOL 52900 - Bacterial Physiology

### Microbiology Selective I: BIOL 500-level (3 credits)

Choose one. May not overlap Microbiology Selective II.

- BIOL 54100 - Molecular Genetics Of Bacteria

### Microbiology Selective II (3-4 credits)

Choose either one 3-credit option, or two 2-credit options. May not overlap with Microbiology Selective I.

Any excess coursework will count as "free electives" towards graduation.

### Two credit options (2 classes/4 credits)

Select TWO 2-credit options.

Any excess coursework will count as "free electives" towards graduation.

- BIOL 49500 - Special Assignments -RNA World:CRISPR & Coronavirus - Credit Hours: 2.00 Credit Hours: 2.00
- BIOL 54900 - Microbial Ecology
- BIOL 59500 - Special Assignments -Immun Of Cancer & Infect Dis - Credit Hours: 2.00 Credit Hours: 2.00

### Three credit options (1 class/3 credits)

Select ONE.

- BIOL 47800 - Introduction To Bioinformatics
- BIOL 49500 - Special Assignments  
-Data Science For Biologists - Credit Hours: 3.00 **Credit Hours:** 3.00
- BIOL 53300 - Medical Microbiology
- BIOL 59500 - Special Assignments  
-Building The Tree Of Life - Credit Hours: 3.00 **Credit Hours:** 3.00  
-CRISPR Mechanism & App - Credit Hours: 3.00 **Credit Hours:** 3.00
- FS 58100 - Microbial Genomics And Metabolism

## Base Lab Requirement (2 credits)

MICR majors must use BIOL 43900 for this requirement.

Click Base Lab Requirements for all Biology majors for additional lists.

- BIOL 43900 - Laboratory In General Microbiology

## Other Departmental Requirements (51-73 credits)

### Chemistry (17 credits)

#### General Chemistry (5 credits)

- CHM 12901 - General Chemistry With A Biological Focus ♦

#### Organic Chemistry (8 credits)

- CHM 25500 - Organic Chemistry For The Life Sciences I ♦
- CHM 25501 - Organic Chemistry For The Life Sciences Laboratory I
- CHM 25600 - Organic Chemistry For The Life Sciences II ♦
- CHM 25601 - Organic Chemistry For The Life Sciences Laboratory II

#### Biochemistry (4 credits)

- CHM 33900 - Biochemistry: A Molecular Approach
- CHM 33901 - Biochemistry Laboratory

## College of Science Core Requirements (34-56 credits)

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation (3-10 credits)

#### Written Communication (3-4 credits)



Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

### Computing (2-4 credits)

If CS 17700 or CS 18000 is selected and taken *at Purdue University*, these courses would also meet the College of Science: 'Team-Building & Collaboration' requirement.

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦ or
- TDM 10100 - The Data Mine Seminar I and TDM 10200 - The Data Mine Seminar II

### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from the list **HERE** to fulfill each Option below (select courses can also satisfy University Core: 'Humanities').

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (9 credits)

Choose courses from the list **HERE** to fulfill each Option below (select courses can also satisfy University Core: 'Behavioral/Social Sciences').

- General Education Option I
- General Education Option II
- General Education Option III

### Great Issues In Science (3 credits)

Choose one from the list **HERE**.

### Laboratory Science (8 credits)

Choose one Physics I and one Physics II option.

### Physics I

- PHYS 23300 - Physics For Life Sciences I or
- PHYS 17200 - Modern Mechanics

### Physics II

- PHYS 23400 - Physics For Life Sciences II or
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory

### Mathematics (6-10 credits)

Choose one Calculus I course and one Calculus II course. (satisfies STS for core)

#### Calculus I

- MA 16010 - Applied Calculus I or
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I

#### Calculus II

- MA 16020 - Applied Calculus II or
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

### Science Technology and Society

*Met with required major coursework (BIOL 12100).*

### Statistics (3 credits)

- STAT 50300 - Statistical Methods For Biology

### Team-Building and Collaboration\* (0 or 3 credits)

This requirement can double-dip with other degree requirements *if taken at Purdue University*, such as BIOL 32800 (Departmental/Program Major Requirements), or CS 17700 or 18000 (College of Science Core: Computing).

For the full list of options, click [HERE](#).

### Electives (10-33 credits)

## GPA Requirements

- 2.0 Graduation GPA required for Bachelor of Science degree.
- **Biology 2.0 Major GPA:** A minimum 2.0 average is required in all courses used to meet major requirements. A maximum of 3 credits of undergraduate research (BIOL 29400/49400/49900) may be factored into the Biology GPA calculation. Any excess Biology courses and research credits are "free electives" and not included in this calculation.

## Course Requirements and Notes

- Students may earn no more than nine credits of graded (grades of A-F) research. This rule applies regardless of the subject under which credit was earned (BIOL, CHM, BTNY, etc.). Any additional research credits beyond nine must be pass/not pass grade mode. (Research courses include but are not limited to: ANSC 49100, ANTH 39000, ASL 39000, BCHM 49800, BIOL 29400, BIOL 49400, BIOL 49900, BTNY 49800, CHM 49900, EDPS 59000, ENTM 49700, FNR 49800, FS 49100, HDFS 39000, HORT 49100, NUTR 39000, PHRM 49500, PSY 39000, PUBH 49000, and SLHS 49800)
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior ♦
- CHM 12901 - General Chemistry With A Biological Focus ♦
- BIOL 13500 - First Year Biology Laboratory or
- BIOL 19500 - Special Assignments (see titles above)
- MA 16010 - Applied Calculus I or
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00

16-18 Credits

## Spring 1st Year

- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms ♦
- CHM 25500 - Organic Chemistry For The Life Sciences I ♦
- CHM 25501 - Organic Chemistry For The Life Sciences Laboratory I
- MA 16020 - Applied Calculus II or
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 16-19 Credits

## Fall 2nd Year

- BIOL 23100 - Biology III: Cell Structure And Function ♦
- BIOL 23200 - Laboratory In Biology III: Cell Structure And Function
- COM 21700 - Science Writing And Presentation
- CHM 25600 - Organic Chemistry For The Life Sciences II ♦
- CHM 25601 - Organic Chemistry For The Life Sciences Laboratory II
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15 Credits

## Spring 2nd Year

- BIOL 24100 - Biology IV: Genetics And Molecular Biology ♦
- BIOL 24200 - Laboratory In Biology IV: Genetics And Molecular Biology
- BIOL 28600 - Introduction To Ecology And Evolution
- CHM 33900 - Biochemistry: A Molecular Approach
- CHM 33901 - Biochemistry Laboratory
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00

## 15-16 Credits

## Fall 3rd Year

- BIOL 43800 - General Microbiology
- BIOL 43900 - Laboratory In General Microbiology (Meets Base Laboratory Requirement)
- PHYS 17200 - Modern Mechanics or
- PHYS 23300 - Physics For Life Sciences I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15 Credits

### Spring 3rd Year

- BIOL 41600 - Viruses And Viral Disease
- BIOL 52900 - Bacterial Physiology
- PHYS 23400 - Physics For Life Sciences II or
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00

## 14 Credits

### Fall 4th Year

- BIOL 54100 - Molecular Genetics Of Bacteria (Microbiology Selective I)
- Computing Selective - Credit Hours: 3.00-4.00 ♦
- Great Issues In Science - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15-16 Credits

### Spring 4th Year

- STAT 50300 - Statistical Methods For Biology
- Microbiology Selective II - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15 Credits

## Prerequisite Information

For current pre-requisites for courses, [click here](#).

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Neurobiology and Physiology, BS

### About the Program

Physiology is the study of the functions of living organisms and of the organ and tissue systems of which they are composed. The goal of physiology is to understand, in terms of physical and chemical principles, the mechanisms that operate in living organisms from the subcellular level to the level of the whole animal, with an emphasis on how these mechanisms are integrated to produce a viable organism.

Neurobiology is the study of the structure, function, and development of the nervous system, and originated, in part, as a subdiscipline of physiology. In recent years, neurobiology has become one of the most rapidly changing and exciting areas of biology. A neurobiology and physiology major is excellent preparation for careers in education, research, industry, medicine, veterinary medicine, and other professions.

Neurobiology and Physiology Website

Biological Sciences Major Change (CODO) Requirements

### Degree Requirements

## 120 Credits Required

### Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### Earning Core Curricular Requirements through Experience

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click here.

## Departmental/Program Major Courses (32-37 credits)

**Biology 2.0 Major GPA:** A minimum 2.0 average is required in all courses used to meet major requirements. A maximum of 3 credits of undergraduate research (BIOL 29400/49400/49900) may be factored into the Biology GPA calculation. Any excess Biology courses and research credits are "free electives" and not included in this calculation.

**BIOL 500-level course:** Each student must take at least one 2-3 credit 500-level BIOL lecture course (excluding lab-only courses such as BIOL 54200 or BIOL 59500 lab modules). This selection may double-dip with other major requirements. Note: BCHM 52100 is currently the only non-"BIOL" subject area course approved for this requirement.

## Biology Core (19 credits)



- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior ♦ (fulfills STS for core)
- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms ♦
- BIOL 13500 - First Year Biology Laboratory or
- BIOL 19500 - Special Assignments
  - Diet, Dis & Immune Sys-Honors - Credit Hours: 2.00 **Credit Hours:** 2.00
  - Year 1 Bio Lab Disease Ecology - Credit Hours: 2.00 **Credit Hours:** 2.00
  - Yr 1 Bio Lab Phges Flds-Honors - Credit Hours: 2.00 **Credit Hours:** 2.00
- BIOL 23100 - Biology III: Cell Structure And Function ♦
- BIOL 23200 - Laboratory In Biology III: Cell Structure And Function
- BIOL 24100 - Biology IV: Genetics And Molecular Biology ♦
- BIOL 24200 - Laboratory In Biology IV: Genetics And Molecular Biology
- BIOL 28600 - Introduction To Ecology And Evolution

## Upper-Level Biology Coursework (13-18 Credits)

### Intermediate Biology Selective (4 credits)

NRPH majors must use BIOL 32800 for this requirement.

- BIOL 32800 - Principles Of Physiology

### Neurobiology & Physiology Selectives (6 credits)

Select two courses. May not overlap with "Biology Selective."

Since at least one course will be 500-level, this selection meets the departmental "BIOL 500-level" requirement.

- BIOL 43600 - Neurobiology
- BIOL 53800 - Molecular, Cellular, And Developmental Neurobiology
- BIOL 56200 - Neural Systems
- BIOL 59500 - Special Assignments
  - Neural Mech Health & Disease - Credit Hours: 3.00 **Credit Hours:** 3.00
  - Neurobiol Learning & Memory - Credit Hours: 3.00 **Credit Hours:** 3.00

### Biology Selective (for NRPH) (2-4 credits)

May not overlap with "Neurobiology & Physiology Selectives."

- BIOL 20400 - Human Anatomy And Physiology
- BIOL 36700 - Principles Of Development
- BIOL 39500 - Special Assignments
  - Exp Dsgn&Quant Analys I-Honors - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Macromolecules - Credit Hours: 2.00 **Credit Hours:** 2.00-3.00
- BIOL 41500 - Introduction To Molecular Biology
- BIOL 41600 - Viruses And Viral Disease
- BIOL 42000 - Eukaryotic Cell Biology
- BIOL 43600 - Neurobiology
- BIOL 43800 - General Microbiology
- BIOL 44400 - Human Genetics

- BIOL 44600 - Molecular Bacterial Pathogenesis
- BIOL 47800 - Introduction To Bioinformatics
- BIOL 48100 - Eukaryotic Genetics
- BIOL 48300 - Great Issues: Environmental And Conservation Biology
- BIOL 49500 - Special Assignments
  - Biodiversity & Museum Research - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Data Science For Biologists - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - RNA World:CRISPR & Coronavirus - Credit Hours: 2.00 **Credit Hours:** 2.00-3.00
  - Tpcs In Endocrinology & Cancer - Credit Hours: 2.00 **Credit Hours:** 2.00-3.00
- BIOL 51600 - Molecular Biology Of Cancer
- BIOL 51700 - Molecular Biology: Proteins
- BIOL 53300 - Medical Microbiology
- BIOL 53601 - Biological And Structural Aspects Of Drug Design And Action
- BIOL 53700 - Immunobiology
- BIOL 53800 - Molecular, Cellular, And Developmental Neurobiology
- BIOL 56200 - Neural Systems
- BIOL 56310 - Protein Bioinformatics
- BIOL 58000 - Evolution
- BIOL 58210 - Ecological Statistics
- BIOL 58705 - Animal Communication
- BIOL 59200 - The Evolution Of Behavior
- BIOL 59500 - Special Assignments
  - Building The Tree Of Life - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - CRISPR Mechanism & App - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - CryoEM 3D Reconstruction - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Disease Ecology - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Ecology - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Immun Of Cancer & Infect Dis - Credit Hours: 2.00 **Credit Hours:** 2.00-3.00
  - Meth Meas Biophys Chem - Credit Hours: 2.00 **Credit Hours:** 2.00-3.00
  - Neural Mech Health & Disease - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Neurobiol Learning & Memory - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Pathwys Human Health & Disease - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Practical Bio Comput - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - X-Ray Crystallography - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
- BCHM 43400 - Medical Topics In Biochemistry
- BCHM 52100 - Comparative Genomics

## Base Lab Requirement (1-4 credits)

NRPH majors meet the BLR "Required Course" with BIOL 32800 (see "Intermediate Biology Selective").&nbsp;Select course(s) or research to satisfy Objectives A & B.

Select Base Lab Requirements for all Biology majors for additional lists.

## Other Departmental Requirements: (51-73 credits)

### Chemistry (17 credits)

### General Chemistry (5 credits)

- CHM 12901 - General Chemistry With A Biological Focus ♦

### Organic Chemistry (8 credits)

- CHM 25500 - Organic Chemistry For The Life Sciences I ♦
- CHM 25501 - Organic Chemistry For The Life Sciences Laboratory I
- CHM 25600 - Organic Chemistry For The Life Sciences II ♦
- CHM 25601 - Organic Chemistry For The Life Sciences Laboratory II

### Biochemistry (4 credits)

- CHM 33900 - Biochemistry: A Molecular Approach
- CHM 33901 - Biochemistry Laboratory

### College of Science Core Requirements (34-56 credits)

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation (3-10 credits)

#### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

#### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

### Computing (2-4 credits)

If CS 17700 or CS 18000 is selected and taken *at Purdue University*, these courses would also meet the College of Science: 'Team-Building & Collaboration' requirement.

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦ or

- TDM 10100 - The Data Mine Seminar I and TDM 10200 - The Data Mine Seminar II

## Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from the list [HERE](#) to fulfill each Option below (select courses can also satisfy University Core: 'Humanities').

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

## General Education^ (9 credits)

Choose courses from the list [HERE](#) to fulfill each Option below (select courses can also satisfy University Core: 'Behavioral/Social Sciences').

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from the list [HERE](#).

## Laboratory Science (8 credits)

Choose one Physics I and one Physics II course.

- PHYS 23300 - Physics For Life Sciences I (satisfies Science for core) or
- PHYS 17200 - Modern Mechanics (satisfies Science for core)
- PHYS 23400 - Physics For Life Sciences II or
- PHYS 27200 - Electric And Magnetic Interactions

### Physics I

- PHYS 23300 - Physics For Life Sciences I
- PHYS 17200 - Modern Mechanics

### Physics II

- PHYS 23400 - Physics For Life Sciences II or
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory

## Mathematics (6-10 credits)

Choose one Calculus I course and one Calculus II course. (fulfills QR for core)

## Calculus I

- MA 16010 - Applied Calculus I
- MA 16100 - Plane Analytic Geometry And Calculus I
- MA 16500 - Analytic Geometry And Calculus I

## Calculus II

- MA 16020 - Applied Calculus II
- MA 16200 - Plane Analytic Geometry And Calculus II
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society

*Met with required major coursework (BIOL 12100).*

## Statistics (3 credits)

- STAT 50300 - Statistical Methods For Biology

## Team-Building and Collaboration\* (0 credits)

This requirement can double-dip with other degree requirements *if taken at Purdue University*, such as BIOL 32800 (Departmental/Program Major Requirements). NRPH majors are required to take BIOL 32800 as their "Intermediate Biology Selective."

For the full list of options, click [HERE](#).

## Electives (10-37 credits)

## GPA Requirements

- 2.0 Graduation GPA required for Bachelor of Science degree.
- **Biology 2.0 Major GPA:** A minimum 2.0 average is required in all courses used to meet major requirements. A maximum of 3 credits of undergraduate research (BIOL 29400/49400/49900) may be factored into the Biology GPA calculation. Any excess Biology courses and research credits are "free electives" and not included in this calculation.

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- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

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- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior ♦
- CHM 12901 - General Chemistry With A Biological Focus ♦
- BIOL 13500 - First Year Biology Laboratory or
- BIOL 19500 - Special Assignments (see above for titles)
- MA 16010 - Applied Calculus I or
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00

### 16-18 Credits

### Spring 1st Year

- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms ♦
- CHM 25500 - Organic Chemistry For The Life Sciences I ♦
- CHM 25501 - Organic Chemistry For The Life Sciences Laboratory I
- MA 16020 - Applied Calculus II or
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00

### 16-19 Credits

### Fall 2nd Year

- BIOL 23100 - Biology III: Cell Structure And Function ♦

- BIOL 23200 - Laboratory In Biology III: Cell Structure And Function
- COM 21700 - Science Writing And Presentation
- CHM 25600 - Organic Chemistry For The Life Sciences II ♦
- CHM 25601 - Organic Chemistry For The Life Sciences Laboratory II
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15 Credits

### Spring 2nd Year

- BIOL 24100 - Biology IV: Genetics And Molecular Biology ♦
- BIOL 24200 - Laboratory In Biology IV: Genetics And Molecular Biology
- BIOL 28600 - Introduction To Ecology And Evolution
- CHM 33900 - Biochemistry: A Molecular Approach
- CHM 33901 - Biochemistry Laboratory
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00

## 15-17 Credits

### Fall 3rd Year

- PHYS 17200 - Modern Mechanics or
- PHYS 23300 - Physics For Life Sciences I
- Neurobiology & Physiology Selective - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 16 Credits

### Spring 3rd Year

- BIOL 32800 - Principles Of Physiology
- STAT 50300 - Statistical Methods For Biology
- PHYS 23400 - Physics For Life Sciences II or
- PHYS 27200 - Electric And Magnetic Interactions
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00

## 15 Credits

### Fall 4th Year

- Biology Selective - Credit Hours: 3.00



- Base Lab Requirement - Credit Hours: 2.00 - 4.00
- Great Issues Course Option - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 14-16 Credits

### Spring 4th Year

- Computing Selective - Credit Hours: 3.00 - 4.00 ♦
- Neurobiology & Physiology Selective 500 Level - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15-16 Credits

### Prerequisite Information

For current pre-requisites for courses, click [here](#).

### World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

### Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

### Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Minor

### Biological Sciences Minor

#### Requirements for Minor (12-16 credits)

##### Part I (8 credits)

###### Cell Biology

- BIOL 23100 - Biology III: Cell Structure And Function or
- BIOL 23000 - Biology Of The Living Cell

###### Genetics and Molecular Biology

- BIOL 24100 - Biology IV: Genetics And Molecular Biology

###### Ecology and Evolution

- BIOL 28600 - Introduction To Ecology And Evolution

##### Part II (2-4 credits)

- BIOL 32800 - Principles Of Physiology
- BIOL 36700 - Principles Of Development
- BIOL 39500 - Special Assignments
  - Exp Dsgn&Quant Analys I-Honors **Credit Hours:** 3.00
  - Macromolecules **Credit Hours:** 2.00
- BIOL 41500 - Introduction To Molecular Biology
- BIOL 41600 - Viruses And Viral Disease
- BIOL 42000 - Eukaryotic Cell Biology
- BIOL 43600 - Neurobiology
- BIOL 43800 - General Microbiology
- BIOL 44400 - Human Genetics
- BIOL 44600 - Molecular Bacterial Pathogenesis
- BIOL 47800 - Introduction To Bioinformatics
- BIOL 48100 - Eukaryotic Genetics
- BIOL 48300 - Great Issues: Environmental And Conservation Biology
- BIOL 49500 - Special Assignments
  - Biodiversity & Museum Research - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Data Science For Biologists - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - RNA World:CRISPR & Coronavirus - Credit Hours: 2.00 **Credit Hours:** 2.00-3.00
  - Tpcs In Endocrinology & Cancer - Credit Hours: 2.00 **Credit Hours:** 2.00-3.00
- BIOL 51600 - Molecular Biology Of Cancer
- BIOL 51700 - Molecular Biology: Proteins
- BIOL 53300 - Medical Microbiology

- BIOL 53601 - Biological And Structural Aspects Of Drug Design And Action
- BIOL 53700 - Immunobiology
- BIOL 53800 - Molecular, Cellular, And Developmental Neurobiology
- BIOL 56200 - Neural Systems
- BIOL 56310 - Protein Bioinformatics
- BIOL 58000 - Evolution
- BIOL 58210 - Ecological Statistics
- BIOL 58705 - Animal Communication
- BIOL 59200 - The Evolution Of Behavior
- BIOL 59500 - Special Assignments
  - CRISPR Mechanism & App - Credit Hours: 3.00 **Credit Hours: 3.00**
  - CryoEM 3D Reconstruction - Credit Hours: 3.00 **Credit Hours: 3.00**
  - Building The Tree Of Life - Credit Hours: 3.00 **Credit Hours: 3.00**
  - Disease Ecology - Credit Hours: 3.00 **Credit Hours: 3.00**
  - Ecology - Credit Hours: 3.00 **Credit Hours: 3.00**
  - Meth Meas Biophys Chem - Credit Hours: 2.00 **Credit Hours: 3.00**
  - Neural Mech Health & Disease - Credit Hours: 3.00 **Credit Hours: 3.00**
  - Neurobiol Learning & Memory - Credit Hours: 3.00 **Credit Hours: 3.00**
  - Pathwys Human Health & Disease - Credit Hours: 3.00 **Credit Hours: 3.00**
  - Practical Bio Comput - Credit Hours: 3.00 **Credit Hours: 3.00**
  - X-Ray Crystallography - Credit Hours: 3.00 **Credit Hours: 3.00**

## Part III Laboratory (2-4 credits)

To use BIOL 29400 research for Part III, 2 credits are required. Only 2 credits of BIOL research can count towards the minor and minor GPA.

- BIOL 20400 - Human Anatomy And Physiology
- BIOL 23200 - Laboratory In Biology III: Cell Structure And Function
- BIOL 24200 - Laboratory In Biology IV: Genetics And Molecular Biology
- BIOL 29400 - Biology Research (Credit hours: 2.00) Credit Hours: 2.00

## Notes

- A 2.0 or higher average is required in courses used to complete the minor.
- Before undertaking this minor, the student must establish the prerequisites for the required minor courses.
- All courses for this minor must be taken at Purdue University West Lafayette.

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Program Information

# Base Lab Requirements for all Biology majors

## Base Lab Requirement

Each student must complete an option from the "Required Course" list. Students must also satisfy Objectives A and B below, which can be met by courses, research, or a combination of the two.

BIOL research (BIOL 49400 or BIOL 49900) can be used to satisfy Objectives A and/or B below with approval. The Research Mentor must approve research to meet one or both objectives. Consult with your academic advisor for the forms used to obtain Research Mentor approval for each objective.

If using research towards the BLR, a minimum of four credits of BIOL 49400 and/or BIOL 49900 (combined) must be earned in addition to research director approval.

Students who complete a Biology Honors Thesis automatically meet Objectives A and B with the approved thesis.

*Microbiology* and **Health & Disease** majors must use BIOL 43900 to meet this requirement.

**Ecology, Evolution, and Environmental Biology** majors must use BIOL 59500 "Laboratory in Ecology" to meet this requirement.

**Chemical Biology & Biochemistry** majors will use BIOL 49500/CHM 49000, "CBB Research Capstone," to meet this requirement.

## Required Course

All students must take one of the following courses:

- BIOL 32800 - Principles Of Physiology
- BIOL 43900 - Laboratory In General Microbiology
- BIOL 44212 - Microscopy And Cell Biology
- BIOL 49500 - Special Assignments  
-Data Science For Biologists - Credit Hours: 3.00
- BIOL 54200 - Modular Upper-Division Laboratory Course Lab In Neurophysiology - Credit Hours: 1.00  
Credit Hours: 1.00
- BIOL 59500 - Special Assignments  
-Building The Tree Of Life - Credit Hours: 3.00  
-Laboratory In Ecology - Credit Hours: 1.00  
-Structural Biology Lab - Credit Hours: 1.00

## Objective A - Research planning, literature review, writing

All students must meet Objective A by seeking approval to use research, or by completing one of the following courses.

- BIOL 39500 - Special Assignments  
-Exp Dsgn&Quant Analys I-Honors - Credit Hours: 3.00
- BIOL 43900 - Laboratory In General Microbiology
- BIOL 48300 - Great Issues: Environmental And Conservation Biology
- BIOL 49500 - Special Assignments

- Biodiversity & Museum Research - Credit Hours: 3.00
- Data Science For Biologists - Credit Hours: 3.00
- Tpcs In Endocrinology & Cancer - Credit Hours: 2.00
- BIOL 58210 - Ecological Statistics
- BIOL 59500 - Special Assignments
  - Building The Tree Of Life - Credit Hours: 3.00
  - CryoEM 3D Reconstruction - Credit Hours: 3.00
  - Laboratory In Ecology - Credit Hours: 1.00
  - Neural Mech Health & Disease - Credit Hours: 3.00
  - Theory Of Molecular Methods - Credit Hours: 3.00

## Objective B - Analysis, simulation, and presentation

All students must meet Objective B by seeking approval to use research, or by completing one of the following courses.

- BIOL 39500 - Special Assignments
  - Exp Dsgn&Quant Analys I-Honors - Credit Hours: 3.00 **Credit Hours:** 3.00
- BIOL 43900 - Laboratory In General Microbiology
- BIOL 44212 - Microscopy And Cell Biology
- BIOL 48300 - Great Issues: Environmental And Conservation Biology
- BIOL 49500 - Special Assignments
  - Biodiversity & Museum Research - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Data Science For Biologists - Credit Hours: 3.00 **Credit Hours:** 2.00-3.00
  - Tpcs In Endocrinology & Cancer - Credit Hours: 2.00 **Credit Hours:** 2.00-3.00
- BIOL 54200 - Modular Upper-Division Laboratory Course -Lab In Neurophysiology - Credit Hours: 1.00  
Credit Hours: 1.00
- BIOL 58210 - Ecological Statistics
- BIOL 59500 - Special Assignments
  - Building The Tree Of Life - Credit Hours: 3.00
  - CryoEM 3D Reconstruction - Credit Hours: 3.00
  - Data Analysis In Neuroscience - Credit Hours: 1.00
  - Laboratory In Ecology - Credit Hours: 1.00
  - Neural Mech Health & Disease - Credit Hours: 3.00
  - Theory Of Molecular Methods - Credit Hours: 3.00

# Department of Chemistry

## Overview

The Department of Chemistry is located centrally on the Purdue campus and is housed in the *Richard B. Wetherill Laboratories(WTHR)* and the *Herbert C. Brown Laboratory of Chemistry(BRWN)*. Students, faculty, and staff have access to world class facilities both for teaching and research.

Our Mission | Our Vision

The Department is home to:

- 52 faculty members
- 350 undergraduate students

- 310 graduate students
- 90 support personnel

In the 2013 Academic Ranking of World Universities (Shanghai Rankings), our departments ranked 20th world-wide and 13th nationally.

The Department of Chemistry offers a Bachelor of Science in Chemistry (ACS accredited), a Bachelor of Science and a minor in Chemistry. The department also offers an Honors program and the opportunity to participate in Cooperative Education Program.

### **Honors Program**

The Department of Chemistry has an honors program for superior students. Participation can begin during the sophomore year, and a student will be assigned to advanced sections in chemistry courses. During the junior and senior years, a student engages in undergraduate research, participates in research seminars and completes honor courses. The undergraduate research experience (CHM 49900 or equivalent) is to be a minimum of six credits. In addition, the student must write an honor's thesis based on the CHM 49900 work. The faculty advisor will read the thesis and the student will give a presentation of the research.

Admission to the chemistry honors program must be made by the end of the junior year. The honors student is expected to achieve and maintain a scholastic graduation index of at least 3.40. Students fulfilling requirements of the chemistry honors program will be graduated "with honors in chemistry". The honors program has been approved by the Royal Society of Chemistry.

### **Cooperative Education Program**

The Department of Chemistry participates in the Cooperative Education Program. This program requires five years and involves the option of 3 or 5 work period sessions, either semester or summer modules, with a cooperating company in the chemical industry. As a student gains experience, she or he is given increasingly responsible industrial assignments and receives more compensation. A student can enter the program meeting the following requirements: has completed two semesters of chemistry and has a chemistry index of 2.80. Information is available from the Coordinator of Cooperative Education in the Department of Chemistry. Check with your advisor for further information.

Department of Chemistry Website

### **Faculty**

## **Contact Information**

*Head:* Professor Chris Hrycyna

*Graduate Admissions:* Dr. Stephen Hoffmann, Assistant Head

*Undergraduate Information:* Dr. Christine Schertz

*Webmaster:* webmaster@chem.purdue.edu

### **Mailing address:**

Department of Chemistry

560 Oval Drive

West Lafayette, Indiana 47907-2084

**Telephone** (765) 494-5200 **FAX** (765) 494-0239

## **Graduate Information**

For Graduate Information please see Chemistry Graduate Program Information.

# Baccalaureate

## Biochemistry (Chemistry), BSCH

### About the Program

Biochemists study the chemical basis of life. Some of the major problems include the transfer of genetic information to biological structures, the conversion of nutrients into cell constituents and their utilization as sources of energy, the storage of memory, and the chemical nature of neural processes. Furthermore, biochemists are interested in the chemical details of important processes such as photosynthesis, blood clotting, fertilization, and other functions that may be unique to certain organisms. This program includes five credits of undergraduate research in a wide range of fields, including drug discovery, nano-medicine, protein structure determination, development and application of novel chemical tools to dissect different biological processes.

By concentrating advanced elective credit hours in biochemistry and by taking biology courses, this degree provides an excellent preparation for medical, dental, or veterinary schools. This program would particularly benefit those planning careers in medical research.

Biochemistry Website

Chemistry Department Major Change (CODO) Requirements

### Degree Requirements

## 120 Credits Required

### Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

## College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### Earning Core Curricular Requirements through Experience

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## Departmental/Program Major Courses (81-86 credits)

### Required Major Courses (48-50 credits)

- CHM 12500 - Introduction To Chemistry I ♦ or
- CHM 11500 - General Chemistry ♦ (satisfies Science for core)
- CHM 12600 - Introduction To Chemistry II or
- CHM 11600 - General Chemistry
- BIOL 23100 - Biology III: Cell Structure And Function
- BIOL 23200 - Laboratory In Biology III: Cell Structure And Function
- CHM 24100 - Introductory Inorganic Chemistry
- CHM 26505 - Organic Chemistry I ♦
- CHM 26605 - Organic Chemistry II
- CHM 33901 - Biochemistry Laboratory
- CHM 34200 - Inorganic Chemistry
- CHM 37300 - Physical Chemistry I
- CHM 37301 - Physical Chemistry Laboratory I
- CHM 37400 - Physical Chemistry II
- CHM 37401 - Physical Chemistry Laboratory II
- CHM 49900 - Special Assignments - repeated for a total of 5 credits
- CHM 26500 - Organic Chemistry Laboratory I or
- CHM 26700 - Organic Chemistry Laboratory I Honors
- CHM 26600 - Organic Chemistry Laboratory II or



- CHM 26800 - Organic Chemistry Laboratory II Honors
- CHM 32100 - Analytical Chemistry I or
- CHM 32300 - Analytical Chemistry I Honors

### Seminars (3 credits)

- CHM 19400 - Freshman Chemistry Orientation
- CHM 29400 - Sophomore Chemistry Seminar
- CHM 49400 - Junior-Senior Chemistry Seminar

### Genetics Option (4-5 credits)

Choose one sequence.

- AGRY 32000 - Genetics
- AGRY 32100 - Genetics Laboratory
- BIOL 24100 - Biology IV: Genetics And Molecular Biology
- BIOL 24200 - Laboratory In Biology IV: Genetics And Molecular Biology

### Biochemistry Option (3 credits)

Choose one.

- BCHM 56100 - General Biochemistry I
- CHM 43300 - Biochemistry
- CHM 53300 - Introductory Biochemistry

### Biotechnology or Biochemistry II Option (3 credits)

Choose one.

- BCHM 56200 - General Biochemistry II
- CHM 43800 - Introduction To Molecular Biotechnology
- CHM 53800 - Molecular Biotechnology

### Required Calculus and Physics Courses (20-22 credits)

- MA 16100 - Plane Analytic Geometry And Calculus I ♦ or
- MA 16500 - Analytic Geometry And Calculus I ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- MA 26100 - Multivariate Calculus
- PHYS 17200 - Modern Mechanics
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory

### Other Departmental /Program Course Requirements (21-57 credits)

# COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

## Composition & Presentation

### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

### Technical Writing And Presentation\* (0 or 3 credits)

*Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found [here](#). (satisfies OC for core)*

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

### Computing (3-4 credits)

- CS 15900 - C Programming or
- CS 17700 - Programming With Multimedia Objects

### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

### Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science

*Met with required major coursework (CHM 11500/11600; CHM 12500/12600).*

## Mathematics

*Met with required major coursework (MA 16100/16200; MA 16500/16600).*

## Multidisciplinary Experience<sup>^\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

- STAT 30100 - Elementary Statistical Methods or
- STAT 35000 - Introduction To Statistics

## Team-Building and Collaboration

*Met with required major coursework (PHYS 17200).*

## Electives (0-18 credits)

## GPA Requirements

- Students must earn a cumulative GPA of 2.0 in all CHM courses.
- 2.0 Graduation GPA required for Bachelor of Science degree.
- Students may graduate with Honors in Chemistry distinction. An approved honors thesis and a min of 3.4 GPA are required. Consult your CHM advisor.

## Course Requirements and Notes

- **\*\*Satisfies a Non-departmental Major Course Requirement**
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.

- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

### Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- CHM 19400 - Freshman Chemistry Orientation
- CHM 11500 - General Chemistry ♦ or
- CHM 12500 - Introduction To Chemistry I ♦
- MA 16100 - Plane Analytic Geometry And Calculus I ♦ or
- MA 16500 - Analytic Geometry And Calculus I ♦
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00
- Science Core Selection - Credit Hours: 3.00-4.00

### 15-19 Credits

### Spring 1st Year

- CHM 11600 - General Chemistry or
- CHM 12600 - Introduction To Chemistry II
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00

### 14-16 Credits

### Fall 2nd Year

- CHM 26505 - Organic Chemistry I ♦
- MA 26100 - Multivariate Calculus
- PHYS 17200 - Modern Mechanics
- CHM 29400 - Sophomore Chemistry Seminar
- CHM 26500 - Organic Chemistry Laboratory I or
- CHM 26700 - Organic Chemistry Laboratory I Honors

### 14 Credits

### Spring 2nd Year

- CHM 26605 - Organic Chemistry II

- CHM 26600 - Organic Chemistry Laboratory II or
- CHM 26800 - Organic Chemistry Laboratory II Honors
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory
- Science Core Selection- Credit Hours: 3.00
- Science Core Selection- Credit Hours: 3.00

## 15 Credits

### Fall 3rd Year

- BIOL 23100 - Biology III: Cell Structure And Function
- BIOL 23200 - Laboratory In Biology III: Cell Structure And Function
- CHM 49900 - Special Assignments - 2 credits recommended
- CHM 43300 - Biochemistry or
- CHM 53300 - Introductory Biochemistry or
- BCHM 56100 - General Biochemistry I
- CHM 24100 - Introductory Inorganic Chemistry
- Science Core Selection- Credit Hours: 3.00

## 17 Credits

### Spring 3rd Year

- BIOL 24100 - Biology IV: Genetics And Molecular Biology or
- AGRY 32000 - Genetics
- BIOL 24200 - Laboratory In Biology IV: Genetics And Molecular Biology or
- AGRY 32100 - Genetics Laboratory
- CHM 43800 - Introduction To Molecular Biotechnology or
- BCHM 56200 - General Biochemistry II or
- CHM 53800 - Molecular Biotechnology
- CHM 33901 - Biochemistry Laboratory
- CHM 49400 - Junior-Senior Chemistry Seminar
- CHM 49900 - Special Assignments - 2 credits recommended

## 15 Credits

### Fall 4th Year

- CHM 37300 - Physical Chemistry I
- CHM 37301 - Physical Chemistry Laboratory I
- CHM 49900 - Special Assignments (1.00 credit recommended)
- COM 21700 - Science Writing And Presentation
- CHM 32100 - Analytical Chemistry I or
- CHM 32300 - Analytical Chemistry I Honors
- CS 17700 - Programming With Multimedia Objects or

- CS 15900 - C Programming

## 16 Credits

### Spring 4th Year

- CHM 34200 - Inorganic Chemistry
- CHM 37400 - Physical Chemistry II
- CHM 37401 - Physical Chemistry Laboratory II
- Science Core Selection - Credit Hours: 3.00
- Great Issues In Science - Credit Hours: 3.00

## 13 Credits

### Prerequisite Information

For current pre-requisites for courses, click [here](#).

### World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

### Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

### Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## **Chemistry (ACS), BSCH**

### About the Program

Chemistry at Purdue University has a ratio of 1 faculty member for every 8 undergraduates, which allows students to enjoy a great deal of individualized attention. It also offers opportunities for mentoring programs and cutting-edge undergraduate research in a wide range of fields from drug discovery to climate change. Chemistry majors can pursue one of two degrees: B.S. in chemistry, accredited by the American Chemical Society (ACS); or the more flexible B.S. with chemistry as a field of study.

Chemistry (ACS accredited) is designed primarily for students planning professional careers as chemists in industry, universities, or research institutes. This degree program fulfills the recommendations of the Committee of Professional Training of the ACS and graduates will be certified by the ACS as having fulfilled its recommended requirements.

This degree provides an excellent preparation for students pursuing graduate school in Chemistry.

There is also the opportunity to complete in five years a dual degree with chemical engineering if the student has been accepted into the College of Engineering.

Chemistry - American Chemical Society Website

Chemistry Department Major Change (CODO) Requirements

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the preceding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.



The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

#### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## Departmental/Program Major Courses (76-83 credits)

### Required Major Courses (46-48 credits)

- CHM 24100 - Introductory Inorganic Chemistry
- CHM 26505 - Organic Chemistry I
- CHM 26605 - Organic Chemistry II
- CHM 34200 - Inorganic Chemistry
- CHM 34201 - Inorganic Chemistry Laboratory
- CHM 37300 - Physical Chemistry I
- CHM 37301 - Physical Chemistry Laboratory I
- CHM 37400 - Physical Chemistry II
- CHM 37401 - Physical Chemistry Laboratory II
- CHM 42400 - Analytical Chemistry II
- CHM 51300 - Chemical Literature
- CHM 12500 - Introduction To Chemistry I ♦ or
- CHM 11500 - General Chemistry ♦ (satisfies Science Selective for core)
- CHM 12600 - Introduction To Chemistry II or
- CHM 11600 - General Chemistry
- CHM 26500 - Organic Chemistry Laboratory I or
- CHM 26700 - Organic Chemistry Laboratory I Honors
- CHM 26600 - Organic Chemistry Laboratory II or
- CHM 26800 - Organic Chemistry Laboratory II Honors
- CHM 32100 - Analytical Chemistry I or
- CHM 32300 - Analytical Chemistry I Honors
- CHM 43300 - Biochemistry or
- CHM 53300 - Introductory Biochemistry

## Required Seminars (3 credits)

- CHM 19400 - Freshman Chemistry Orientation
- CHM 29400 - Sophomore Chemistry Seminar
- CHM 49400 - Junior-Senior Chemistry Seminar

## Chemistry Selective (3 credits)

- CHM 43800 - Introduction To Molecular Biotechnology
- CHM 46200 - Intermediate Organic Chemistry
- CHM 48100 - Environmental Chemistry
- CHM 49900 - Special Assignments
- CHM 53800 - Molecular Biotechnology
- CHM 56000 - Organic Spectroscopic Analysis
- CHM 57900 - Computational Chemistry
- CHM 58100 - Atmospheric Chemistry

## Required Calculus and Physics Courses (24-29 credits)

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- MA 26200 - Linear Algebra And Differential Equations or
- MA 26500 - Linear Algebra and MA 26600 - Ordinary Differential Equations
- PHYS 17200 - Modern Mechanics
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory

## Other Departmental /Program Course Requirements (21-62 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

#### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

## Technical Writing And Presentation\* (0 or 3 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **HERE**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

## Computing (3-4 credits)

- CS 15900 - C Programming or
- CS 17700 - Programming With Multimedia Objects

## Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

## General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science

*Met with required major coursework (CHM 11500/11600; CHM 12500/12600).*

## Mathematics

*Met with required major coursework (MA 16100/16200; MA 16500/16600).*

## Science Technology and Society^\* (3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

### Statistics (3 credits)

- STAT 30100 - Elementary Statistical Methods or
- STAT 35000 - Introduction To Statistics

### Team-Building and Collaboration

*Met with required major coursework (PHYS 17200).*

### Electives (0-23 credits)

### GPA Requirements

- Students must earn a cumulative GPA of 2.0 in all CHM courses.
- 2.0 Graduation GPA required for Bachelor of Science degree.
- Students may graduate with Honors in Chemistry distinction. An approved honors thesis and a min of 3.4 GPA are required. Consult your CHM advisor.

### Course Requirements and Notes

- \*\*Satisfies a Non-departmental Major Course Requirement
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

### College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

### College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

### Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- CHM 19400 - Freshman Chemistry Orientation
- CHM 12500 - Introduction To Chemistry I ♦ or

- CHM 11500 - General Chemistry ♦
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core First-Year Composition Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00

## 15-18 Credits

### Spring 1st Year

- PHYS 17200 - Modern Mechanics
- CHM 12600 - Introduction To Chemistry II or
- CHM 11600 - General Chemistry
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00

## 15-17 Credits

### Fall 2nd Year

- CHM 26505 - Organic Chemistry I
- CHM 29400 - Sophomore Chemistry Seminar
- CHM 26500 - Organic Chemistry Laboratory I or
- CHM 26700 - Organic Chemistry Laboratory I Honors
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory

## 14-15 Credits

### Spring 2nd Year

- CHM 26605 - Organic Chemistry II
- CHM 26600 - Organic Chemistry Laboratory II or
- CHM 26800 - Organic Chemistry Laboratory II Honors
- MA 26200 - Linear Algebra And Differential Equations or
- MA 26500 - Linear Algebra and MA 26600 - Ordinary Differential Equations
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00

## 15 Credits

### Fall 3rd Year

- CHM 37300 - Physical Chemistry I
- CHM 37301 - Physical Chemistry Laboratory I
- CHM 32100 - Analytical Chemistry I or
- CHM 32300 - Analytical Chemistry I Honors
- CS 15900 - C Programming or
- CS 17700 - Programming With Multimedia Objects
- STAT 30100 - Elementary Statistical Methods or
- STAT 35000 - Introduction To Statistics

## 14-15 Credits

### Spring 3rd Year

- CHM 37400 - Physical Chemistry II
- CHM 37401 - Physical Chemistry Laboratory II
- CHM 51300 - Chemical Literature
- COM 21700 - Science Writing And Presentation
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00

## 14 Credits

### Fall 4th Year

- CHM 24100 - Introductory Inorganic Chemistry
- CHM 43300 - Biochemistry or
- CHM 53300 - Introductory Biochemistry
- CHM 49400 - Junior-Senior Chemistry Seminar
- Great Issues In Science Option - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00

## 13 Credits

### Spring 4th Year

- CHM 34200 - Inorganic Chemistry
- CHM 34201 - Inorganic Chemistry Laboratory
- CHM 42400 - Analytical Chemistry II
- Chemistry Selective - Credit Hours: 3.00
- Elective - Credit Hours: 2.00

## 13 Credits

### Prerequisite Information

For current pre-requisites for courses, click [here](#).

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Chemistry, BS

### About the Program

Chemistry at Purdue University has a ratio of 1 faculty member for every 8 undergraduates, which allows students to enjoy a great deal of individualized attention. It also offers opportunities for mentoring programs and cutting-edge undergraduate research in a wide range of fields from drug discovery to climate change.

The B.S. program with chemistry as a field of study is designed for those who want training in chemistry and freedom to pursue minors or second majors in other areas. Common areas of interest have been Forensic Sciences, Biology, Foreign Languages, Management, Psychology, and other Liberal Arts areas. The flexibility in this program adapts easily to Study Abroad semesters.

[Chemistry Website](#)

[Chemistry Department Major Change \(CODO\) Requirements](#)

### Degree Requirements

## 120 Credits Required



# Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

## College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

## Earning Core Curricular Requirements through Experience

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## Departmental/Program Major Courses (60-64 credits)

## Required Major Courses (37-39 credits)

- CHM 24100 - Introductory Inorganic Chemistry
- CHM 26505 - Organic Chemistry I
- CHM 26605 - Organic Chemistry II
- CHM 34200 - Inorganic Chemistry
- CHM 37300 - Physical Chemistry I
- CHM 37301 - Physical Chemistry Laboratory I
- CHM 37400 - Physical Chemistry II
- CHM 37401 - Physical Chemistry Laboratory II
- CHM 12500 - Introduction To Chemistry I ♦ or
- CHM 11500 - General Chemistry ♦ (satisfies Science for core)
- CHM 12600 - Introduction To Chemistry II or
- CHM 11600 - General Chemistry
- CHM 26500 - Organic Chemistry Laboratory I or
- CHM 26700 - Organic Chemistry Laboratory I Honors
- CHM 26600 - Organic Chemistry Laboratory II or
- CHM 26800 - Organic Chemistry Laboratory II Honors
- CHM 32100 - Analytical Chemistry I or
- CHM 32300 - Analytical Chemistry I Honors

## Required Seminar Courses (3 credits)

- CHM 19400 - Freshman Chemistry Orientation
- CHM 29400 - Sophomore Chemistry Seminar
- CHM 49400 - Junior-Senior Chemistry Seminar

## Required Calculus and Physics Courses (20-22 credits)

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- MA 26100 - Multivariate Calculus
- PHYS 17200 - Modern Mechanics
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory

## Other Departmental /Program Course Requirements (21-62 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

## Composition & Presentation

### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

### Technical Writing And Presentation\* (0 or 3 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **HERE**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

### Computing (3-4 credits)

- CS 15900 - C Programming or
- CS 17700 - Programming With Multimedia Objects

### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

### Great Issues In Science (3 credits)

Choose one from this list.

### Laboratory Science

*Met with required major coursework (CHM 11500/11600; CHM 12500/12600).*

## Mathematics

*Met with required major coursework (MA 16100/16200; MA 16500/16600).*

## Science Technology and Society<sup>^\*</sup> (3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

- STAT 30100 - Elementary Statistical Methods or
- STAT 35000 - Introduction To Statistics

## Team-Building and Collaboration

*Met with required major coursework (PHYS 17200).*

## Electives (0-29 credits)

## GPA Requirements

- Students must earn a cumulative GPA of 2.0 in all CHM courses.
- 2.0 Graduation GPA required for Bachelor of Science degree.
- Students may graduate with Honors in Chemistry distinction. An approved honors thesis and a min of 3.4 GPA are required. Consult your CHM advisor.

## Course Requirements and Notes

- **\*\*Satisfies a Non-departmental Major Course Requirement**
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.

- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

### Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

## Fall 1st Year

- CHM 19400 - Freshman Chemistry Orientation
- CHM 11500 - General Chemistry ♦ or
- CHM 12500 - Introduction To Chemistry I ♦
- MA 16100 - Plane Analytic Geometry And Calculus I ♦ or
- MA 16500 - Analytic Geometry And Calculus I ♦
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00
- Science Core Selection - Credit Hours: 3.00-4.00

## 15-19 Credits

## Spring 1st Year

- CHM 11600 - General Chemistry or
- CHM 12600 - Introduction To Chemistry II
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00

## 14-16 Credits

## Fall 2nd Year

- CHM 26505 - Organic Chemistry I ♦
- CHM 29400 - Sophomore Chemistry Seminar
- MA 26100 - Multivariate Calculus
- PHYS 17200 - Modern Mechanics
- CHM 26500 - Organic Chemistry Laboratory I or
- CHM 26700 - Organic Chemistry Laboratory I Honors

## 14 Credits

## Spring 2nd Year

- CHM 26605 - Organic Chemistry II
- CHM 26600 - Organic Chemistry Laboratory II or
- CHM 26800 - Organic Chemistry Laboratory II Honors
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory
- STAT 30100 - Elementary Statistical Methods or
- STAT 35000 - Introduction To Statistics
- Science Core Selection - Credit Hours: 3.0

## 15 Credits

### Fall 3rd Year

- CHM 32100 - Analytical Chemistry I or
- CHM 32300 - Analytical Chemistry I Honors
- CHM 24100 - Introductory Inorganic Chemistry
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 2.00

## 16 Credits

### Spring 3rd Year

- CS 17700 - Programming With Multimedia Objects or
- CS 15900 - C Programming
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Great Issues In Science - Credit Hours: 3.00

## 12-13 Credits

### Fall 4th Year

- CHM 37300 - Physical Chemistry I
- CHM 37301 - Physical Chemistry Laboratory I
- CHM 49400 - Junior-Senior Chemistry Seminar
- COM 21700 - Science Writing And Presentation
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 14 Credits

### Spring 4th Year

- CHM 34200 - Inorganic Chemistry
- CHM 37400 - Physical Chemistry II
- CHM 37401 - Physical Chemistry Laboratory II
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 4.00 or 5.00

## 14 - 15 Credits

## Prerequisite Information

For current pre-requisites for courses, click [here](#).

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Minor

### Chemistry Minor

Chemistry Minor provides a strong background in Chemistry for students majoring in some other discipline.

### Requirements for the Minor (16 credits)

Requirements for the minor can be completed in two ways: (1) a combination of courses from Area 1 (1-10 credits) and Area 2 (6-15 credits) to equal 16 credits **or** (2) courses from just Area 2 (16 credits total). Before undertaking this minor, the student must establish the prerequisites for the required minor courses.

### Area 1 Organic Chemistry (maximum 10 credits)

Only one course in each Part can count toward the minor.

#### Part I

- CHM 25500 - Organic Chemistry For The Life Sciences I



- CHM 26100 - Organic Chemistry I
- CHM 26505 - Organic Chemistry I
- MCMP 20400 - Organic Chemistry I \*

## Part II

- CHM 25600 - Organic Chemistry For The Life Sciences II
- CHM 26200 - Organic Chemistry II
- CHM 26605 - Organic Chemistry II
- MCMP 20500 - Organic Chemistry II \*

## Part III

- CHM 25501 - Organic Chemistry For The Life Sciences Laboratory I
- CHM 26300 - Organic Chemistry Laboratory I
- CHM 26500 - Organic Chemistry Laboratory I
- CHM 26700 - Organic Chemistry Laboratory I Honors

## Part IV

- CHM 25601 - Organic Chemistry For The Life Sciences Laboratory II
- CHM 26400 - Organic Chemistry Laboratory II
- CHM 26600 - Organic Chemistry Laboratory II
- CHM 26800 - Organic Chemistry Laboratory II Honors

## Area 2 Additional Selectives

- BCHM 56100 - General Biochemistry I or
- CHM 33900 - Biochemistry: A Molecular Approach or
- CHM 43300 - Biochemistry or
- CHM 53300 - Introductory Biochemistry
- CHM 32100 - Analytical Chemistry I or
- CHM 32300 - Analytical Chemistry I Honors
- CHM 37000 - Topics In Physical Chemistry or
- CHM 37400 - Physical Chemistry II
- CHM 37200 - Physical Chemistry or
- CHM 37300 - Physical Chemistry I
- CHM 24100 - Introductory Inorganic Chemistry or
- CHM 34800 - Bioinorganic Chemistry
- CHM 33901 - Biochemistry Laboratory
- CHM 34200 - Inorganic Chemistry
- CHM 34201 - Inorganic Chemistry Laboratory
- CHM 37301 - Physical Chemistry Laboratory I
- CHM 37401 - Physical Chemistry Laboratory II
- CHM 42400 - Analytical Chemistry II
- CHM 43800 - Introduction To Molecular Biotechnology

- CHM 46200 - Intermediate Organic Chemistry
- CHM 48100 - Environmental Chemistry
- CHM 49900 - Special Assignments (up to 3 credits)
- CHM 51300 - Chemical Literature
- CHM 56000 - Organic Spectroscopic Analysis
- CHM 57900 - Computational Chemistry
- CHM 58100 - Atmospheric Chemistry

## Notes

- No more than three (3) credits of CHM 49900 can be applied to the minor.
- \*In Area 1, MCMP 20400 will count as courses from both Parts I and III; and MCMP 20500 will count as courses from both Parts II and IV.
- To qualify for the minor, classes must be completed with a cumulative GPA of 2.0 or better.
- The P/NP Option is not available for courses in this minor.
- All courses for this minor must be taken at Purdue University West Lafayette.
- Study Abroad CHM courses approved by the Department of Chemistry will be allowed to meet the minor requirements.

## Prerequisite Information

For current pre-requisites for courses, click [here](#).

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

# Department of Computer Science

## Department of Computer Science

Purdue Computer Science is one of the country's top-ranked programs. Faculty members are shaping the future of information technology through cutting-edge research. Students can take courses that include such topics as artificial intelligence and machine learning, security and cryptography, software engineering, networking, operating systems, graphics and animation, competitive programming, distributed systems, information systems, and bioinformatics. Computer Science graduates pursue careers in software engineering, data science, systems development, animation and visualization, computational finance, consulting, information security, wireless systems, embedded systems, and biotechnology. Many also go on to graduate or professional school in areas such as engineering, business, law, or medicine.

The Department also offers a Data Science program. A major in data science puts graduates at the forefront of an emerging field and prepares them for an exciting career at the intersection of computer science and statistics. Data Science is the interdisciplinary field of inquiry that uses quantitative and analytical methods to help gain insights and predictions based on big data. Students learn about key computational methods and statistical techniques and develop

the deep analytical thinking skills needed to reason reliably, intelligently and creatively from data. The vast amounts of data generated every day has created a data-rich and data-driven world. The data science major opens pathways to careers in virtually every area of society, from healthcare, security and sustainability to education, business and economics.

The department is located in the Lawson Computer Science Building, which opened in 2006. In addition to offering an inviting and comfortable environment, the building is equipped with cutting-edge networking and computing technologies, including 10-gigabit Ethernet cabling and wireless access throughout the building. There are four classrooms, five instructional labs, five research labs, and a student activity center. The building also offers students a variety of interaction areas, and a deli-style café and espresso bar. A 16-by-9 foot tiled video wall is used for a variety of purposes, including notices of campus events, workshop and colloquium speakers, news and information, sporting events, research demonstrations, and class projects.

The Purdue Computer Science Department offers a Bachelor of Science (BS), a minor in computer science, or a 5-year combined BS/MS degree. The department also offers an Honors Program, and the opportunity to participate in the Cooperative Education Program. A transfer program is also available, TSAP in Computer Science.

Computer Science Website

### **Faculty**

## **Contact Information**

### **General Department Contact**

Purdue University  
Department of Computer Science  
305 N. University Street  
West Lafayette, IN 47907-2107  
Phone: (765) 494-6010  
Fax: (765) 494-0739

## **Graduate Information**

For Graduate Information please see Computer Science Graduate Program Information.

## **Baccalaureate**

## **Artificial Intelligence, BS**

Artificial Intelligence (AI) systems are increasingly being deployed for real-world tasks. Students in the AI major will master the foundations and tools for building and understanding artificial intelligence systems which reason about data, correct themselves, and make decisions. Students will explore the link between cognitive psychology, neuroscience, and AI, and the ethics of AI, which are integral to a holistic understanding of AI. The major will open pathways to new careers ranging from healthcare and sustainability to business and economics.

## **About the Program**

Artificial Intelligence (AI) systems are increasingly being deployed for real-world tasks. Students in the AI major will master the foundations and tools for building and understanding artificial intelligence systems which reason about data,

correct themselves, and make decisions. Students will explore the link between cognitive psychology, neuroscience, and AI, and the ethics of AI, which are integral to a holistic understanding of AI. The major will open pathways to new careers ranging from healthcare and sustainability to business and economics.

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration

- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## Departmental/Program Major Courses (62-63 credits)

### Required Major Courses (50-51 credits)

- CS 17600 - Data Engineering In Python
- CS 18000 - Problem Solving And Object-Oriented Programming
- CS 18200 - Foundations Of Computer Science
- CS 25100 - Data Structures And Algorithms
- CS 37300 - Data Mining And Machine Learning
- CS 38100 - Introduction To The Analysis Of Algorithms
- CS 47100 - Introduction to Artificial Intelligence
- PSY 12000 - Elementary Psychology
- CS 24200 - Introduction To Data Science or
- STAT 24200 - Introduction To Data Science
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- MA 26500 - Linear Algebra or
- MA 35100 - Elementary Linear Algebra
- MA 41600 - Probability or
- STAT 41600 - Probability
- PHIL 20700 - Ethics For Technology, Engineering, And Design or
- PHIL 20800 - Ethics Of Data Science
- PHIL 22100 - Introduction To Philosophy Of Science or
- PHIL 32200 - Philosophy Of Technology
- PSY 20000 - Introduction To Cognitive Psychology or
- PSY 22200 - Introduction To Behavioral Neuroscience
- STAT 35000 - Introduction To Statistics or
- STAT 51100 - Statistical Methods

### CS Selective I (6 credits)

*Choose two.*

- CS 43900 - Introduction To Data Visualization
- CS 44000 - Large Scale Data Analytics
- CS 47300 - Web Information Search And Management
- CS 47500 - Human-Computer Interaction
- CS 57700 - Natural Language Processing

## CS Selective II (3 credits)

*Choose one.*

- CS 34800 - Information Systems
- CS 44800 - Introduction To Relational Database Systems
- CS 48300 - Introduction To The Theory Of Computation
- CS 52300 - Social, Economic, And Legal Aspects Of Security
- CS 52900 - Security Analytics

## Philosophy Selective (3 credits)

*Choose one.*

- PHIL 30300 - History Of Modern Philosophy
- PHIL 43200 - Theory Of Knowledge
- PHIL 43500 - Philosophy Of Mind

## Other Departmental/Program Course Requirements (20-37 Credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

#### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

#### Technical Writing And Presentation\* (0 or 3 credits)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

#### Computing (0 credits)

*Met with CS 17600.*

#### Cultural Diversity (Language & Culture)^\* (0-6 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I - fulfilled by PHIL 20700 or PHIL 20800.

- Language & Culture Option II
- Language & Culture Option III

## General Education^ (0 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- Met with PHIL 22100 or PHIL 32200.
- Met with PSY 12000.
- Met with PSY 20000 or PSY 22200.

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core)*

- MA 16100 - Plane Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200) or
- MA 16500 - Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society^\* (0 credits)

*Met with PHIL 20700 or PHIL 20800 or PHIL 22100.*

## Statistics (0 credits)

*Met with STAT 35000 or STAT 51100.*

## Team-Building and Collaboration (0 credits)

*Met with CS 18000.*

## Electives (20-38 credits)

*CS 19300 - Tools is a required freshman seminar course; corequisite with CS 18000. This is not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.*

## Grade Requirements

- For this degree, all major required courses, all major electives (selectives), and their pre-requisites, regardless of department, must be completed with a grade of C or better.

## GPA Requirements

- 2.0 Major and Graduation GPA required for Bachelor of Science degree.

## Course Requirements and Notes

- Enrollment in freshman seminar course CS 19300 is required with CS 18000. This is not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).



- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-year Plan

All Major core courses and Major elective requirements, regardless of department, must be completed with a grade of "C" or higher. All prerequisites to Major core courses and Major elective requirements, regardless of department, must be completed with a grade of C or higher.

### Fall 1st Year

- CS 17600 - Data Engineering In Python
- PSY 12000 - Elementary Psychology
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00-4.00 (English Composition suggested.)
- Elective - Credit Hours: 1.00
- Elective - Credit Hours: 1.00 (CS 19300 suggested.)

### 15-17 Credits

## Spring 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming
- CS 18200 - Foundations Of Computer Science
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- PSY 20000 - Introduction To Cognitive Psychology or
- PSY 22200 - Introduction To Behavioral Neuroscience

14-15 Credits

## Fall 2nd Year

- CS 24200 - Introduction To Data Science or
- STAT 24200 - Introduction To Data Science
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- STAT 35000 - Introduction To Statistics
- STAT 51100 - Statistical Methods
- PHIL 20700 - Ethics For Technology, Engineering, And Design or
- PHIL 20800 - Ethics Of Data Science
- Science Core Selection - Credit Hours: 3.00-4.00

16-18 Credits

## Spring 2nd Year

- CS 25100 - Data Structures And Algorithms
- MA 26500 - Linear Algebra  
OR
- MA 41600 - Probability  
OR
- MA 35100 - Elementary Linear Algebra
- STAT 41600 - Probability
- PHIL 22100 - Introduction To Philosophy Of Science  
OR
- PHIL 32200 - Philosophy Of Technology
- Science Core Selection - Credit Hours: 3.00-4.00

15-16 Credits

## Fall 3rd Year

- CS 37300 - Data Mining And Machine Learning
- CS Selective I - Credit Hours: 3.00
- Philosophy Selective - Credit Hours: 3.00

- Science Core Selection - Credit Hours: 3.00-4.00
- Science Core Selection - Credit Hours: 3.00-4.00

## 15-17 Credits

### Spring 3rd Year

- CS 38100 - Introduction To The Analysis Of Algorithms
- Science Core Selection - Credit Hours: 3.00-4.00
- Science Core Selection - Credit Hours: 3.00-4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

### Fall 4th Year

- CS 47100 - Introduction to Artificial Intelligence
- CS Selective I - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00-4.00
- Science Core Selection - Credit Hours: 3.00-4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

### Spring 4th Year

- CS Selective II - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00-4.00
- Science Core Selection - Credit Hours: 3.00-4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

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## Computer Science Honors: Algorithmic Foundations, BS

### About the Program

Students in the Computer Science Honors major, in addition to fulfilling all the requirements for a BS in Computer Science, will complete additional coursework and a research project. Honors students must maintain an overall GPA of 3.25 plus at least a 3.6 in Computer Science and required CSHO courses. The program requirements include additional math coursework, three out of four selected CS and ECE courses, a research seminar and project, and a graduate level course. It is especially suitable for students planning on graduate level coursework, though it also offers advantages to students seeking employment.

Students are invited to declare the major if they meet the qualifications after their first semester or after completion of the six core courses. Students who have been admitted to the Honors College may also join the major. Students may also request to declare the major if they meet qualifications no later than their seventh semester (student must have at least 2 academic semesters remaining to accommodate both the research seminar and the research project).

Computer Science Website

Computer Science Major Change (CODO) Requirements (Students must first CODO into Computer Science before Honors.)

### About the Program

Students in the Computer Science Honors major, in addition to fulfilling all the requirements for a BS in Computer Science, will complete additional coursework and a research project. Honors students must maintain an overall GPA of 3.25 plus at least a 3.6 in Computer Science and required CSHO courses. The program requirements include additional math coursework, three out of four selected CS and ECE courses, a research seminar and project, and a graduate level course. It is especially suitable for students planning on graduate level coursework, though it also offers advantages to students seeking employment.

Students are invited to declare the major if they meet the qualifications after their first semester or after completion of the six core courses. Students who have been admitted to the Honors College may also join the major. Students may also request to declare the major if they meet qualifications no later than their seventh semester (student must have at least 2 academic semesters remaining to accommodate both the research seminar and the research project).

Computer Science Website

Computer Science Major Change (CODO) Requirements (Students must first CODO into Computer Science before Honors.)

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration

- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## **Computer Science Honors Major Courses (58-63 credits)**

### **Required CS Honors Major Math Courses (7-8 credits)**

Must have C or better to meet prerequisite for certain upper level CS courses

- MA 35100 - Elementary Linear Algebra
- MA 26100 - Multivariate Calculus *or*
- MA 27101 - Honors Multivariate Calculus

### **Required CS Major Core Courses (21 credits)**

Must have C or better in all courses.

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ (satisfies Computing and Teambuilding for College of Science)
- CS 18200 - Foundations Of Computer Science ♦
- CS 24000 - Programming In C ♦
- CS 25000 - Computer Architecture
- CS 25100 - Data Structures And Algorithms
- CS 25200 - Systems Programming

## **Algorithmic Foundations Concentration (18 credits)**

### **Required Courses**

- CS 38100 - Introduction To The Analysis Of Algorithms
- CS 35200 - Compilers: Principles And Practice *or*
- CS 35400 - Operating Systems
- CS 37300 - Data Mining And Machine Learning *or*
- CS 47100 - Introduction to Artificial Intelligence

### **Selectives**

Choose three.

- CS 31400 - Numerical Methods
- CS 33400 - Fundamentals Of Computer Graphics
- CS 35300 - Principles Of Concurrency And Parallelism
- CS 35500 - Introduction To Cryptography

- CS 44800 - Introduction To Relational Database Systems
- CS 45600 - Programming Languages
- CS 48300 - Introduction To The Theory Of Computation
- MA 34100 - Foundations Of Analysis or
- MA 35301 - Linear Algebra II or
- MA 36200 - Topics In Vector Calculus or
- MA 36600 - Ordinary Differential Equations or
- MA 38500 - Introduction To Logic or
- MA 42100 - Linear Programming And Optimization Techniques or
- MA 45300 - Elements Of Algebra I or
- One three-credit computer science course at the 300, 400, 500 level\* or an independent study course approved by the track chair.

## Required CS Honors - (12-13 credits)

Need CS GPA of 3.60 or better & cumulative GPA of 3.25 and must have a C or better in all courses

- CS 39700 - Honors Seminar
- CS 49700 - Honors Research Project (may use for Track Elective - see Track chairperson for approval)
- MA 35301 - Linear Algebra II or
- MA 41600 - Probability or
- MA 51800 - Advanced Discrete Mathematics or
- An approved MA course with course number higher than MA 35100 - Elementary Linear Algebra or
- An approved STAT course with course number higher than STAT 51100 - Statistical Methods
- CS 50000 level course (may use for Track Elective - see Track chairperson for approval) - Credit Hours: 3.00
- Three out of the four following courses: CS 35400, CS 35200, CS 38100, ECE 27000. CS 35400, CS 35200, and CS 38100 may be used to meet track requirements if the courses are required or electives for the student's track.

## Other Departmental/Program Course Requirements (32-55 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

#### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

#### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here** (ADD LINK IN ACALOG). (satisfies OC for core)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

\*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.

International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

## Computing

*Met with required major coursework.*

## Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

## General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core)*



- MA 16100 - Plane Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200) or
- MA 16500 - Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society<sup>^\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦

## Team-Building and Collaboration

*Met with required major coursework.*

## Electives (2-30 credits)

Enrollment in freshman seminar course CS 19300 is required with CS 18000. This is not a degree requirement. CS 19700 - Freshman Honors Seminar, CS 29100 - Sophomore Development Seminar, and CS 39100 are optional but recommended.

## Grade Requirements

- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.

## GPA Requirements

- 3.6 CS GPA and 3.25 cumulative GPA is required for graduation with the CS Honors degree.

## Course Requirements and Notes

- Enrollment in the seminar course CS 19300 is strongly recommended with CS 18000. This is not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.
- \*Foundations Electives exclude programming language classes CS 38001, CS 38002 and CS 38003, as well as CS 39100 and CS 39700. The use of any Variable Title course must be approved by the faculty.
- Use of 300, 400, and 500 level CS courses outside of track or an independent study course to count as a track elective requires track chair approval.
- Non-CS courses and graduate level courses may have additional prerequisites that must be met in order to be eligible to take the course.
- No more than one Math course may be counted toward the Electives.

- No course can be counted both for a required and elective course within the same track.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Program Requirements

### Fall 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \*\*\*
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00-4.00 (English Composition suggested.)
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00 (CS 19300 suggested.)

### 15-17 Credits

### Spring 1st Year

- CS 18200 - Foundations Of Computer Science \*\*\* ♦
- CS 24000 - Programming In C \*\*\* ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00
- Electives - Credit Hours: 1.00 (Recommended CS 19700 )
- Electives - Credit Hours: 1.00

### 15-17 Credits

### Fall 2nd Year

- CS 25000 - Computer Architecture \*\*\*
- CS 25100 - Data Structures And Algorithms \*\*\*
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00

- Electives - Credit Hours: 1.00 (Recommended CS 29100)

## 15-17 Credits

### Spring 2nd Year

- CS 25200 - Systems Programming \*\*\*
- MA 35100 - Elementary Linear Algebra \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00 (COM 21700 suggested.)
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 16-17 Credits

### Fall 3rd Year

- MA 35301 - Linear Algebra II \*\*\* or
- MA 41600 - Probability \*\*\* or
- MA 51800 - Advanced Discrete Mathematics \*\*\* or
- An approved MA course with a course number higher than MA 35100 - Elementary Linear Algebra \*\*\*  
or
- An approved MA course with a course number higher than STAT 51100\*\*\*
- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods
- Algorithmic Foundations Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 35200 )
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (Recommended CS 39100)
- Elective - Credit Hours: 3.00

## 16-17 Credits

### Spring 3rd Year

- Algorithmic Foundations Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 35400)
- Algorithmic Foundations Concentration course - Credit Hours: 3.00 \*\*\*
- Great Issues In Science - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-16 Credits

### Fall 4th Year

- CS 39700 - Honors Seminar
- Algorithmic Foundations Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 38100)

- Algorithmic Foundations Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

### Spring 4th Year

- CS 49700 - Honors Research Project
- Algorithmic Foundations Concentration course - Credit Hours: 3.00 \*\*\*
- CS 50000 level - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15-17 Credits

### World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

### Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

### Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## **Computer Science Honors: Computational Science and Engineering, BS**

# About the Program

Students in the Computer Science Honors major, in addition to fulfilling all the requirements for a BS in Computer Science, will complete additional coursework and a research project. Honors students must maintain an overall GPA of 3.25 plus at least a 3.6 in Computer Science and required CSHO courses. The program requirements include additional math coursework, three out of four selected CS and ECE courses, a research seminar and project, and a graduate level course. It is especially suitable for students planning on graduate level coursework, though it also offers advantages to students seeking employment.

Students are invited to declare the major if they meet the qualifications after their first semester or after completion of the six core courses. Students who have been admitted to the Honors College may also join the major. Students may also request to declare the major if they meet qualifications no later than their seventh semester (student must have at least 2 academic semesters remaining to accommodate both the research seminar and the research project).

This concentration is intended to introduce computer science basics in Computational Science and Engineering (CS&E). Students not intending to pursue an advanced degree are advised to choose Option 1 for electives and to take courses in some area of pure or applied science with the objective of learning how to develop software useful for the chosen area.

[Computer Science Website](#)

[Computer Science Major Change \(CODO\) Requirements](#) (Students must first CODO into Computer Science before Honors.)

## About the Program

Purdue Computer Science is one of the country's top-ranked programs. Faculty members are shaping the future of information technology through cutting-edge research. Students can take courses that include such topics as graphics and animation, web programming, competitive programming, cryptography and security, networks, software engineering, distributed systems, information systems, artificial intelligence, and bioinformatics.

The flexible curriculum offers students the opportunity to be involved in a dynamic discipline that will continue to grow and to contribute significantly to progress in many other disciplines and ultimately to changes in human society that are nothing short of profound. Students learn communication skills, teamwork, and problem-solving skills and acquire the necessary technical skills for positions in computing throughout society.

[Computer Science Website](#)

[Computer Science Major Change \(CODO\) Requirements](#)

Computer Science students begin by taking six core courses that teach them the fundamentals of computer science. Students then take coursework in a concentration, which allows them to deepen their understanding in a specific area. This concentration is intended to introduce computer science basics in Computational Science and Engineering (CS&E). Students not intending to pursue an advanced degree are advised to choose Option 1 for electives and to take courses in some area of pure or applied science with the objective of learning how to develop software useful for the chosen area. Students intending to pursue an advanced degree are advised to choose Option 2 for electives and also to take the following courses: Physics lab science courses; MA 35100 rather than MA 26500, MA 36200 or MA 44200; MA 36600 rather than MA 26600, MA 34100, or MA 44000.

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the preceding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### Earning Core Curricular Requirements through Experience

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## Computer Science Honors Major Courses (58-63 credits)

### Required CS Honors Major Math Courses (7-8 credits)

Must have C or better to meet prerequisite for certain upper level CS courses

- MA 35100 - Elementary Linear Algebra
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus

### Required CS Major Core Courses (21 credits)

Must have C or better in all courses.

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ (satisfies Computing and Teambuilding for College of Science)
- CS 18200 - Foundations Of Computer Science ♦
- CS 24000 - Programming In C ♦
- CS 25000 - Computer Architecture
- CS 25100 - Data Structures And Algorithms
- CS 25200 - Systems Programming

## Computational Science and Engineering Concentration (21 credits)

### Required Courses (5 courses)

- CS 31400 - Numerical Methods
- CS 38100 - Introduction To The Analysis Of Algorithms
- MA 26600 - Ordinary Differential Equations or
- MA 36600 - Ordinary Differential Equations

Applications - Choose one.

- CS 37300 - Data Mining And Machine Learning
- CS 47300 - Web Information Search And Management
- CS 47800 - Introduction to Bioinformatics
- ECE 30100 - Signals And Systems
- IE 33600 - Operations Research - Stochastic Models

Systems - Choose one.

- CS 35200 - Compilers: Principles And Practice
- CS 35300 - Principles Of Concurrency And Parallelism
- CS 35400 - Operating Systems

### Selectives (2 courses)



- CS 30700 - Software Engineering I
- CS 42200 - Computer Networks
- CS 45600 - Programming Languages
- CS 47100 - Introduction to Artificial Intelligence
- CS 48300 - Introduction To The Theory Of Computation
- CS 51400 - Numerical Analysis
- CS 51500 - Numerical Linear Algebra
- CS 52000 - Computational Methods In Optimization
- CS 52500 - Parallel Computing
- IE 33500 - Operations Research - Optimization
- MA 34100 - Foundations Of Analysis
- MA 44000 - Honors Real Analysis I

## Concentration Notes

- At least four (4) of the seven (7) courses for Computational Science and Engineering track must be CS courses.
- Any course beyond the one required class from the list of Applications/Systems courses may count as an elective.
- Non-CS courses and graduate level courses may have additional prerequisites that must be met to be eligible to take the course.
- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.
- No course may be counted for both a required and selective course within the same track.

## Required CS Honors (12-13 credits)

Need CS GPA of 3.60 or better & cumulative GPA of 3.25 and must have a C or better in all courses

- CS 39700 - Honors Seminar
- CS 49700 - Honors Research Project (may use for Concentration Selective - see chairperson for approval)
- MA 35301 - Linear Algebra II or
- MA 41600 - Probability or
- MA 51800 - Advanced Discrete Mathematics or
- An approved MA course with course number higher than MA 35100 - Elementary Linear Algebra or
- An approved STAT course with course number higher than STAT 51100 - Statistical Methods
- CS 50000 level course (may use for Track Elective - see Track chairperson for approval) - Credit Hours: 3.00
- Three out of the four following courses: CS 35400, CS 35200, CS 38100, ECE 27000. CS 35400, CS 35200, and CS 38100 may be used to meet track requirements if the courses are required or electives for the student's track.

## Other Departmental/Program Course Requirements (32-55 credits)

## COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

## Composition & Presentation

### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here** (ADD LINK IN ACALOG). (satisfies OC for core)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

\*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.

International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

## Computing

*Met with required major coursework.*

### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

### Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core)*

- MA 16100 - Plane Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200) or
- MA 16500 - Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society<sup>^\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦

## Team-Building and Collaboration

*Met with required major coursework.*

## Electives (2-30 credits)

Enrollment in freshman seminar course CS 19300 is required with CS 18000. This is not a degree requirement. CS 19700 - Freshman Honors Seminar, CS 29100 - Sophomore Development Seminar, and CS 39100 are optional but recommended.

## Grade Requirements

- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.

## GPA Requirements

- 3.6 CS GPA and 3.25 cumulative GPA is required for graduation with the CS Honors degree.

## Course Requirements & Notes

- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.
- Enrollment in freshman seminar course CS 19300 is required with CS 18000. This is not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the Civics Literacy Proficiency website.

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \*\*\*
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00-4.00 (English Composition suggested.)
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00 (CS 19300 suggested.)

### 15-17 Credits

### Spring 1st Year

- CS 18200 - Foundations Of Computer Science \*\*\* ♦
- CS 24000 - Programming In C \*\*\* ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00
- Electives - Credit Hours: 1.00 (Recommended CS 19700 )
- Electives - Credit Hours: 1.00

### 15-17 Credits

### Fall 2nd Year

- CS 25000 - Computer Architecture \*\*\*

- CS 25100 - Data Structures And Algorithms \*\*\*
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 1.00 (Recommended CS 29100)

## 15-17 Credits

### Spring 2nd Year

- CS 25200 - Systems Programming \*\*\*
- MA 35100 - Elementary Linear Algebra ♦
- Science Core Selection - Credit Hours: 3.00 - 4.00 (COM 21700 suggested.)
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 16-17 Credits

### Fall 3rd Year

- MA 35301 - Linear Algebra II \*\*\* or
- MA 41600 - Probability \*\*\* or
- MA 51800 - Advanced Discrete Mathematics \*\*\* or
- An approved MA course with a course number higher than MA 35100 - Elementary Linear Algebra \*\*\* or
- An approved MA course with a course number higher than STAT 51100\*\*\*
- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods
- Computational Science and Engineering Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 35200 )
- Computational Science and Engineering Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (Recommended CS 39100)

## 16-17 Credits

### Spring 3rd Year

- Computational Science and Engineering Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 35400)
- Computational Science and Engineering Concentration course - Credit Hours: 3.00 \*\*\*
- Great Issues In Science - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-16 Credits

## Fall 4th Year

- CS 39700 - Honors Seminar
- Computational Science and Engineering Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 38100)
- Computational Science and Engineering Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

## Spring 4th Year

- CS 49700 - Honors Research Project
- Computational Science and Engineering Concentration course - Credit Hours: 3.00 \*\*\*
- CS 50000 level - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15-17 Credits

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

# Computer Science Honors: Computer Graphics and Visualization, BS

## About the Program

Students in the Computer Science Honors major, in addition to fulfilling all the requirements for a BS in Computer Science, will complete additional coursework and a research project. Honors students must maintain an overall GPA of 3.25 plus at least a 3.6 in Computer Science and required CSHO courses. The program requirements include additional math coursework, three out of four selected CS and ECE courses, a research seminar and project, and a graduate level course. It is especially suitable for students planning on graduate level coursework, though it also offers advantages to students seeking employment.

The Computer Graphics and Visualization concentration is designed to prepare students for work and/or for graduate school in computer graphics, visualization, and related areas. Computer graphics refers to modeling (including 3D acquisition) and rendering 3D objects and scenes. Visualization refers to using imagery to convey digital information and facilitate its interpretation and analysis. Jobs and activities for students graduating from this track may include:

Graphics-related Industry jobs (e.g., Intel, NVIDIA, Microsoft, Adobe, IBM, Google) - working on graphics software, hardware, and applications.

CAD and Architectural Applications - developing CAD/Engineering/Architecture related applications.

Movie Industry (e.g., Pixar, Dreamworks, Disney, Sony) - working on creating movies and related tools.

Gaming Industry (e.g., Electronic Arts, Midway Games, Disney, Sony) - working on game programming and related tools.

Laboratories - working in one of several scientific visualization laboratories (though often a graduate degree is preferred).

Graduate school - continuing studies towards a MS or PhD which opens up other job opportunities including research labs and academic positions.

Students are invited to declare the major if they meet the qualifications after their first semester or after completion of the six core courses. Students who have been admitted to the Honors College may also join the major. Students may also request to declare the major if they meet qualifications no later than their seventh semester (student must have at least 2 academic semesters remaining to accommodate both the research seminar and the research project).

Computer Science Website

Computer Science Major Change (CODO) Requirements (Students must first CODO into Computer Science before Honors.)

## About the Program

Students in the Computer Science Honors major, in addition to fulfilling all the requirements for a BS in Computer Science, will complete additional coursework and a research project. Honors students must maintain an overall GPA of 3.25 plus at least a 3.6 in Computer Science and required CSHO courses. The program requirements include additional math coursework, three out of four selected CS and ECE courses, a research seminar and project, and a graduate level course. It is especially suitable for students planning on graduate level coursework, though it also offers advantages to students seeking employment.



The Computer Graphics and Visualization concentration is designed to prepare students for work and/or for graduate school in computer graphics, visualization, and related areas. Computer graphics refers to modeling (including 3D acquisition) and rendering 3D objects and scenes. Visualization refers to using imagery to convey digital information and facilitate its interpretation and analysis. Jobs and activities for students graduating from this track may include:

Graphics-related Industry jobs (e.g., Intel, NVIDIA, Microsoft, Adobe, IBM, Google) - working on graphics software, hardware, and applications.

CAD and Architectural Applications - developing CAD/Engineering/Architecture related applications.

Movie Industry (e.g., Pixar, Dreamworks, Disney, Sony) - working on creating movies and related tools.

Gaming Industry (e.g., Electronic Arts, Midway Games, Disney, Sony) - working on game programming and related tools.

Laboratories - working in one of several scientific visualization laboratories (though often a graduate degree is preferred).

Graduate school - continuing studies towards a MS or PhD which opens up other job opportunities including research labs and academic positions.

Students are invited to declare the major if they meet the qualifications after their first semester or after completion of the six core courses. Students who have been admitted to the Honors College may also join the major. Students may also request to declare the major if they meet qualifications no later than their seventh semester (student must have at least 2 academic semesters remaining to accommodate both the research seminar and the research project).

Computer Science Website

Computer Science Major Change (CODO) Requirements (Students must first CODO into Computer Science before Honors.)

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the preceding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## **Computer Science Honors Major Courses (58-63 credits)**

### **Required CS Honors Major Math Courses (7-8 credits)**

Must have C or better to meet prerequisite for certain upper level CS courses

- MA 35100 - Elementary Linear Algebra
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus

### **Required CS Major Core Courses (21 credits)**

Must have C or better in all courses.

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ (satisfies Computing and Teambuilding for College of Science)
- CS 18200 - Foundations Of Computer Science ♦
- CS 24000 - Programming In C ♦
- CS 25000 - Computer Architecture

- CS 25100 - Data Structures And Algorithms
- CS 25200 - Systems Programming

## Computer Graphics and Visualization Concentration (18 credits)

### Required Courses (3 courses)

- CS 31400 - Numerical Methods
- CS 33400 - Fundamentals Of Computer Graphics
- CS 37300 - Data Mining And Machine Learning or
- CS 43400 - Advanced Computer Graphics or
- CS 47100 - Introduction to Artificial Intelligence

### Selectives (3 courses)

- CS 35200 - Compilers: Principles And Practice
- CS 35400 - Operating Systems
- CS 37300 - Data Mining And Machine Learning
- CS 38100 - Introduction To The Analysis Of Algorithms
- CS 42200 - Computer Networks
- CS 43400 - Advanced Computer Graphics
- CS 45600 - Programming Languages
- CS 47100 - Introduction to Artificial Intelligence
- CS 43900 - Introduction To Data Visualization

### Project Option

Electives could include 1 semester of CS 49000 project course with CGVLAB.

This option is very useful to undergraduate students involved in research, and such is beneficial to both job-seeking and graduate-school seeking students.

### Concentration Notes

- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.
- No course may be counted for both a required and selective course within the same track.
- Electives could include one semester of CS 49000 project with CGVLAB with Chair approval.

### Required CS Honors (12-13 credits)

Need CS GPA of 3.60 or better & cumulative GPA of 3.25 and must have a C or better in all courses

- CS 39700 - Honors Seminar
- CS 49700 - Honors Research Project (may use for Track Elective - see Track chairperson for approval)
- MA 35301 - Linear Algebra II or
- MA 41600 - Probability or

- MA 51800 - Advanced Discrete Mathematics or
- An approved MA course with course number higher than MA 35100 - Elementary Linear Algebra or
- An approved STAT course with course number higher than STAT 51100 - Statistical Methods
- CS 50000 level course (may use for Track Elective - see Track chairperson for approval) - Credit Hours: 3.00
- Three out of the four following courses: CS 35400, CS 35200, CS 38100, ECE 27000. CS 35400, CS 35200, and CS 38100 may be used to meet track requirements if the courses are required or electives for the student's track.

## Other Departmental/Program Course Requirements (32-55 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

#### Composition & Presentation

##### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

##### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here** (ADD LINK IN ACALOG). (satisfies OC for core)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

\*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.

International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

#### Computing

*Met with required major coursework.*

##### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

## General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core)*

- MA 16100 - Plane Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200) or
- MA 16500 - Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society^\* (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦

## Team-Building and Collaboration

*Met with required major coursework.*

## Electives (2-30 credits)

Enrollment in freshman seminar course CS 19300 is required with CS 18000. This is not a degree requirement. CS 19700 - Freshman Honors Seminar, CS 29100 - Sophomore Development Seminar, and CS 39100 are optional but recommended.

## Grade Requirements

- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.

## GPA Requirements

- 3.6 CS GPA and 3.25 cumulative GPA is required for graduation with the CS Honors degree.

## Course Requirements & Notes

- Enrollment in freshman seminar course CS 19300 is required with CS 18000. This is not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

## University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \*\*\*
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00-4.00 (English Composition suggested.)
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00 (CS 19300 suggested.)

### 15-17 Credits

### Spring 1st Year

- CS 18200 - Foundations Of Computer Science \*\*\* ♦
- CS 24000 - Programming In C \*\*\* ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00
- Electives - Credit Hours: 1.00 (Recommended CS 19700 )
- Electives - Credit Hours: 1.00

## 15-17 Credits

### Fall 2nd Year

- CS 25000 - Computer Architecture \*\*\*
- CS 25100 - Data Structures And Algorithms \*\*\*
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 1.00 (Recommended CS 29100)

## 15-17 Credits

### Spring 2nd Year

- CS 25200 - Systems Programming \*\*\*
- MA 35100 - Elementary Linear Algebra ♦
- Science Core Selection - Credit Hours: 3.00 - 4.00 (COM 21700 suggested.)
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 16-17 Credits

### Fall 3rd Year

- MA 35301 - Linear Algebra II \*\*\* or
- MA 41600 - Probability \*\*\* or
- MA 51800 - Advanced Discrete Mathematics \*\*\* or
- An approved MA course with a course number higher than MA 35100 - Elementary Linear Algebra \*\*\* or
- An approved MA course with a course number higher than STAT 51100\*\*\*
- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods
- Computer Graphics and Visualization Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 35200 )
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (Recommended CS 39100)
- Elective - Credit Hours: 3.00



## 16-17 Credits

### Spring 3rd Year

- Computer Graphics and Visualization Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 35400)
- Computer Graphics and Visualization Concentration course - Credit Hours: 3.00 \*\*\*
- Great Issues In Science - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-16 Credits

### Fall 4th Year

- CS 39700 - Honors Seminar
- Computer Graphics and Visualization Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 38100)
- Computer Graphics and Visualization Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

### Spring 4th Year

- CS 49700 - Honors Research Project
- Computer Graphics and Visualization Concentration course - Credit Hours: 3.00 \*\*\*
- CS 50000 level - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15-17 Credits

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Computer Science Honors: Database and Information Systems, BS

### About the Program

Students in the Computer Science Honors major, in addition to fulfilling all the requirements for a BS in Computer Science, will complete additional coursework and a research project. Honors students must maintain an overall GPA of 3.25 plus at least a 3.6 in Computer Science and required CSHO courses. The program requirements include additional math coursework, three out of four selected CS and ECE courses, a research seminar and project, and a graduate level course. It is especially suitable for students planning on graduate level coursework, though it also offers advantages to students seeking employment.

Students are invited to declare the major if they meet the qualifications after their first semester or after completion of the six core courses. Students who have been admitted to the Honors College may also join the major. Students may also request to declare the major if they meet qualifications no later than their seventh semester (student must have at least 2 academic semesters remaining to accommodate both the research seminar and the research project). Database and Information Systems is designed to prepare students to become computer scientists who understand and can apply the principles and techniques of database design, algorithms for information retrieval, their strengths and limitations, and tools for the design of databases and information systems.

Computer Science Website

Computer Science Major Change (CODO) Requirements (Students must first CODO into Computer Science before Honors.)

### About the Program

Students in the Computer Science Honors major, in addition to fulfilling all the requirements for a BS in Computer Science, will complete additional coursework and a research project. Honors students must maintain an overall GPA of 3.25 plus at least a 3.6 in Computer Science and required CSHO courses. The program requirements include additional math coursework, three out of four selected CS and ECE courses, a research seminar and project, and a graduate level course. It is especially suitable for students planning on graduate level coursework, though it also offers advantages to students seeking employment.

Students are invited to declare the major if they meet the qualifications after their first semester or after completion of the six core courses. Students who have been admitted to the Honors College may also join the major. Students may

also request to declare the major if they meet qualifications no later than their seventh semester (student must have at least 2 academic semesters remaining to accommodate both the research seminar and the research project). Database and Information Systems is designed to prepare students to become computer scientists who understand and can apply the principles and techniques of database design, algorithms for information retrieval, their strengths and limitations, and tools for the design of databases and information systems.

Computer Science Website

Computer Science Major Change (CODO) Requirements (Students must first CODO into Computer Science before Honors.)

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science

- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

#### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## Computer Science Honors Major Courses (58-63 credits)

### Required CS Honors Major Math Courses (7-8 credits)

Must have C or better to meet prerequisite for certain upper level CS courses

- MA 35100 - Elementary Linear Algebra
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus

### Required CS Major Core Courses (21 credits)

Must have C or better in all courses.

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ (satisfies Computing and Teambuilding for College of Science)
- CS 18200 - Foundations Of Computer Science ♦
- CS 24000 - Programming In C ♦
- CS 25000 - Computer Architecture
- CS 25100 - Data Structures And Algorithms
- CS 25200 - Systems Programming

## Database and Information Systems Concentration (21 credits)

### Required Courses

- CS 34800 - Information Systems
- CS 38100 - Introduction To The Analysis Of Algorithms
- CS 44800 - Introduction To Relational Database Systems
- CS 37300 - Data Mining And Machine Learning or
- CS 47300 - Web Information Search And Management

### Selectives

Choose one course from each of the following categories.

### Category I - Computing Systems

- CS 35200 - Compilers: Principles And Practice
- CS 35300 - Principles Of Concurrency And Parallelism
- CS 35400 - Operating Systems

### Category II - Information Assurance

- CS 35500 - Introduction To Cryptography
- CS 42600 - Computer Security

### Category III - Related Studies

- CS 37300 - Data Mining And Machine Learning
- CS 42200 - Computer Networks
- CS 47100 - Introduction to Artificial Intelligence
- CS 47300 - Web Information Search And Management
- CS 47800 - Introduction to Bioinformatics
- CS 48300 - Introduction To The Theory Of Computation
- Senior Project Option:
- CS 49000 - Topics In Computer Sciences For Undergraduates - (Senior Project)  
or
- EPCS 41100 - Senior Design Participation In EPICS and
- EPCS 41200 - Senior Design Participation In EPICS - (Senior Project)  
or
- CS 49700 - Honors Research Project

### Concentration Notes

- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.
- No course may be counted for both a required and selective course within the same track.
- Senior Project (CS 49000/CS 49700) must be taken for at least three credits, be supervised by CS faculty & approved by DBIS chair.

### Required CS Honors (12-13 credits)

Need CS GPA of 3.60 or better & cumulative GPA of 3.25 and must have a C or better in all courses

- CS 39700 - Honors Seminar
- CS 49700 - Honors Research Project (may use for Track Elective - see Track chairperson for approval)
- MA 35301 - Linear Algebra II or
- MA 41600 - Probability or
- MA 51800 - Advanced Discrete Mathematics or
- An approved MA course with course number higher than MA 35100 - Elementary Linear Algebra or
- An approved STAT course with course number higher than STAT 51100 - Statistical Methods

- CS 50000 level course (may use for Track Elective - see Track chairperson for approval) - Credit Hours: 3.00
- Three out of the four following courses: CS 35400, CS 35200, CS 38100, ECE 27000. CS 35400, CS 35200, and CS 38100 may be used to meet track requirements if the courses are required or electives for the student's track.

## Other Departmental/Program Course Requirements (32-55 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

#### Composition & Presentation

##### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

##### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here** (ADD LINK IN ACALOG). (satisfies OC for core)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

\*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.

International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

#### Computing

*Met with required major coursework.*

##### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

##### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core)*

- MA 16100 - Plane Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200) or
- MA 16500 - Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society<sup>^\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦

## Team-Building and Collaboration

*Met with required major coursework.*

## Electives (2-30 credits)

Enrollment in freshman seminar course CS 19300 is required with CS 18000. This is not a degree requirement. CS 19700 - Freshman Honors Seminar, CS 29100 - Sophomore Development Seminar, and CS 39100 are optional but recommended.

## Grade Requirements

- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.

## GPA Requirements

- 3.6 CS GPA and 3.25 cumulative GPA is required for graduation with the CS Honors degree.

## Course Requirements & Notes

- Enrollment in freshman seminar course CS 19300 is required with CS 18000. This is not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)



- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \*\*\*
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00-4.00 (English Composition suggested.)
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00 (CS 19300 suggested.)

### 15-17 Credits

### Spring 1st Year

- CS 18200 - Foundations Of Computer Science \*\*\* ♦
- CS 24000 - Programming In C \*\*\* ♦

- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00
- Electives - Credit Hours: 1.00 (Recommended CS 19700 )
- Electives - Credit Hours: 1.00

## 15-17 Credits

### Fall 2nd Year

- CS 25000 - Computer Architecture \*\*\*
- CS 25100 - Data Structures And Algorithms \*\*\*
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 1.00 (Recommended CS 29100)

## 15-17 Credits

### Spring 2nd Year

- CS 25200 - Systems Programming \*\*\*
- MA 35100 - Elementary Linear Algebra ♦
- Science Core Selection - Credit Hours: 3.00 - 4.00 (COM 21700 suggested.)
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 16-17 Credits

### Fall 3rd Year

- MA 35301 - Linear Algebra II \*\*\* or
- MA 41600 - Probability \*\*\* or
- MA 51800 - Advanced Discrete Mathematics \*\*\* or
- An approved MA course with a course number higher than MA 35100 - Elementary Linear Algebra \*\*\* or
- An approved MA course with a course number higher than STAT 51100\*\*\*
- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods
- Database and Information Systems Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 35200 )
- Database and Information Systems Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (Recommended CS 39100)

## 16-17 Credits

## Spring 3rd Year

- Database and Information Systems Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 35400)
- Database and Information Systems Concentration course - Credit Hours: 3.00 \*\*\*
- Great Issues In Science - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-16 Credits

## Fall 4th Year

- CS 39700 - Honors Seminar
- Database and Information Systems Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 38100)
- Database and Information Systems Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

## Spring 4th Year

- CS 49700 - Honors Research Project
- Database and Information Systems Concentration course - Credit Hours: 3.00 \*\*\*
- CS 50000 level - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15-17 Credits

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should

know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Computer Science Honors: Machine Intelligence, BS

### About the Program

Students in the Computer Science Honors major, in addition to fulfilling all the requirements for a BS in Computer Science, will complete additional coursework and a research project. Honors students must maintain an overall GPA of 3.25 plus at least a 3.6 in Computer Science and required CSHO courses. The program requirements include additional math coursework, three out of four selected CS and ECE courses, a research seminar and project, and a graduate level course. It is especially suitable for students planning on graduate level coursework, though it also offers advantages to students seeking employment. Machine Intelligence is designed to prepare students to work in fields related to management and analysis of data, including areas such as machine learning, information retrieval, and data mining. The track is designed to prepare students to understand, and effectively apply in practice, the principles and techniques of data and knowledge representation, search, as well as learning and reasoning with data.

Students are invited to declare the major if they meet the qualifications after their first semester or after completion of the six core courses. Students who have been admitted to the Honors College may also join the major. Students may also request to declare the major if they meet qualifications no later than their seventh semester (student must have at least 2 academic semesters remaining to accommodate both the research seminar and the research project).

Computer Science Website

Computer Science Major Change (CODO) Requirements (Students must first CODO into Computer Science before Honors.)

### About the Program

Students in the Computer Science Honors major, in addition to fulfilling all the requirements for a BS in Computer Science, will complete additional coursework and a research project. Honors students must maintain an overall GPA of 3.25 plus at least a 3.6 in Computer Science and required CSHO courses. The program requirements include additional math coursework, three out of four selected CS and ECE courses, a research seminar and project, and a graduate level course. It is especially suitable for students planning on graduate level coursework, though it also offers advantages to students seeking employment. Machine Intelligence is designed to prepare students to work in fields related to management and analysis of data, including areas such as machine learning, information retrieval, and data mining. The track is designed to prepare students to understand, and effectively apply in practice, the principles and techniques of data and knowledge representation, search, as well as learning and reasoning with data.

Students are invited to declare the major if they meet the qualifications after their first semester or after completion of the six core courses. Students who have been admitted to the Honors College may also join the major. Students may also request to declare the major if they meet qualifications no later than their seventh semester (student must have at least 2 academic semesters remaining to accommodate both the research seminar and the research project).

Computer Science Website

Computer Science Major Change (CODO) Requirements (Students must first CODO into Computer Science before Honors.)

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration

- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## **Computer Science Honors Major Courses (58-63 credits)**

### **Required CS Honors Major Math Courses (7-8 credits)**

Must have C or better to meet prerequisite for certain upper level CS courses

- MA 35100 - Elementary Linear Algebra
- MA 26100 - Multivariate Calculus *or*
- MA 27101 - Honors Multivariate Calculus

### **Required CS Major Core Courses (21 credits)**

Must have C or better in all courses.

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ (satisfies Computing and Teambuilding for College of Science)
- CS 18200 - Foundations Of Computer Science ♦
- CS 24000 - Programming In C ♦
- CS 25000 - Computer Architecture
- CS 25100 - Data Structures And Algorithms
- CS 25200 - Systems Programming

## **Machine Intelligence Concentration (18 credits)**

### **Required Courses (4 courses)**

- CS 37300 - Data Mining And Machine Learning
- CS 38100 - Introduction To The Analysis Of Algorithms
- CS 47100 - Introduction to Artificial Intelligence *or*
- CS 47300 - Web Information Search And Management
- MA 41600 - Probability *or*
- STAT 41600 - Probability *or*
- STAT 51200 - Applied Regression Analysis

### **Electives (2 courses)**

- CS 31400 - Numerical Methods
- CS 34800 - Information Systems
- CS 35200 - Compilers: Principles And Practice
- CS 43900 - Introduction To Data Visualization
- CS 44000 - Large Scale Data Analytics
- CS 44800 - Introduction To Relational Database Systems
- CS 45600 - Programming Languages
- CS 47100 - Introduction to Artificial Intelligence
- CS 47300 - Web Information Search And Management
- CS 47500 - Human-Computer Interaction
- CS 48300 - Introduction To The Theory Of Computation
- CS 57700 - Natural Language Processing
- CS 57800 - Statistical Machine Learning

## Concentration Notes

- Non-CS courses and graduate level courses may have additional prerequisites that must be met to be eligible to take the course.
- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.
- No course may be counted for both a required and selective course within the same track.

## Required CS Honors - (12-13 credits)

Need CS GPA of 3.60 or better & cumulative GPA of 3.25 and must have a C or better in all courses

- CS 39700 - Honors Seminar
- CS 49700 - Honors Research Project (may use for Track Elective - see Track chairperson for approval)
- MA 35301 - Linear Algebra II or
- MA 41600 - Probability or
- MA 51800 - Advanced Discrete Mathematics or
- An approved MA course with course number higher than MA 35100 - Elementary Linear Algebra or
- An approved STAT course with course number higher than STAT 51100 - Statistical Methods
- CS 50000 level course (may use for Track Elective - see Track chairperson for approval) - Credit Hours: 3.00
- Three out of the four following courses: CS 35400, CS 35200, CS 38100, ECE 27000. CS 35400, CS 35200, and CS 38100 may be used to meet track requirements if the courses are required or electives for the student's track.

## Other Departmental/Program Course Requirements (32-55 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

## Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

## Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here** (ADD LINK IN ACALOG). (satisfies OC for core)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

\*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.

International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

## Computing

*Met with required major coursework.*

## Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

## General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I



- Laboratory Science Option II

## Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core)*

- MA 16100 - Plane Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200) or
- MA 16500 - Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society<sup>^\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦

## Team-Building and Collaboration

*Met with required major coursework.*

## Electives (2-30 credits)

Enrollment in freshman seminar course CS 19300 is required with CS 18000. This is not a degree requirement. CS 19700 - Freshman Honors Seminar, CS 29100 - Sophomore Development Seminar, and CS 39100 are optional but recommended.

## Grade Requirements

- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.

## GPA Requirements

- 3.6 CS GPA and 3.25 cumulative GPA is required for graduation with the CS Honors degree.

## Course Requirements & Notes

- Enrollment in freshman seminar course CS 19300 is required with CS 18000. This is not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.

- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \*\*\*
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00-4.00 (English Composition suggested.)
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00 (CS 19300 suggested.)

### 15-17 Credits

### Spring 1st Year

- CS 18200 - Foundations Of Computer Science \*\*\* ♦
- CS 24000 - Programming In C \*\*\* ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00
- Electives - Credit Hours: 1.00 (Recommended CS 19700 )
- Electives - Credit Hours: 1.00

### 15-17 Credits

### Fall 2nd Year

- CS 25000 - Computer Architecture \*\*\*
- CS 25100 - Data Structures And Algorithms \*\*\*
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00

- Electives - Credit Hours: 1.00 (Recommended CS 29100)

## 15-17 Credits

### Spring 2nd Year

- CS 25200 - Systems Programming \*\*\*
- MA 35100 - Elementary Linear Algebra ♦
- Science Core Selection - Credit Hours: 3.00 - 4.00 (COM 21700 suggested.)
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 16-17 Credits

### Fall 3rd Year

- MA 35301 - Linear Algebra II \*\*\* or
- MA 41600 - Probability \*\*\* or
- MA 51800 - Advanced Discrete Mathematics \*\*\* or
- An approved MA course with a course number higher than MA 35100 - Elementary Linear Algebra \*\*\*  
or
- An approved MA course with a course number higher than STAT 51100\*\*\*
- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods
- Machine Intelligence Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 35200 )
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (Recommended CS 39100)
- Elective - Credit Hours: 3.00

## 16-17 Credits

### Spring 3rd Year

- Machine Intelligence Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 35400)
- Machine Intelligence Concentration course - Credit Hours: 3.00 \*\*\*
- Great Issues In Science - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-16 Credits

### Fall 4th Year

- CS 39700 - Honors Seminar
- Machine Intelligence Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 38100)

- Machine Intelligence Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

### Spring 4th Year

- CS 49700 - Honors Research Project
- Machine Intelligence Concentration course - Credit Hours: 3.00 \*\*\*
- CS 50000 level - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15-17 Credits

### World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

### Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

### Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## **Computer Science Honors: Programming Language, BS**

### **About the Program**

Students in the Computer Science Honors major, in addition to fulfilling all the requirements for a BS in Computer Science, will complete additional coursework and a research project. Honors students must maintain an overall GPA of 3.25 plus at least a 3.6 in Computer Science and required CSHO courses. The program requirements include additional math coursework, three out of four selected CS and ECE courses, a research seminar and project, and a graduate level course. It is especially suitable for students planning on graduate level coursework, though it also offers advantages to students seeking employment.

Students are invited to declare the major if they meet the qualifications after their first semester or after completion of the six core courses. Students who have been admitted to the Honors College may also join the major. Students may also request to declare the major if they meet qualifications no later than their seventh semester (student must have at least 2 academic semesters remaining to accommodate both the research seminar and the research project). This concentration is designed to prepare students to work in fields related to program understanding, manipulation and transformation. This includes run-time system engineering as well as domain specific techniques (e.g., real-time computing or web programming). They will acquire tools and techniques needed to specify and implement language-based solutions.

Computer Science Website

Computer Science Major Change (CODO) Requirements (Students must first CODO into Computer Science before Honors.)

## About the Program

Students in the Computer Science Honors major, in addition to fulfilling all the requirements for a BS in Computer Science, will complete additional coursework and a research project. Honors students must maintain an overall GPA of 3.25 plus at least a 3.6 in Computer Science and required CSHO courses. The program requirements include additional math coursework, three out of four selected CS and ECE courses, a research seminar and project, and a graduate level course. It is especially suitable for students planning on graduate level coursework, though it also offers advantages to students seeking employment.

Students are invited to declare the major if they meet the qualifications after their first semester or after completion of the six core courses. Students who have been admitted to the Honors College may also join the major. Students may also request to declare the major if they meet qualifications no later than their seventh semester (student must have at least 2 academic semesters remaining to accommodate both the research seminar and the research project). This concentration is designed to prepare students to work in fields related to program understanding, manipulation and transformation. This includes run-time system engineering as well as domain specific techniques (e.g., real-time computing or web programming). They will acquire tools and techniques needed to specify and implement language-based solutions.

Computer Science Website

Computer Science Major Change (CODO) Requirements (Students must first CODO into Computer Science before Honors.)

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## **Computer Science Honors Major Courses (58-63 credits)**

### **Required CS Honors Major Math Courses (7-8 credits)**

Must have C or better to meet prerequisite for certain upper level CS courses

- MA 35100 - Elementary Linear Algebra
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus

## Required CS Major Core Courses (21 credits)

Must have C or better in all courses.

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ (satisfies Computing and Teambuilding for College of Science)
- CS 18200 - Foundations Of Computer Science ♦
- CS 24000 - Programming In C ♦
- CS 25000 - Computer Architecture
- CS 25100 - Data Structures And Algorithms
- CS 25200 - Systems Programming

## Programming Language Concentration (18 credits)

### Required Courses

- CS 35200 - Compilers: Principles And Practice
- CS 35400 - Operating Systems
- CS 45600 - Programming Languages

### Selectives

Choose 3.

- CS 30700 - Software Engineering I or
- CS 40800 - Software Testing
- CS 34800 - Information Systems or
- CS 44800 - Introduction To Relational Database Systems
- CS 35300 - Principles Of Concurrency And Parallelism
- CS 38100 - Introduction To The Analysis Of Algorithms
- CS 42600 - Computer Security
- CS 48300 - Introduction To The Theory Of Computation
- CS 56000 - Reasoning About Programs
- MA 38500 - Introduction To Logic or
- MA 45300 - Elements Of Algebra I

### Concentration Notes

- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.
- No course may be counted for both a required and selective course within the same track.



## Required CS Honors - (12-13 credits)

Need CS GPA of 3.60 or better & cumulative GPA of 3.25 and must have a C or better in all courses

- CS 39700 - Honors Seminar
- CS 49700 - Honors Research Project (may use for Track Elective - see Track chairperson for approval)
- MA 35301 - Linear Algebra II or
- MA 41600 - Probability or
- MA 51800 - Advanced Discrete Mathematics or
- An approved MA course with course number higher than MA 35100 - Elementary Linear Algebra or
- An approved STAT course with course number higher than STAT 51100 - Statistical Methods
- CS 50000 level course (may use for Track Elective - see Track chairperson for approval) - Credit Hours: 3.00
- Three out of the four following courses: CS 35400, CS 35200, CS 38100, ECE 27000. CS 35400, CS 35200, and CS 38100 may be used to meet track requirements if the courses are required or electives for the student's track.

## Other Departmental/Program Course Requirements (32-55 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

#### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

#### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here** (ADD LINK IN ACALOG). (satisfies OC for core)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

\*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.

International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

### Computing

*Met with required major coursework.*

## Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

## General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core)*

- MA 16100 - Plane Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200) or
- MA 16500 - Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology & Society^\* (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦

## Team-Building and Collaboration

*Met with required major coursework.*

## Electives (2-30 credits)

Enrollment in freshman seminar course CS 19300 is required with CS 18000. This is not a degree requirement. CS 19700 - Freshman Honors Seminar, CS 29100 - Sophomore Development Seminar, and CS 39100 are optional but recommended.

## Grade Requirements

- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.

## GPA Requirements

- 3.6 CS GPA and 3.25 cumulative GPA is required for graduation with the CS Honors degree.

## Course Requirements & Notes

- Enrollment in freshman seminar course CS 19300 is required with CS 18000. This is not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

### Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \*\*\*
- MA 16100 - Plane Analytic Geometry And Calculus I or

- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00-4.00 (English Composition suggested.)
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00 (CS 19300 suggested.)

## 15-17 Credits

### Spring 1st Year

- CS 18200 - Foundations Of Computer Science \*\*\* ♦
- CS 24000 - Programming In C \*\*\* ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00
- Electives - Credit Hours: 1.00 (Recommended CS 19700 )
- Electives - Credit Hours: 1.00

## 15-17 Credits

### Fall 2nd Year

- CS 25000 - Computer Architecture \*\*\*
- CS 25100 - Data Structures And Algorithms \*\*\*
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 1.00 (Recommended CS 29100)

## 15-17 Credits

### Spring 2nd Year

- CS 25200 - Systems Programming \*\*\*
- MA 35100 - Elementary Linear Algebra ♦
- Science Core Selection - Credit Hours: 3.00 - 4.00 (COM 21700 suggested.)
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 16-17 Credits

### Fall 3rd Year

- MA 35301 - Linear Algebra II \*\*\* or
- MA 41600 - Probability \*\*\* or
- MA 51800 - Advanced Discrete Mathematics \*\*\* or

- An approved MA course with a course number higher than MA 35100 - Elementary Linear Algebra \*\*\*  
or
- An approved MA course with a course number higher than STAT 51100\*\*\*
- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods
- Programming Language Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 35200 )
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (Recommended CS 39100)
- Elective - Credit Hours: 3.00

## 16-17 Credits

### Spring 3rd Year

- Programming Language Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 35400)
- Programming Language Concentration course - Credit Hours: 3.00 \*\*\*
- Great Issues In Science - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-16 Credits

### Fall 4th Year

- CS 39700 - Honors Seminar
- Programming Language Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 38100)
- Programming Language Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

### Spring 4th Year

- CS 49700 - Honors Research Project
- Programming Language Concentration course - Credit Hours: 3.00 \*\*\*
- CS 50000 level - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15-17 Credits

### World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Computer Science Honors: Security, BS

### About the Program

Students in the Computer Science Honors major, in addition to fulfilling all the requirements for a BS in Computer Science, will complete additional coursework and a research project. Honors students must maintain an overall GPA of 3.25 plus at least a 3.6 in Computer Science and required CSHO courses. The program requirements include additional math coursework, three out of four selected CS and ECE courses, a research seminar and project, and a graduate level course. It is especially suitable for students planning on graduate level coursework, though it also offers advantages to students seeking employment.

Students are invited to declare the major if they meet the qualifications after their first semester or after completion of the six core courses. Students who have been admitted to the Honors College may also join the major. Students may also request to declare the major if they meet qualifications no later than their seventh semester (student must have at least 2 academic semesters remaining to accommodate both the research seminar and the research project).

The Security track is designed to prepare students to become computer scientists who:

- understand the importance of and are capable of designing and developing secure software,
- are familiar with the societal impact of insecure software and related infrastructure, and
- are familiar with and can use techniques for testing and assessing systems for secure operation.

Computer Science Website

Computer Science Major Change (CODO) Requirements (Students must first CODO into Computer Science before Honors.)

## About the Program

Students in the Computer Science Honors major, in addition to fulfilling all the requirements for a BS in Computer Science, will complete additional coursework and a research project. Honors students must maintain an overall GPA of 3.25 plus at least a 3.6 in Computer Science and required CSHO courses. The program requirements include additional math coursework, three out of four selected CS and ECE courses, a research seminar and project, and a graduate level course. It is especially suitable for students planning on graduate level coursework, though it also offers advantages to students seeking employment.

Students are invited to declare the major if they meet the qualifications after their first semester or after completion of the six core courses. Students who have been admitted to the Honors College may also join the major. Students may also request to declare the major if they meet qualifications no later than their seventh semester (student must have at least 2 academic semesters remaining to accommodate both the research seminar and the research project).

The Security track is designed to prepare students to become computer scientists who:

- understand the importance of and are capable of designing and developing secure software,
- are familiar with the societal impact of insecure software and related infrastructure, and
- are familiar with and can use techniques for testing and assessing systems for secure operation.

Computer Science Website

Computer Science Major Change (CODO) Requirements (Students must first CODO into Computer Science before Honors.)

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the preceding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.



## College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### Earning Core Curricular Requirements through Experience

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## Computer Science Honors Major Courses (58-63 credits)

### Required CS Honors Major Math Courses (7-8 credits)

Must have C or better to meet prerequisite for certain upper level CS courses

- MA 35100 - Elementary Linear Algebra
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus

### Required CS Major Core Courses (21 credits)

Must have C or better in all courses.

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ (satisfies Computing and Teambuilding for College of Science)
- CS 18200 - Foundations Of Computer Science ♦
- CS 24000 - Programming In C ♦
- CS 25000 - Computer Architecture
- CS 25100 - Data Structures And Algorithms
- CS 25200 - Systems Programming

## Security Concentration (18 credits)

## Required Courses

- CS 35400 - Operating Systems
- CS 35500 - Introduction To Cryptography
- CS 42600 - Computer Security

## Electives (3 courses)

- CS 35200 - Compilers: Principles And Practice
- CS 38100 - Introduction To The Analysis Of Algorithms
- CS 42200 - Computer Networks
- CS 49000 - Topics In Computer Sciences For Undergraduates - SWS Software Security
- CS 30700 - Software Engineering I or
- CS 40800 - Software Testing
- CS 34800 - Information Systems or
- CS 44800 - Introduction To Relational Database Systems or
- CS 47300 - Web Information Search And Management
- CS 35300 - Principles Of Concurrency And Parallelism or
- CS 45600 - Programming Languages
- CS 37300 - Data Mining And Machine Learning or
- CS 47100 - Introduction to Artificial Intelligence
- CS 48900 - Embedded Systems or
- CS 49000 - Topics In Computer Sciences For Undergraduates-DSO Distributed Systems

## Concentration Notes

- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.
- No course may be counted for both a required and selective course within the same track.

## Required CS Honors - (12-13 credits)

Need CS GPA of 3.60 or better & cumulative GPA of 3.25 and must have a C or better in all courses

- CS 39700 - Honors Seminar
- CS 49700 - Honors Research Project (may use for Track Elective - see Track chairperson for approval)
- MA 35301 - Linear Algebra II or
- MA 41600 - Probability or
- MA 51800 - Advanced Discrete Mathematics or
- An approved MA course with course number higher than MA 35100 - Elementary Linear Algebra or
- An approved STAT course with course number higher than STAT 51100 - Statistical Methods
- CS 50000 level course (may use for Track Elective - see Track chairperson for approval) - Credit Hours: 3.00
- Three out of the four following courses: CS 35400, CS 35200, CS 38100, ECE 27000. CS 35400, CS 35200, and CS 38100 may be used to meet track requirements if the courses are required or electives for the student's track.

## Other Departmental/Program Course Requirements (32-55 credits)

# COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

## Composition & Presentation

### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here** (ADD LINK IN ACALOG). (satisfies OC for core)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

\*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.

International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

## Computing

*Met with required major coursework.*

### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core)*

- MA 16100 - Plane Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200) or
- MA 16500 - Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology & Society<sup>^\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦

## Team-Building and Collaboration

*Met with required major coursework.*

## Electives (2-30 credits)

Enrollment in freshman seminar course CS 19300 is required with CS 18000. This is not a degree requirement. CS 19700 - Freshman Honors Seminar, CS 29100 - Sophomore Development Seminar, and CS 39100 are optional but recommended.

## Grade Requirements

- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.

## GPA Requirements

- 3.6 CS GPA and 3.25 cumulative GPA is required for graduation with the CS Honors degree.

## Course Requirements & Notes

- Enrollment in freshman seminar course CS 19300 is required with CS 18000. This is not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the Civics Literacy Proficiency [website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \*\*\*
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00-4.00 (English Composition suggested.)
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00 (CS 19300 suggested.)

### 15-17 Credits

### Spring 1st Year

- CS 18200 - Foundations Of Computer Science \*\*\* ♦
- CS 24000 - Programming In C \*\*\* ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00
- Electives - Credit Hours: 1.00 (Recommended CS 19700 )
- Electives - Credit Hours: 1.00

### 15-17 Credits

## Fall 2nd Year

- CS 25000 - Computer Architecture \*\*\*
- CS 25100 - Data Structures And Algorithms \*\*\*
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 1.00 (Recommended CS 29100)

## 15-17 Credits

## Spring 2nd Year

- CS 25200 - Systems Programming \*\*\*
- MA 35100 - Elementary Linear Algebra ♦
- Science Core Selection - Credit Hours: 3.00 - 4.00 (COM 21700 suggested.)
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 16-17 Credits

## Fall 3rd Year

- MA 35301 - Linear Algebra II \*\*\* or
- MA 41600 - Probability \*\*\* or
- MA 51800 - Advanced Discrete Mathematics \*\*\* or
- An approved MA course with a course number higher than MA 35100 - Elementary Linear Algebra \*\*\*  
or
- An approved MA course with a course number higher than STAT 51100\*\*\*
- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods
- Security Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 35200 )
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (Recommended CS 39100)
- Elective - Credit Hours: 3.00

## 16-17 Credits

## Spring 3rd Year

- Security Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 35400)
- Security Concentration course - Credit Hours: 3.00 \*\*\*
- Great Issues In Science - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-16 Credits

### Fall 4th Year

- CS 39700 - Honors Seminar
- Security Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 38100)
- Security Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

### Spring 4th Year

- CS 49700 - Honors Research Project
- Security Concentration course - Credit Hours: 3.00 \*\*\*
- CS 50000 level - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15-17 Credits

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.



The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Computer Science Honors: Software Engineering, BS

### About the Program

Students in the Computer Science Honors major, in addition to fulfilling all the requirements for a BS in Computer Science, will complete additional coursework and a research project. Honors students must maintain an overall GPA of 3.25 plus at least a 3.6 in Computer Science and required CSHO courses. The program requirements include additional math coursework, three out of four selected CS and ECE courses, a research seminar and project, and a graduate level course. It is especially suitable for students planning on graduate level coursework, though it also offers advantages to students seeking employment.

Students are invited to declare the major if they meet the qualifications after their first semester or after completion of the six core courses. Students who have been admitted to the Honors College may also join the major. Students may also request to declare the major if they meet qualifications no later than their seventh semester (student must have at least 2 academic semesters remaining to accommodate both the research seminar and the research project).

The Software Engineering track is designed to prepare students to become software engineers who:

- understand and can use the principles and techniques of software engineering essential for the design and development of large software products,
- are familiar with and can effectively use a variety of tools for software analysis, design, testing, and maintenance, and
- can effectively work in teams and communicate orally and in writing.

Computer Science Website

Computer Science Major Change (CODO) Requirements (Students must first CODO into Computer Science before Honors.)

### About the Program

Students in the Computer Science Honors major, in addition to fulfilling all the requirements for a BS in Computer Science, will complete additional coursework and a research project. Honors students must maintain an overall GPA of 3.25 plus at least a 3.6 in Computer Science and required CSHO courses. The program requirements include additional math coursework, three out of four selected CS and ECE courses, a research seminar and project, and a graduate level course. It is especially suitable for students planning on graduate level coursework, though it also offers advantages to students seeking employment.

Students are invited to declare the major if they meet the qualifications after their first semester or after completion of the six core courses. Students who have been admitted to the Honors College may also join the major. Students may also request to declare the major if they meet qualifications no later than their seventh semester (student must have at least 2 academic semesters remaining to accommodate both the research seminar and the research project).

The Software Engineering track is designed to prepare students to become software engineers who:

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- are familiar with and can effectively use a variety of tools for software analysis, design, testing, and maintenance, and
- can effectively work in teams and communicate orally and in writing.

Computer Science Website

Computer Science Major Change (CODO) Requirements (Students must first CODO into Computer Science before Honors.)

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration

- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## **Computer Science Honors Major Courses (58-63 credits)**

### **Required CS Honors Major Math Courses (7-8 credits)**

Must have C or better to meet prerequisite for certain upper level CS courses

- MA 35100 - Elementary Linear Algebra
- MA 26100 - Multivariate Calculus *or*
- MA 27101 - Honors Multivariate Calculus

### **Required CS Major Core Courses (21 credits)**

Must have C or better in all courses.

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ (satisfies Computing and Teambuilding for College of Science)
- CS 18200 - Foundations Of Computer Science ♦
- CS 24000 - Programming In C ♦
- CS 25000 - Computer Architecture
- CS 25100 - Data Structures And Algorithms
- CS 25200 - Systems Programming

## **Software Engineering Concentration (18 credits)**

### **Required Courses**

- CS 30700 - Software Engineering I
- CS 38100 - Introduction To The Analysis Of Algorithms
- CS 40700 - Software Engineering Senior Project
- CS 40800 - Software Testing
- CS 35200 - Compilers: Principles And Practice *or*
- CS 35400 - Operating Systems

### **Selective**

Choose one course.

- CS 34800 - Information Systems
- CS 35100 - Cloud Computing
- CS 35200 - Compilers: Principles And Practice

- CS 35300 - Principles Of Concurrency And Parallelism
- CS 35400 - Operating Systems
- CS 37300 - Data Mining And Machine Learning
- CS 42200 - Computer Networks
- CS 42600 - Computer Security
- CS 44800 - Introduction To Relational Database Systems
- CS 45600 - Programming Languages
- CS 47300 - Web Information Search And Management
- CS 48900 - Embedded Systems
- CS 49000 - Topics In Computer Sciences For Undergraduates
- DSO Distributed Systems
- SWS Software Security
- CS 51000 - Software Engineering
- CS 59000 - Topics In Computer Sciences
- SRS Software Reliability and Security

## Software Engineering Senior Project

- The Software Engineering Senior Project (CS 40700) must be completed in the student's last or next-to-last semester.
- It must be a team project involving 4-6 people.
- CS 30700 is a pre-requisite for the Software Engineering Senior Project.

## Concentration Notes

- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.
- No course may be counted for both a required and selective course within the same track.

## Required CS Honors - (12-13 credits)

Need CS GPA of 3.60 or better & cumulative GPA of 3.25 and must have a C or better in all courses

- CS 39700 - Honors Seminar
- CS 49700 - Honors Research Project (may use for Track Elective - see Track chairperson for approval)
- MA 35301 - Linear Algebra II or
- MA 41600 - Probability or
- MA 51800 - Advanced Discrete Mathematics or
- An approved MA course with course number higher than MA 35100 - Elementary Linear Algebra or
- An approved STAT course with course number higher than STAT 51100 - Statistical Methods
- CS 50000 level course (may use for Track Elective - see Track chairperson for approval) - Credit Hours: 3.00
- Three out of the four following courses: CS 35400, CS 35200, CS 38100, ECE 27000. CS 35400, CS 35200, and CS 38100 may be used to meet track requirements if the courses are required or electives for the student's track.

## Other Departmental/Program Course Requirements (32-55 credits)

# COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

## Composition & Presentation

### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here** (ADD LINK IN ACALOG). (satisfies OC for core)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

\*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.

International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

## Computing

*Met with required major coursework.*

### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core)*

- MA 16100 - Plane Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200) or
- MA 16500 - Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society<sup>^\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦

## Team-Building and Collaboration

*Met with required major coursework.*

## Electives (2-30 credits)

Enrollment in freshman seminar course CS 19300 is required with CS 18000. This is not a degree requirement. CS 19700 - Freshman Honors Seminar, CS 29100 - Sophomore Development Seminar, and CS 39100 are optional but recommended.

## Grade Requirements

- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.

## GPA Requirements

- 3.6 CS GPA and 3.25 cumulative GPA is required for graduation with the CS Honors degree.

## Course Requirements & Notes

- Enrollment in freshman seminar course CS 19300 is required with CS 18000. This is not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the Civics Literacy Proficiency [website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \*\*\*
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00-4.00 (English Composition suggested.)
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00 (CS 19300 suggested.)

### 15-17 Credits

### Spring 1st Year

- CS 18200 - Foundations Of Computer Science \*\*\* ♦
- CS 24000 - Programming In C \*\*\* ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00
- Electives - Credit Hours: 1.00 (Recommended CS 19700 )
- Electives - Credit Hours: 1.00

### 15-17 Credits



## Fall 2nd Year

- CS 25000 - Computer Architecture \*\*\*
- CS 25100 - Data Structures And Algorithms \*\*\*
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00 (COM 21700 suggested.)
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

## Spring 2nd Year

- CS 25200 - Systems Programming \*\*\*
- MA 35100 - Elementary Linear Algebra ♦
- Science Core Selection - Credit Hours: 3.00 - 4.00 (COM 21700 suggested.)
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 16-17 Credits

## Fall 3rd Year

- MA 35301 - Linear Algebra II \*\*\* or
- MA 41600 - Probability \*\*\* or
- MA 51800 - Advanced Discrete Mathematics \*\*\* or
- An approved MA course with a course number higher than MA 35100 - Elementary Linear Algebra \*\*\*  
or
- An approved MA course with a course number higher than STAT 51100\*\*\*
- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods
- Software Engineering Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 35200 )
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (Recommended CS 39100)
- Elective - Credit Hours: 3.00

## 16-17 Credits

## Spring 3rd Year

- Software Engineering Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 35400)
- Software Engineering Concentration course - Credit Hours: 3.00 \*\*\*
- Great Issues In Science - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-16 Credits

### Fall 4th Year

- CS 39700 - Honors Seminar
- Software Engineering Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 38100)
- Software Engineering Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

### Spring 4th Year

- CS 49700 - Honors Research Project
- Software Engineering Concentration course - Credit Hours: 3.00 \*\*\*
- CS 50000 level - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15-17 Credits

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Computer Science Honors: Systems Software, BS

### About the Program

Students in the Computer Science Honors major, in addition to fulfilling all the requirements for a BS in Computer Science, will complete additional coursework and a research project. Honors students must maintain an overall GPA of 3.25 plus at least a 3.6 in Computer Science and required CSHO courses. The program requirements include additional math coursework, three out of four selected CS and ECE courses, a research seminar and project, and a graduate level course. It is especially suitable for students planning on graduate level coursework, though it also offers advantages to students seeking employment.

Students are invited to declare the major if they meet the qualifications after their first semester or after completion of the six core courses. Students who have been admitted to the Honors College may also join the major. Students may also request to declare the major if they meet qualifications no later than their seventh semester (student must have at least 2 academic semesters remaining to accommodate both the research seminar and the research project). The Systems Software track is designed to prepare students to become programmers who can build...

- low-level software that uses or runs inside an operating system,
- system tools for other users (e.g., compilers and assemblers),
- programs that communicate over a computer network or the Internet (e.g., web servers).

Computer Science Website

Computer Science Major Change (CODO) Requirements (Students must first CODO into Computer Science before Honors.)

### About the Program

Students in the Computer Science Honors major, in addition to fulfilling all the requirements for a BS in Computer Science, will complete additional coursework and a research project. Honors students must maintain an overall GPA of 3.25 plus at least a 3.6 in Computer Science and required CSHO courses. The program requirements include additional math coursework, three out of four selected CS and ECE courses, a research seminar and project, and a graduate level course. It is especially suitable for students planning on graduate level coursework, though it also offers advantages to students seeking employment.

Students are invited to declare the major if they meet the qualifications after their first semester or after completion of the six core courses. Students who have been admitted to the Honors College may also join the major. Students may also request to declare the major if they meet qualifications no later than their seventh semester (student must have at least 2 academic semesters remaining to accommodate both the research seminar and the research project). The Systems Software track is designed to prepare students to become programmers who can build...

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- programs that communicate over a computer network or the Internet (e.g., web servers).

Computer Science Website

Computer Science Major Change (CODO) Requirements (Students must first CODO into Computer Science before Honors.)

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating

experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## Computer Science Honors Major Courses (58-63 credits)

### Required CS Honors Major Math Courses (7-8 credits)

Must have C or better to meet prerequisite for certain upper level CS courses

- MA 35100 - Elementary Linear Algebra
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus

### Required CS Major Core Courses (21 credits)

Must have C or better in all courses.

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ (satisfies Computing and Teambuilding for College of Science)
- CS 18200 - Foundations Of Computer Science ♦
- CS 24000 - Programming In C ♦
- CS 25000 - Computer Architecture
- CS 25100 - Data Structures And Algorithms
- CS 25200 - Systems Programming

## Systems Software Concentration (18 credits)

### Required Courses

- CS 35200 - Compilers: Principles And Practice
- CS 35400 - Operating Systems
- CS 42200 - Computer Networks

### Selectives

Choose three.

- CS 30700 - Software Engineering I
- CS 33400 - Fundamentals Of Computer Graphics
- CS 35100 - Cloud Computing
- CS 35300 - Principles Of Concurrency And Parallelism
- CS 38100 - Introduction To The Analysis Of Algorithms
- CS 42600 - Computer Security
- CS 44800 - Introduction To Relational Database Systems
- CS 45600 - Programming Languages
- CS 48900 - Embedded Systems
- CS 49000 - Topics In Computer Sciences For Undergraduates
- DSO Distributed Systems
- Senior Project

## Concentration Notes

- The track has three electives, chosen from the list provided. In addition to elective courses listed, other courses, including project and independent study courses, will be approved as electives, provided the course involves systems programming (as opposed to web page scripting, or other high-level application programming). Faculty strongly recommend that students include a senior project as one of the electives.
- The Software Engineering Senior Project cannot be used as the Systems research project unless track chair approval from both track chairs is obtained.
- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.
- No course may be counted for both a required and selective course within the same track.

## Required CS Honors - (12-13 credits)

Need CS GPA of 3.60 or better & cumulative GPA of 3.25 and must have a C or better in all courses

- CS 39700 - Honors Seminar
- CS 49700 - Honors Research Project (may use for Track Elective - see Track chairperson for approval)
- MA 35301 - Linear Algebra II or
- MA 41600 - Probability or
- MA 51800 - Advanced Discrete Mathematics or
- An approved MA course with course number higher than MA 35100 - Elementary Linear Algebra or
- An approved STAT course with course number higher than STAT 51100 - Statistical Methods
- CS 50000 level course (may use for Track Elective - see Track chairperson for approval) - Credit Hours: 3.00
- Three out of the four following courses: CS 35400, CS 35200, CS 38100, ECE 27000. CS 35400, CS 35200, and CS 38100 may be used to meet track requirements if the courses are required or electives for the student's track.

## Other Departmental/Program Course Requirements (32-55 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

#### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

#### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here** (ADD LINK IN ACALOG). (satisfies OC for core)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

\*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.

International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

## Computing

*Met with required major coursework.*

## Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

## General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core)*

- MA 16100 - Plane Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)  
or
- MA 16500 - Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society<sup>^\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦

## Team-Building and Collaboration

*Met with required major coursework.*

## Electives (2-30 credits)

Enrollment in freshman seminar course CS 19300 is required with CS 18000. This is not a degree requirement. CS 19700 - Freshman Honors Seminar, CS 29100 - Sophomore Development Seminar, and CS 39100 are optional but recommended.

## Grade Requirements

- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.

## GPA Requirements

- 3.6 CS GPA and 3.25 cumulative GPA is required for graduation with the CS Honors degree.

## Course Requirements & Notes

- Enrollment in freshman seminar course CS 19300 is required with CS 18000. This is not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.



- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

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College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
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- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

### Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

# Sample 4-Year Plan

## Fall 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \*\*\*
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00-4.00 (English Composition suggested.)
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00 (CS 19300 suggested.)

## 15-17 Credits

## Spring 1st Year

- CS 18200 - Foundations Of Computer Science \*\*\* ♦
- CS 24000 - Programming In C \*\*\* ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00
- Electives - Credit Hours: 1.00 (Recommended CS 19700 )
- Electives - Credit Hours: 1.00

## 15-17 Credits

## Fall 2nd Year

- CS 25000 - Computer Architecture \*\*\*
- CS 25100 - Data Structures And Algorithms \*\*\*
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 1.00 (Recommended CS 29100)

## 15-17 Credits

## Spring 2nd Year

- CS 25200 - Systems Programming \*\*\*
- MA 35100 - Elementary Linear Algebra ♦
- Science Core Selection - Credit Hours: 3.00 - 4.00 (COM 21700 suggested.)
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 16-17 Credits

## Fall 3rd Year

- MA 35301 - Linear Algebra II \*\*\* or
- MA 41600 - Probability \*\*\* or
- MA 51800 - Advanced Discrete Mathematics \*\*\* or
- An approved MA course with a course number higher than MA 35100 - Elementary Linear Algebra \*\*\* or
- An approved MA course with a course number higher than STAT 51100\*\*\*
- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods
- Systems Software Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 35200 )
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (Recommended CS 39100)
- Elective - Credit Hours: 3.00

## 16-17 Credits

## Spring 3rd Year

- Systems Software Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 35400)
- Systems Software Concentration course - Credit Hours: 3.00 \*\*\*
- Great Issues In Science - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-16 Credits

## Fall 4th Year

- CS 39700 - Honors Seminar
- Systems Software Concentration course - Credit Hours: 3.00 \*\*\* (Suggested CS 38100)
- Systems Software Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

## Spring 4th Year

- CS 49700 - Honors Research Project
- Systems Software Concentration course - Credit Hours: 3.00 \*\*\*
- CS 50000 level - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15-17 Credits

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Computer Science: Algorithmic Foundations, BS

### About the Program

Purdue Computer Science is one of the country's top-ranked programs. Faculty members are shaping the future of information technology through cutting-edge research. Students can take courses that include such topics as graphics and animation, web programming, competitive programming, cryptography and security, networks, software engineering, distributed systems, information systems, artificial intelligence, and bioinformatics.

The flexible curriculum offers students the opportunity to be involved in a dynamic discipline that will continue to grow and to contribute significantly to progress in many other disciplines and ultimately to changes in human society that are nothing short of profound. Students learn communication skills, teamwork, and problem-solving skills and acquire the necessary technical skills for positions in computing throughout society.

[Computer Science Website](#)

[Computer Science Major Change \(CODO\) Requirements](#)

Computer Science students begin by taking six core courses that teach them the fundamentals of computer science. Students then take coursework in a concentration, which allows them to deepen their understanding in a specific area, like Algorithmic Foundations.

### About the Program

Purdue Computer Science is one of the country's top-ranked programs. Faculty members are shaping the future of information technology through cutting-edge research. Students can take courses that include such topics as graphics and animation, web programming, competitive programming, cryptography and security, networks, software engineering, distributed systems, information systems, artificial intelligence, and bioinformatics.

The flexible curriculum offers students the opportunity to be involved in a dynamic discipline that will continue to grow and to contribute significantly to progress in many other disciplines and ultimately to changes in human society that are nothing short of profound. Students learn communication skills, teamwork, and problem-solving skills and acquire the necessary technical skills for positions in computing throughout society.

Computer Science Website

Computer Science Major Change (CODO) Requirements

Computer Science students begin by taking six core courses that teach them the fundamentals of computer science. Students then take coursework in a concentration, which allows them to deepen their understanding in a specific area, like Algorithmic Foundations.

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the preceding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

#### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## Computer Science Major Courses (46-50 credits)

### Required CS Major Math Courses (7-8 credits)

Must have C or better to meet prerequisite for certain upper level CS courses

- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- MA 26500 - Linear Algebra or
- MA 35100 - Elementary Linear Algebra

### Required CS Major Core Courses (21 credits)

Must have C or better in all courses.

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ (satisfies Computing and Teambuilding requirements for College of Science core)
- CS 18200 - Foundations Of Computer Science ♦
- CS 24000 - Programming In C ♦
- CS 25000 - Computer Architecture
- CS 25100 - Data Structures And Algorithms
- CS 25200 - Systems Programming

### Algorithmic Foundations Concentration (18 credits)

#### Required Courses

- CS 38100 - Introduction To The Analysis Of Algorithms
- CS 35200 - Compilers: Principles And Practice or

- CS 35400 - Operating Systems
- CS 37300 - Data Mining And Machine Learning or
- CS 47100 - Introduction to Artificial Intelligence

## Selectives

Choose three.

- CS 31400 - Numerical Methods
- CS 33400 - Fundamentals Of Computer Graphics
- CS 35300 - Principles Of Concurrency And Parallelism
- CS 35500 - Introduction To Cryptography
- CS 44800 - Introduction To Relational Database Systems
- CS 45600 - Programming Languages
- CS 48300 - Introduction To The Theory Of Computation
- MA 34100 - Foundations Of Analysis or
- MA 35301 - Linear Algebra II or
- MA 36200 - Topics In Vector Calculus or
- MA 36600 - Ordinary Differential Equations or
- MA 38500 - Introduction To Logic or
- MA 42100 - Linear Programming And Optimization Techniques or
- MA 45300 - Elements Of Algebra I or
- One three-credit computer science course at the 300, 400, 500 level\* or an independent study course approved by the track chair.

## Concentration Notes

- \*Foundations Electives exclude programming language classes CS 38001, CS 38002 and CS 38003, as well as CS 39100 and CS 39700. The use of any Variable Title course must be approved by the faculty.
- Use of 300, 400, and 500 level CS courses outside of track or an independent study course to count as a track elective requires track chair approval.
- Non-CS courses and graduate level courses may have additional prerequisites that must be met in order to be eligible to take the course.
- No more than one Math course may be counted toward the Electives.
- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.
- No course can be counted both for a required and elective course within the same track.

## Other Departmental/Program Course Requirements (32-54 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

#### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

### Technical Writing And Presentation\* (0 or 3 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here** (ADD LINK IN ACALOG). (satisfies OC for core)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

\*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.

International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

### Computing

*Met with required major coursework.*

### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

### Great Issues In Science (3 credits)

Choose one from this list.

### Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II



## Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core)*

- MA 16100 - Plane Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)  
or
- MA 16500 - Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society<sup>^\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦

## Team-Building and Collaboration

*Met with required major coursework.*

## Electives (16-42 credits)

*CS 19300 - Tools is a required freshman seminar course; corequisite with CS 18000. This not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.*

## Grade Requirements

- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.

## GPA Requirements

- 2.0 Major and Graduation GPA required for Bachelor of Science degree.

## Course Requirements & Notes

- Enrollment in freshman seminar course CS 19300 is required with CS 18000. This is not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
  - The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
  - Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
  - Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
  - The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade.
- University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
  - Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

**The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the Civics Literacy Proficiency website.**

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \*\*\*
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00-4.00 (English Composition suggested.)
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00 (CS 19300 suggested.)

### 15-17 Credits

### Spring 1st Year

- CS 18200 - Foundations Of Computer Science ♦ \*\*\*
- CS 24000 - Programming In C ♦ \*\*\*
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 1.00 - 3.00

### 14-18 Credits

### Fall 2nd Year

- CS 25000 - Computer Architecture \*\*\*
- CS 25100 - Data Structures And Algorithms \*\*\*
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00-3.00(CS 29100 recommended)

### 15-18 Credits

### Spring 2nd Year

- CS 25200 - Systems Programming \*\*\*
- MA 26500 - Linear Algebra or

- MA 35100 - Elementary Linear Algebra
- Science Core Selection - Credit Hours: 3.00 - 4.00 (COM 21700 suggested.)
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 16-17 Credits

### Fall 3rd Year

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦
- Algorithmic Foundations Concentration course - Credit Hours: 3.00 \*\*\*
- Algorithmic Foundations Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (CS 39100 recommended)
- Elective - Credit Hours: 3.00

## 16-17 Credits

### Spring 3rd Year

- Algorithmic Foundations Concentration course - Credit Hours: 3.00 \*\*\*
- Algorithmic Foundations Concentration course - Credit Hours: 3.00 \*\*\*
- Great Issues In Science Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

### Fall 4th Year

- Algorithmic Foundations Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00

## 16-18 Credits

### Spring 4th Year

- Algorithmic Foundations Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## **Computer Science: Computational Science And Engineering, BS**

### **About the Program**

Purdue Computer Science is one of the country's top-ranked programs. Faculty members are shaping the future of information technology through cutting-edge research. Students can take courses that include such topics as graphics and animation, web programming, competitive programming, cryptography and security, networks, software engineering, distributed systems, information systems, artificial intelligence, and bioinformatics.

The flexible curriculum offers students the opportunity to be involved in a dynamic discipline that will continue to grow and to contribute significantly to progress in many other disciplines and ultimately to changes in human society that are nothing short of profound. Students learn communication skills, teamwork, and problem-solving skills and acquire the necessary technical skills for positions in computing throughout society.

[Computer Science Website](#)

[Computer Science Major Change \(CODO\) Requirements](#)

Computer Science students begin by taking six core courses that teach them the fundamentals of computer science. Students then take coursework in a concentration, which allows them to deepen their understanding in a specific area.

This concentration is intended to introduce computer science basics in Computational Science and Engineering (CS&E). Students not intending to pursue an advanced degree are advised to choose Option 1 for electives and to take courses in some area of pure or applied science with the objective of learning how to develop software useful for the chosen area. Students intending to pursue an advanced degree are advised to choose Option 2 for electives and also to take the following courses: Physics lab science courses; MA 35100 rather than MA 26500, MA 36200 or MA 44200; MA 36600 rather than MA 26600, MA 34100, or MA 44000.

## About the Program

Purdue Computer Science is one of the country's top-ranked programs. Faculty members are shaping the future of information technology through cutting-edge research. Students can take courses that include such topics as graphics and animation, web programming, competitive programming, cryptography and security, networks, software engineering, distributed systems, information systems, artificial intelligence, and bioinformatics.

The flexible curriculum offers students the opportunity to be involved in a dynamic discipline that will continue to grow and to contribute significantly to progress in many other disciplines and ultimately to changes in human society that are nothing short of profound. Students learn communication skills, teamwork, and problem-solving skills and acquire the necessary technical skills for positions in computing throughout society.

Computer Science Website

Computer Science Major Change (CODO) Requirements

Computer Science students begin by taking six core courses that teach them the fundamentals of computer science. Students then take coursework in a concentration, which allows them to deepen their understanding in a specific area. This concentration is intended to introduce computer science basics in Computational Science and Engineering (CS&E). Students not intending to pursue an advanced degree are advised to choose Option 1 for electives and to take courses in some area of pure or applied science with the objective of learning how to develop software useful for the chosen area. Students intending to pursue an advanced degree are advised to choose Option 2 for electives and also to take the following courses: Physics lab science courses; MA 35100 rather than MA 26500, MA 36200 or MA 44200; MA 36600 rather than MA 26600, MA 34100, or MA 44000.

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## **Computer Science Major Courses (46-50 credits)**

### **Required CS Major Math Courses (7-8 credits)**

Must have C or better to meet prerequisite for certain upper level CS courses

- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- MA 26500 - Linear Algebra or
- MA 35100 - Elementary Linear Algebra

### **Required CS Major Core Courses (21 credits)**

Must have C or better in all courses.

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ (satisfies Computing and Teambuilding requirements for College of Science core)

- CS 18200 - Foundations Of Computer Science ♦
- CS 24000 - Programming In C ♦
- CS 25000 - Computer Architecture
- CS 25100 - Data Structures And Algorithms
- CS 25200 - Systems Programming

## Computational Science and Engineering Concentration (21 credits)

### Required Courses

- CS 31400 - Numerical Methods
- CS 38100 - Introduction To The Analysis Of Algorithms
- MA 26600 - Ordinary Differential Equations or
- MA 36600 - Ordinary Differential Equations

### Applications - Choose one.

- CS 37300 - Data Mining And Machine Learning
- CS 47300 - Web Information Search And Management
- CS 47800 - Introduction to Bioinformatics
- ECE 30100 - Signals And Systems
- IE 33600 - Operations Research - Stochastic Models

### Systems - Choose one.

- CS 35200 - Compilers: Principles And Practice
- CS 35300 - Principles Of Concurrency And Parallelism
- CS 35400 - Operating Systems

### Selectives

Choose 2 courses.

- CS 30700 - Software Engineering I
- CS 42200 - Computer Networks
- CS 45600 - Programming Languages
- CS 47100 - Introduction to Artificial Intelligence
- CS 48300 - Introduction To The Theory Of Computation
- CS 51400 - Numerical Analysis
- CS 51500 - Numerical Linear Algebra
- CS 52000 - Computational Methods In Optimization
- CS 52500 - Parallel Computing
- IE 33500 - Operations Research - Optimization
- MA 34100 - Foundations Of Analysis
- MA 44000 - Honors Real Analysis I

## Other Departmental/Program Course Requirements (32-54 credits)



# COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

## Composition & Presentation

### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

### Technical Writing And Presentation\* (0 or 3 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here** (ADD LINK IN ACALOG). (satisfies OC for core)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

\*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.

International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

## Computing

*Met with required major coursework.*

### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

### Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core)*

- MA 16100 - Plane Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- or
- MA 16500 - Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society<sup>^\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦

## Team-Building and Collaboration

*Met with required major coursework.*

## Electives (16-42 credits)

*CS 19300 - Tools is a required freshman seminar course; corequisites with CS 18000. This is not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.*

## Grade Requirements

- \*\*\*All CS core courses and all track requirements, regardless of department, must be completed with a grade of "C" or higher.
- All prerequisites to CS core courses and track requirements, regardless of department, must be completed with a grade of C or higher.
- All track requirements, regardless of department, must be completed with a grade of C or higher.
- Minimum grade requirements for prerequisites is C unless alternative minimum grade requirement is listed.

## GPA Requirements

- 2.0 Major and Graduation GPA required for Bachelor of Science degree.

## Course Requirements & Notes

- Enrollment in freshman seminar courses CS 19100 and CS 19300 is required with CS 18000. They are not degree requirements. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.
- At least four (4) of the seven (7) courses for Computation Science and Engineering concentration must be CS courses.
- Any course beyond the one required class from the list of Applications/Systems courses may count as electives.
- Non-CS courses and graduate level courses may have additional prerequisites that must be met in order to be eligible to take the course.
- No course can be counted both for a required and selective course within the same track.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)

- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the Civics Literacy Proficiency website.

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \*\*\*
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00-4.00 (English Composition suggested.)
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00 (CS 19300 suggested.)

### 15-17 Credits

### Spring 1st Year

- CS 18200 - Foundations Of Computer Science ♦ \*\*\*
- CS 24000 - Programming In C ♦ \*\*\*
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00
- Electives - Credit Hours: 1.00 - 3.00

## 14-18 Credits

### Fall 2nd Year

- CS 25000 - Computer Architecture \*\*\*
- CS 25100 - Data Structures And Algorithms \*\*\*
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (CS 29100 recommended)

## 15-17 Credits

### Spring 2nd Year

- CS 25200 - Systems Programming \*\*\*
- MA 26500 - Linear Algebra or
- MA 35100 - Elementary Linear Algebra
- Science Core Selection - Credit Hours: 3.00 - 4.00 (COM 21700 suggested.)
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 16-17 Credits

### Fall 3rd Year

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦
- Computational Science and Engineering Concentration course - Credit Hours: 3.00 \*\*\*
- Computational Science and Engineering Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (CS 39100 recommended)
- Elective - Credit Hours: 3.00

## 16-17 Credits

### Spring 3rd Year

- Computational Science and Engineering Concentration course - Credit Hours: 3.00 \*\*\*
- Computational Science and Engineering Concentration course - Credit Hours: 3.00 \*\*\*
- Great Issues In Science Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

## Fall 4th Year

- Computational Science and Engineering Concentration course - Credit Hours: 3.00 \*\*\*
- Computational Science and Engineering Concentration course - Credit Hours: 3.00 \*\*\*
  
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00

## 16-18 Credits

## Spring 4th Year

- Computational Science and Engineering Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

# Computer Science: Computer Graphics and Visualization, BS

## About the Program

Purdue Computer Science is one of the country's top-ranked programs. Faculty members are shaping the future of information technology through cutting-edge research. Students can take courses that include such topics as graphics and animation, web programming, competitive programming, cryptography and security, networks, software engineering, distributed systems, information systems, artificial intelligence, and bioinformatics.

The flexible curriculum offers students the opportunity to be involved in a dynamic discipline that will continue to grow and to contribute significantly to progress in many other disciplines and ultimately to changes in human society that are nothing short of profound. Students learn communication skills, teamwork, and problem-solving skills and acquire the necessary technical skills for positions in computing throughout society.

Computer Science Website

Computer Science Major Change (CODO) Requirements

Computer Science students begin by taking six core courses that teach them the fundamentals of computer science. Students then take coursework in a concentration, which allows them to deepen their understanding in a specific area. The Computer Graphics and Visualization concentration is designed to prepare students for work and/or for graduate school in computer graphics, visualization, and related areas. Computer graphics refers to modeling (including 3D acquisition) and rendering 3D objects and scenes. Visualization refers to using imagery to convey digital information and facilitate its interpretation and analysis. Jobs and activities for students graduating from this track may include:

Graphics-related Industry jobs (e.g., Intel, NVIDIA, Microsoft, Adobe, IBM, Google) - working on graphics software, hardware, and applications.

CAD and Architectural Applications - developing CAD/Engineering/Architecture related applications.

Movie Industry (e.g., Pixar, Dreamworks, Disney, Sony) - working on creating movies and related tools.

Gaming Industry (e.g., Electronic Arts, Midway Games, Disney, Sony) - working on game programming and related tools.

Laboratories - working in one of several scientific visualization laboratories (though often a graduate degree is preferred).

Graduate school - continuing studies towards a MS or PhD which opens up other job opportunities including research labs and academic positions.

## About the Program

Purdue Computer Science is one of the country's top-ranked programs. Faculty members are shaping the future of information technology through cutting-edge research. Students can take courses that include such topics as graphics and animation, web programming, competitive programming, cryptography and security, networks, software engineering, distributed systems, information systems, artificial intelligence, and bioinformatics.

The flexible curriculum offers students the opportunity to be involved in a dynamic discipline that will continue to grow and to contribute significantly to progress in many other disciplines and ultimately to changes in human society that are nothing short of profound. Students learn communication skills, teamwork, and problem-solving skills and acquire the necessary technical skills for positions in computing throughout society.

Computer Science Website

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Computer Science students begin by taking six core courses that teach them the fundamentals of computer science. Students then take coursework in a concentration, which allows them to deepen their understanding in a specific area. The Computer Graphics and Visualization concentration is designed to prepare students for work and/or for graduate school in computer graphics, visualization, and related areas. Computer graphics refers to modeling (including 3D acquisition) and rendering 3D objects and scenes. Visualization refers to using imagery to convey digital information and facilitate its interpretation and analysis. Jobs and activities for students graduating from this track may include:

Graphics-related Industry jobs (e.g., Intel, NVIDIA, Microsoft, Adobe, IBM, Google) - working on graphics software, hardware, and applications.

CAD and Architectural Applications - developing CAD/Engineering/Architecture related applications.

Movie Industry (e.g., Pixar, Dreamworks, Disney, Sony) - working on creating movies and related tools.

Gaming Industry (e.g., Electronic Arts, Midway Games, Disney, Sony) - working on game programming and related tools.

Laboratories - working in one of several scientific visualization laboratories (though often a graduate degree is preferred).

Graduate school - continuing studies towards a MS or PhD which opens up other job opportunities including research labs and academic positions.

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete



minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## **Computer Science Major Courses (46-50 credits)**

### **Required CS Major Math Courses (7-8 credits)**

Must have C or better to meet prerequisite for certain upper level CS courses

- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- MA 26500 - Linear Algebra or
- MA 35100 - Elementary Linear Algebra

### **Required CS Major Core Courses (21 credits)**

Must have C or better in all courses.

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ (satisfies Computing and Teambuilding requirements for College of Science core)
- CS 18200 - Foundations Of Computer Science ♦
- CS 24000 - Programming In C ♦
- CS 25000 - Computer Architecture
- CS 25100 - Data Structures And Algorithms
- CS 25200 - Systems Programming

## Computer Graphics and Visualization Concentration (18 credits)

### Required Courses

- CS 31400 - Numerical Methods
- CS 33400 - Fundamentals Of Computer Graphics
- CS 37300 - Data Mining And Machine Learning or
- CS 43400 - Advanced Computer Graphics or
- CS 47100 - Introduction to Artificial Intelligence

### Selectives

Choose 3 courses.

- CS 35200 - Compilers: Principles And Practice
- CS 35400 - Operating Systems
- CS 37300 - Data Mining And Machine Learning
- CS 38100 - Introduction To The Analysis Of Algorithms
- CS 42200 - Computer Networks
- CS 43400 - Advanced Computer Graphics
- CS 45600 - Programming Languages
- CS 47100 - Introduction to Artificial Intelligence
- CS 43900 - Introduction To Data Visualization

### Project Option

Electives could include 1 semester of CS 49000 project course with CGVLAB.

This option is very useful to undergraduate students involved in research, and such is beneficial to both job-seeking and graduate school-seeking students.

### Track Notes

- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.
- No course can be counted both for a required and selective course within the same track.
- Electives could include one semester of CS 49000 project with CGVLAB with Track Chair approval.

## Other Departmental/Program Course Requirements (32-54 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

## Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

## Technical Writing And Presentation\* (0 or 3 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here** (ADD LINK IN ACALOG). (satisfies OC for core)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

\*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.

International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

## Computing

*Met with required major coursework.*

## Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

## General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I

- Laboratory Science Option II

## Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core)*

- MA 16100 - Plane Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)  
or
- MA 16500 - Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society<sup>^\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦

## Team-Building and Collaboration

*Met with required major coursework.*

## Electives (16-42 credits)

*CS 19100 - Freshman Resources Seminar CS 19300 - Tools is a required freshman seminar course; corequisite with CS 18000. This not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.*

## Grade Requirements

- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.

## GPA Requirements

- 2.0 Major and Graduation GPA required for Bachelor of Science degree.

## Course Requirements & Notes

- Enrollment in freshman seminar course CS 19300 is required with CS 18000 . This is not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
  - The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
  - Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
  - Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
  - The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade.
- University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
  - Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

**The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the Civics Literacy Proficiency website.**

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \*\*\*
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00-4.00 (English Composition suggested.)
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00 (CS 19300 suggested.)

### 15-17 Credits

### Spring 1st Year

- CS 18200 - Foundations Of Computer Science ♦ \*\*\*
- CS 24000 - Programming In C ♦ \*\*\*
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00
- Electives - Credit Hours: 1.00 - 3.00

### 14-18 Credits

### Fall 2nd Year

- CS 25000 - Computer Architecture \*\*\*
- CS 25100 - Data Structures And Algorithms \*\*\*
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (CS 29100 recommended)

### 15-17 Credits

### Spring 2nd Year

- CS 25200 - Systems Programming \*\*\*
- MA 26500 - Linear Algebra or

- MA 35100 - Elementary Linear Algebra
- Science Core Selection - Credit Hours: 3.00 - 4.00 (COM 21700 suggested.)
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 16-17 Credits

### Fall 3rd Year

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦
- Computer Graphics and Visualization Concentration course - Credit Hours: 3.00 \*\*\*
- Computer Graphics and Visualization Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (CS 39100 recommended)
- Elective - Credit Hours: 3.00

## 16-17 Credits

### Spring 3rd Year

- Computer Graphics and Visualization Concentration course - Credit Hours: 3.00 \*\*\*
- Computer Graphics and Visualization Concentration course - Credit Hours: 3.00 \*\*\*
- Great Issues In Science Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

### Fall 4th Year

- Computer Graphics and Visualization Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00

## 16-18 Credits

### Spring 4th Year

- Computer Graphics and Visualization Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

15-17 Credits

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Computer Science: Database and Information Systems, BS

### About the Program

Purdue Computer Science is one of the country's top-ranked programs. Faculty members are shaping the future of information technology through cutting-edge research. Students can take courses that include such topics as graphics and animation, web programming, competitive programming, cryptography and security, networks, software engineering, distributed systems, information systems, artificial intelligence, and bioinformatics.

The flexible curriculum offers students the opportunity to be involved in a dynamic discipline that will continue to grow and to contribute significantly to progress in many other disciplines and ultimately to changes in human society that are nothing short of profound. Students learn communication skills, teamwork, and problem-solving skills and acquire the necessary technical skills for positions in computing throughout society.

Computer Science Website

Computer Science Major Change (CODO) Requirements

Computer Science students begin by taking six core courses that teach them the fundamentals of computer science. Students then take coursework in a concentration, which allows them to deepen their understanding in a specific area. Database and Information Systems is designed to prepare students to become computer scientists who understand and



can apply the principles and techniques of database design, algorithms for information retrieval, their strengths and limitations, and tools for the design of databases and information systems.

## About the Program

Purdue Computer Science is one of the country's top-ranked programs. Faculty members are shaping the future of information technology through cutting-edge research. Students can take courses that include such topics as graphics and animation, web programming, competitive programming, cryptography and security, networks, software engineering, distributed systems, information systems, artificial intelligence, and bioinformatics.

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Computer Science Website

Computer Science Major Change (CODO) Requirements

Computer Science students begin by taking six core courses that teach them the fundamentals of computer science. Students then take coursework in a concentration, which allows them to deepen their understanding in a specific area. Database and Information Systems is designed to prepare students to become computer scientists who understand and can apply the principles and techniques of database design, algorithms for information retrieval, their strengths and limitations, and tools for the design of databases and information systems.

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete

minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## **Computer Science Major Courses (46-50 credits)**

### **Required CS Major Math Courses (7-8 credits)**

Must have C or better to meet prerequisite for certain upper level CS courses

- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- MA 26500 - Linear Algebra or
- MA 35100 - Elementary Linear Algebra

### **Required CS Major Core Courses (21 credits)**

Must have C or better in all courses.

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ (satisfies Computing and Teambuilding requirements for College of Science core)
- CS 18200 - Foundations Of Computer Science ♦
- CS 24000 - Programming In C ♦
- CS 25000 - Computer Architecture
- CS 25100 - Data Structures And Algorithms
- CS 25200 - Systems Programming

## Database and Information Systems Concentration (21 credits)

### Required Courses

- CS 34800 - Information Systems
- CS 38100 - Introduction To The Analysis Of Algorithms
- CS 44800 - Introduction To Relational Database Systems
- CS 37300 - Data Mining And Machine Learning or
- CS 47300 - Web Information Search And Management

### Selectives

Choose one course from each of the following three categories.

#### Category I - Computing Systems

- CS 35200 - Compilers: Principles And Practice
- CS 35300 - Principles Of Concurrency And Parallelism
- CS 35400 - Operating Systems

#### Category II - Information Assurance

- CS 35500 - Introduction To Cryptography
- CS 42600 - Computer Security

#### Category III - Related Studies

- CS 37300 - Data Mining And Machine Learning
  - CS 42200 - Computer Networks
  - CS 47100 - Introduction to Artificial Intelligence
  - CS 47300 - Web Information Search And Management
  - CS 47800 - Introduction to Bioinformatics
  - CS 48300 - Introduction To The Theory Of Computation
- Senior Project Option:
- CS 49000 - Topics In Computer Sciences For Undergraduates - (Senior Project)  
or
  - CS 49700 - Honors Research Project  
or
  - EPCS 41100 - Senior Design Participation In EPICS and
  - EPCS 41200 - Senior Design Participation In EPICS - (Senior Project)

## Other Departmental/Program Course Requirements (32-54 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

## Composition & Presentation

### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here** (ADD LINK IN ACALOG). (satisfies OC for core)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

\*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.

International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

## Computing

*Met with required major coursework.*

### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

### Great Issues In Science (3 credits)

Choose one from this list.

### Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core)*

- MA 16100 - Plane Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- or
- MA 16500 - Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society<sup>^\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦

## Team-Building and Collaboration

*Met with required major coursework.*

## Electives (16-42 credits)

*CS 19300 - Tools is a required freshman seminar course; corequisites with CS 18000. This is not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.*

## Grade Requirements

- All track requirements, regardless of department, must be completed with a grade of C or higher.
- Minimum grade requirements for prerequisites is C unless alternative minimum grade requirement is listed.
- \*\*\*All CS core courses and all track requirements, regardless of department, must be completed with a grade of "C" or higher.
- All prerequisites to CS core courses and track requirements, regardless of department, must be completed with a grade of C or higher.

## GPA Requirements

- 2.0 Major and Graduation GPA required for Bachelor of Science degree.

## Course Requirements & Notes

- Senior Project (CS 49000/CS 49700) must be taken for at least three credits, be supervised by CS faculty & approved by DBIS track chair.
- No course can be counted both for a required and selective course within the same track.
- Enrollment in freshman seminar courses CS 19100 and CS 19300 is required with CS 18000. They are not degree requirements. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the Civics Literacy Proficiency website.

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \*\*\*
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00-4.00 (English Composition suggested.)
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00 (CS 19300 suggested.)

### 15-17 Credits

### Spring 1st Year

- CS 18200 - Foundations Of Computer Science ♦ \*\*\*
- CS 24000 - Programming In C ♦ \*\*\*
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00
- Electives - Credit Hours: 1.00 - 3.00

### 14-18 Credits

### Fall 2nd Year

- CS 25000 - Computer Architecture \*\*\*
- CS 25100 - Data Structures And Algorithms \*\*\*
- MA 26100 - Multivariate Calculus or

- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (CS 29100 recommended)

## 15-17 Credits

### Spring 2nd Year

- CS 25200 - Systems Programming \*\*\*
- MA 26500 - Linear Algebra or
- MA 35100 - Elementary Linear Algebra
- Science Core Selection - Credit Hours: 3.00 - 4.00 (COM 21700 suggested.)
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 16-17 Credits

### Fall 3rd Year

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦
- Database and Information Systems Concentration course - Credit Hours: 3.00 \*\*\*
- Database and Information Systems Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (CS 39100 recommended)
- Elective - Credit Hours: 3.00

## 16-17 Credits

### Spring 3rd Year

- Database and Information Systems Concentration course - Credit Hours: 3.00 \*\*\*
- Database and Information Systems Concentration course - Credit Hours: 3.00 \*\*\*
- Great Issues In Science Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

### Fall 4th Year

- Database and Information Systems Concentration course - Credit Hours: 3.00 \*\*\*
- Database and Information Systems Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00



- Elective - Credit Hours: 1.00

## 16-18 Credits

### Spring 4th Year

- Database and Information Systems Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

### World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

### Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

### Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Computer Science: Machine Intelligence, BS

### About the Program

Purdue Computer Science is one of the country's top-ranked programs. Faculty members are shaping the future of information technology through cutting-edge research. Students can take courses that include such topics as graphics

and animation, web programming, competitive programming, cryptography and security, networks, software engineering, distributed systems, information systems, artificial intelligence, and bioinformatics.

The flexible curriculum offers students the opportunity to be involved in a dynamic discipline that will continue to grow and to contribute significantly to progress in many other disciplines and ultimately to changes in human society that are nothing short of profound. Students learn communication skills, teamwork, and problem-solving skills and acquire the necessary technical skills for positions in computing throughout society.

[Computer Science Website](#)

[Computer Science Major Change \(CODO\) Requirements](#)

Computer Science students begin by taking six core courses that teach them the fundamentals of computer science. Students then take coursework in a concentration, which allows them to deepen their understanding in a specific area. Machine Intelligence is designed to prepare students to work in fields related to management and analysis of data, including areas such as machine learning, information retrieval, and data mining. The track is designed to prepare students to understand, and effectively apply in practice, the principles and techniques of data and knowledge representation, search, as well as learning and reasoning with data.

## About the Program

Purdue Computer Science is one of the country's top-ranked programs. Faculty members are shaping the future of information technology through cutting-edge research. Students can take courses that include such topics as graphics and animation, web programming, competitive programming, cryptography and security, networks, software engineering, distributed systems, information systems, artificial intelligence, and bioinformatics.

The flexible curriculum offers students the opportunity to be involved in a dynamic discipline that will continue to grow and to contribute significantly to progress in many other disciplines and ultimately to changes in human society that are nothing short of profound. Students learn communication skills, teamwork, and problem-solving skills and acquire the necessary technical skills for positions in computing throughout society.

[Computer Science Website](#)

[Computer Science Major Change \(CODO\) Requirements](#)

Computer Science students begin by taking six core courses that teach them the fundamentals of computer science. Students then take coursework in a concentration, which allows them to deepen their understanding in a specific area. Machine Intelligence is designed to prepare students to work in fields related to management and analysis of data, including areas such as machine learning, information retrieval, and data mining. The track is designed to prepare students to understand, and effectively apply in practice, the principles and techniques of data and knowledge representation, search, as well as learning and reasoning with data.

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experiencing**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## **Computer Science Major Courses (46-50 credits)**

### **Required CS Major Math Courses (7-8 credits)**

Must have C or better to meet prerequisite for certain upper level CS courses

- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- MA 26500 - Linear Algebra or

- MA 35100 - Elementary Linear Algebra

## Required CS Major Core Courses (21 credits)

Must have C or better in all courses.

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ (satisfies Computing and Teambuilding requirements for College of Science core)
- CS 18200 - Foundations Of Computer Science ♦
- CS 24000 - Programming In C ♦
- CS 25000 - Computer Architecture
- CS 25100 - Data Structures And Algorithms
- CS 25200 - Systems Programming

## Machine Intelligence Concentration (18 credits)

### Required Courses

- CS 37300 - Data Mining And Machine Learning
- CS 38100 - Introduction To The Analysis Of Algorithms
- CS 47100 - Introduction to Artificial Intelligence or
- CS 47300 - Web Information Search And Management
- MA 41600 - Probability or
- STAT 41600 - Probability or
- STAT 51200 - Applied Regression Analysis

### Selectives

Choose 2 courses.

- CS 31400 - Numerical Methods
- CS 34800 - Information Systems
- CS 35200 - Compilers: Principles And Practice
- CS 43900 - Introduction To Data Visualization
- CS 44000 - Large Scale Data Analytics
- CS 44800 - Introduction To Relational Database Systems
- CS 45600 - Programming Languages
- CS 47100 - Introduction to Artificial Intelligence
- CS 47300 - Web Information Search And Management
- CS 47500 - Human-Computer Interaction
- CS 48300 - Introduction To The Theory Of Computation
- CS 57700 - Natural Language Processing
- CS 57800 - Statistical Machine Learning

## Other Departmental/Program Course Requirements (32-54 credits)

## COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

## Composition & Presentation

### First-Year Composition (3-4 credits)

Choose one course from this list. (satisfies Written Communication and Information Literacy for core)

### Technical Writing And Presentation\* (0-6 credits)

Choose one or two from this list; COM 21700 is strongly recommended to satisfy Oral Communication for core.

## Computing

*Met with required major coursework.*

### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

### Great Issues In Science (3 credits)

Choose one from this list.

### Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

### Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core)*

- MA 16100 - Plane Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- or
- MA 16500 - Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Multidisciplinary Experience<sup>^\*</sup> (0-3 credits)

Choose one from this list (select courses COULD satisfy Science, Technology, Society for core).

## Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦

## Team-Building and Collaboration

*Met with required major coursework.*

## Electives (16-42 credits)

*CS 19300 - Tools is a required freshman seminar course; corequisites with CS 18000. This is not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.*

## Grade Requirements

- All track requirements, regardless of department, must be completed with a grade of C or higher.
- Minimum grade requirements for prerequisites is C unless alternative minimum grade requirement is listed.
- \*\*\*All CS core courses and all track requirements, regardless of department, must be completed with a grade of "C" or higher.
- All prerequisites to CS core courses and track requirements, regardless of department, must be completed with a grade of C or higher.

## GPA Requirements

- 2.0 Major and Graduation GPA required for Bachelor of Science degree.

## Course Requirements & Notes

- Non-CS courses and graduate level courses may have additional prerequisites that must be met in order to be eligible to take the course.
- No course can be counted both for a required and selective course within the same track.
- Enrollment in freshman seminar courses CS 19100 and CS 19300 is required with CS 18000. They are not degree requirements. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
  - The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
  - Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
  - Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
  - The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade.
- University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
  - Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or

- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \*\*\*
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00-4.00 (English Composition suggested.)
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00 (CS 19300 suggested.)

### 15-17 Credits

### Spring 1st Year

- CS 18200 - Foundations Of Computer Science ♦ \*\*\*
- CS 24000 - Programming In C ♦ \*\*\*
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00
- Electives - Credit Hours: 1.00 - 3.00

### 14-18 Credits

### Fall 2nd Year

- CS 25000 - Computer Architecture \*\*\*
- CS 25100 - Data Structures And Algorithms \*\*\*
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (CS 29100 recommended)

### 15-17 Credits

### Spring 2nd Year



- CS 25200 - Systems Programming \*\*\*
- MA 26500 - Linear Algebra or
- MA 35100 - Elementary Linear Algebra
- Science Core Selection - Credit Hours: 3.00 - 4.00 (COM 21700 suggested.)
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 16-17 Credits

### Fall 3rd Year

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦
- Machine Intelligence Concentration course- Credit Hours: 3.00 \*\*\*
- Machine Intelligence Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (CS 39100 recommended)
- Elective - Credit Hours: 3.00

## 16-17 Credits

### Spring 3rd Year

- Machine Intelligence Concentration course - Credit Hours: 3.00 \*\*\*
- Machine Intelligence Concentration course - Credit Hours: 3.00 \*\*\*
- Great Issues In Science Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

### Fall 4th Year

- Machine Intelligence Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00

## 16-18 Credits

### Spring 4th Year

- Machine Intelligence Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00

- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Computer Science: Programming Language, BS

### About the Program

Purdue Computer Science is one of the country's top-ranked programs. Faculty members are shaping the future of information technology through cutting-edge research. Students can take courses that include such topics as graphics and animation, web programming, competitive programming, cryptography and security, networks, software engineering, distributed systems, information systems, artificial intelligence, and bioinformatics.

The flexible curriculum offers students the opportunity to be involved in a dynamic discipline that will continue to grow and to contribute significantly to progress in many other disciplines and ultimately to changes in human society that are nothing short of profound. Students learn communication skills, teamwork, and problem-solving skills and acquire the necessary technical skills for positions in computing throughout society.

[Computer Science Website](#)

[Computer Science Major Change \(CODO\) Requirements](#)

Computer Science students begin by taking six core courses that teach them the fundamentals of computer science. Students then take coursework in a concentration, which allows them to deepen their understanding in a specific area. This track is designed to prepare students to work in fields related to program understanding, manipulation and transformation. This includes run-time system engineering as well as domain specific techniques (e.g., real-time computing or web programming). They will acquire tools and techniques needed to specify and implement language-based solutions.

## About the Program

Purdue Computer Science is one of the country's top-ranked programs. Faculty members are shaping the future of information technology through cutting-edge research. Students can take courses that include such topics as graphics and animation, web programming, competitive programming, cryptography and security, networks, software engineering, distributed systems, information systems, artificial intelligence, and bioinformatics.

The flexible curriculum offers students the opportunity to be involved in a dynamic discipline that will continue to grow and to contribute significantly to progress in many other disciplines and ultimately to changes in human society that are nothing short of profound. Students learn communication skills, teamwork, and problem-solving skills and acquire the necessary technical skills for positions in computing throughout society.

[Computer Science Website](#)

[Computer Science Major Change \(CODO\) Requirements](#)

Computer Science students begin by taking six core courses that teach them the fundamentals of computer science. Students then take coursework in a concentration, which allows them to deepen their understanding in a specific area. This track is designed to prepare students to work in fields related to program understanding, manipulation and transformation. This includes run-time system engineering as well as domain specific techniques (e.g., real-time computing or web programming). They will acquire tools and techniques needed to specify and implement language-based solutions.

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## **Computer Science Major Courses (46-50 credits)**

### **Required CS Major Math Courses (7-8 credits)**

Must have C or better to meet prerequisite for certain upper level CS courses

- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- MA 26500 - Linear Algebra or
- MA 35100 - Elementary Linear Algebra

### **Required CS Major Core Courses (21 credits)**

Must have C or better in all courses.

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ (satisfies Computing and Teambuilding requirements for College of Science core)

- CS 18200 - Foundations Of Computer Science ♦
- CS 24000 - Programming In C ♦
- CS 25000 - Computer Architecture
- CS 25100 - Data Structures And Algorithms
- CS 25200 - Systems Programming

## Programming Language Concentration (18 credits)

### Required Courses

- CS 35200 - Compilers: Principles And Practice
- CS 35400 - Operating Systems
- CS 45600 - Programming Languages

### Selectives

Choose 3 courses.

- CS 30700 - Software Engineering I or
- CS 40800 - Software Testing
- CS 34800 - Information Systems or
- CS 44800 - Introduction To Relational Database Systems
- CS 35300 - Principles Of Concurrency And Parallelism
- CS 38100 - Introduction To The Analysis Of Algorithms
- CS 42600 - Computer Security
- CS 48300 - Introduction To The Theory Of Computation
- CS 56000 - Reasoning About Programs
- MA 38500 - Introduction To Logic or
- MA 45300 - Elements Of Algebra I

## Other Departmental/Program Course Requirements (32-54 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

#### First-Year Composition (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

#### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here** (ADD LINK IN ACALOG). (satisfies OC for core)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

\*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.

International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

## Computing

*Met with required major coursework.*

## Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

## General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core)*

- MA 16100 - Plane Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- or
- MA 16500 - Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
  - MA 16200 - Plane Analytic Geometry And Calculus II or
  - MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society<sup>^\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦

## Team-Building and Collaboration

*Met with required major coursework.*

## Electives (16-42 credits)

*CS 19300 - Tools is a required freshman seminar course; corequisites with CS 18000. This is not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.*

## Grade Requirements

- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.
- All track requirements, regardless of department, must be completed with a grade of C or higher.
- Minimum grade requirements for prerequisites is C unless alternative minimum grade requirement is listed.

## GPA Requirements

- 2.0 Major and Graduation GPA required for Bachelor of Science degree.

## Course Requirements & Notes

- Enrollment in freshman seminar course CS 19300 is required with CS 18000. This is not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.

- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
  - Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
  - Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
  - The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade.
- University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
  - Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

**The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the Civics Literacy Proficiency website.**

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

### Upper Level Requirement



- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \*\*\*
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00-4.00 (English Composition suggested.)
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00 (CS 19300 suggested.)

### 15-17 Credits

### Spring 1st Year

- CS 18200 - Foundations Of Computer Science ♦ \*\*\*
- CS 24000 - Programming In C ♦ \*\*\*
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00
- Electives - Credit Hours: 1.00 - 3.00

### 14-18 Credits

### Fall 2nd Year

- CS 25000 - Computer Architecture \*\*\*
- CS 25100 - Data Structures And Algorithms \*\*\*
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (CS 29100 recommended)

### 15-17 Credits

### Spring 2nd Year

- CS 25200 - Systems Programming \*\*\*
- MA 26500 - Linear Algebra or
- MA 35100 - Elementary Linear Algebra
- Science Core Selection - Credit Hours: 3.00 - 4.00 (COM 21700 suggested.)

- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 16-17 Credits

### Fall 3rd Year

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦
- Programming Language Concentration course - Credit Hours: 3.00 \*\*\*
- Programming Language Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (CS 39100 recommended)
- Elective - Credit Hours: 3.00

## 16-17 Credits

### Spring 3rd Year

- Programming Language Concentration course - Credit Hours: 3.00 \*\*\*
- Programming Language Concentration course - Credit Hours: 3.00 \*\*\*
- Great Issues In Science Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

### Fall 4th Year

- Programming Language Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00

## 16-18 Credits

### Spring 4th Year

- Programming Language Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Computer Science: Security, BS

### About the Program

Purdue Computer Science is one of the country's top-ranked programs. Faculty members are shaping the future of information technology through cutting-edge research. Students can take courses that include such topics as graphics and animation, web programming, competitive programming, cryptography and security, networks, software engineering, distributed systems, information systems, artificial intelligence, and bioinformatics.

The flexible curriculum offers students the opportunity to be involved in a dynamic discipline that will continue to grow and to contribute significantly to progress in many other disciplines and ultimately to changes in human society that are nothing short of profound. Students learn communication skills, teamwork, and problem-solving skills and acquire the necessary technical skills for positions in computing throughout society.

Computer Science Website

Computer Science Major Change (CODO) Requirements

Computer Science students begin by taking six core courses that teach them the fundamentals of computer science. Students then take coursework in a concentration, which allows them to deepen their understanding in a specific area. The Security track is designed to prepare students to become computer scientists who:

- understand the importance of and are capable of designing and developing secure software,
- are familiar with the societal impact of insecure software and related infrastructure, and

- are familiar with and can use techniques for testing and assessing systems for secure operation.

## About the Program

Purdue Computer Science is one of the country's top-ranked programs. Faculty members are shaping the future of information technology through cutting-edge research. Students can take courses that include such topics as graphics and animation, web programming, competitive programming, cryptography and security, networks, software engineering, distributed systems, information systems, artificial intelligence, and bioinformatics.

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Computer Science Website

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- understand the importance of and are capable of designing and developing secure software,
- are familiar with the societal impact of insecure software and related infrastructure, and
- are familiar with and can use techniques for testing and assessing systems for secure operation.

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
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Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete

minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## **Computer Science Major Courses (46-50 credits)**

### **Required CS Major Math Courses (7-8 credits)**

Must have C or better to meet prerequisite for certain upper level CS courses

- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- MA 26500 - Linear Algebra or
- MA 35100 - Elementary Linear Algebra

### **Required CS Major Core Courses (21 credits)**

Must have C or better in all courses.

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ (satisfies Computing and Teambuilding requirements for College of Science core)
- CS 18200 - Foundations Of Computer Science ♦
- CS 24000 - Programming In C ♦
- CS 25000 - Computer Architecture
- CS 25100 - Data Structures And Algorithms
- CS 25200 - Systems Programming

## Security Concentration (18 credits)

### Required Courses

- CS 35400 - Operating Systems
- CS 35500 - Introduction To Cryptography
- CS 42600 - Computer Security

### Selectives

Choose 3 courses.

- CS 35200 - Compilers: Principles And Practice
- CS 38100 - Introduction To The Analysis Of Algorithms
- CS 42200 - Computer Networks
- CS 49000 - Topics In Computer Sciences For Undergraduates - SWS Software Security
- CS 30700 - Software Engineering I or
- CS 40800 - Software Testing
- CS 34800 - Information Systems or
- CS 44800 - Introduction To Relational Database Systems or
- CS 47300 - Web Information Search And Management
- CS 35300 - Principles Of Concurrency And Parallelism or
- CS 45600 - Programming Languages
- CS 37300 - Data Mining And Machine Learning or
- CS 47100 - Introduction to Artificial Intelligence
- CS 48900 - Embedded Systems or
- CS 49000 - Topics In Computer Science For Undergraduates - DSO Distributed Systems

## Other Departmental/Program Course Requirements (32-54 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

#### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

#### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here** (ADD LINK IN ACALOG). (satisfies OC for core)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

\*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.

International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

## Computing

*Met with required major coursework.*

## Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

## General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core)*

- MA 16100 - Plane Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)  
or
- MA 16500 - Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Multidisciplinary Experience<sup>^\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦

## Team-Building and Collaboration

*Met with required major coursework.*

## Electives (16-42 credits)

*CS 19300 - Tools is a required freshman seminar course; corequisites with CS 18000. This is not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.*

## Grade Requirements

- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.

## GPA Requirements

- 2.0 Major and Graduation GPA required for Bachelor of Science degree.

## Course Requirements & Notes

- Enrollment in freshman seminar course CS 19300 is required with CS 18000 . This not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.
- No course can be counted both for a required and selective course within the same track.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.



- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

### Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

# Sample 4-Year Plan

## Fall 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \*\*\*
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00-4.00 (English Composition suggested.)
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00 (CS 19300 suggested.)

## 15-17 Credits

## Spring 1st Year

- CS 18200 - Foundations Of Computer Science ♦ \*\*\*
- CS 24000 - Programming In C ♦ \*\*\*
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00
- Electives - Credit Hours: 1.00 - 3.00

## 14-18 Credits

## Fall 2nd Year

- CS 25000 - Computer Architecture \*\*\*
- CS 25100 - Data Structures And Algorithms \*\*\*
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (CS 29100 recommended)

## 15-17 Credits

## Spring 2nd Year

- CS 25200 - Systems Programming \*\*\*
- MA 26500 - Linear Algebra or
- MA 35100 - Elementary Linear Algebra
- Science Core Selection - Credit Hours: 3.00 - 4.00 (COM 21700 suggested.)
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 16-17 Credits

## Fall 3rd Year

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦
- Security Concentration course - Credit Hours: 3.00 \*\*\*
- Security Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (CS 39100 recommended)
- Elective - Credit Hours: 3.00

16-17 Credits

## Spring 3rd Year

- Security Concentration course - Credit Hours: 3.00 \*\*\*
- Security Concentration course - Credit Hours: 3.00 \*\*\*
- Great Issues In Science Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

15-17 Credits

## Fall 4th Year

- Security Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00

16-18 Credits

## Spring 4th Year

- Security Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

15-17 Credits

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language;

ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Computer Science: Software Engineering, BS

### About the Program

Purdue Computer Science is one of the country's top-ranked programs. Faculty members are shaping the future of information technology through cutting-edge research. Students can take courses that include such topics as graphics and animation, web programming, competitive programming, cryptography and security, networks, software engineering, distributed systems, information systems, artificial intelligence, and bioinformatics.

The flexible curriculum offers students the opportunity to be involved in a dynamic discipline that will continue to grow and to contribute significantly to progress in many other disciplines and ultimately to changes in human society that are nothing short of profound. Students learn communication skills, teamwork, and problem-solving skills and acquire the necessary technical skills for positions in computing throughout society.

Computer Science Website

Computer Science Major Change (CODO) Requirements

Computer Science students begin by taking six core courses that teach them the fundamentals of computer science. Students then take coursework in a concentration, which allows them to deepen their understanding in a specific area. The Software Engineering track is designed to prepare students to become software engineers who:

- understand and can use the principles and techniques of software engineering essential for the design and development of large software products,
- are familiar with and can effectively use a variety of tools for software analysis, design, testing, and maintenance, and
- can effectively work in teams and communicate orally and in writing.

## About the Program

Purdue Computer Science is one of the country's top-ranked programs. Faculty members are shaping the future of information technology through cutting-edge research. Students can take courses that include such topics as graphics and animation, web programming, competitive programming, cryptography and security, networks, software engineering, distributed systems, information systems, artificial intelligence, and bioinformatics.

The flexible curriculum offers students the opportunity to be involved in a dynamic discipline that will continue to grow and to contribute significantly to progress in many other disciplines and ultimately to changes in human society that are nothing short of profound. Students learn communication skills, teamwork, and problem-solving skills and acquire the necessary technical skills for positions in computing throughout society.

Computer Science Website

Computer Science Major Change (CODO) Requirements

Computer Science students begin by taking six core courses that teach them the fundamentals of computer science. Students then take coursework in a concentration, which allows them to deepen their understanding in a specific area. The Software Engineering track is designed to prepare students to become software engineers who:

- understand and can use the principles and techniques of software engineering essential for the design and development of large software products,
- are familiar with and can effectively use a variety of tools for software analysis, design, testing, and maintenance, and
- can effectively work in teams and communicate orally and in writing.

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete

minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## **Computer Science Major Courses (46-50 credits)**

### **Required CS Major Math Courses (7-8 credits)**

Must have C or better to meet prerequisite for certain upper level CS courses

- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- MA 26500 - Linear Algebra or
- MA 35100 - Elementary Linear Algebra

### **Required CS Major Core Courses (21 credits)**

Must have C or better in all courses.

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ (satisfies Computing and Teambuilding requirements for College of Science core)
- CS 18200 - Foundations Of Computer Science ♦
- CS 24000 - Programming In C ♦
- CS 25000 - Computer Architecture
- CS 25100 - Data Structures And Algorithms
- CS 25200 - Systems Programming

## Software Engineering Concentration (18 credits)

### Required Courses

- CS 30700 - Software Engineering I
- CS 38100 - Introduction To The Analysis Of Algorithms
- CS 40700 - Software Engineering Senior Project
- CS 40800 - Software Testing
- CS 35200 - Compilers: Principles And Practice or
- CS 35400 - Operating Systems

### Selectives

Choose 1 course.

- CS 34800 - Information Systems
- CS 35100 - Cloud Computing
- CS 35200 - Compilers: Principles And Practice
- CS 35300 - Principles Of Concurrency And Parallelism
- CS 35400 - Operating Systems
- CS 37300 - Data Mining And Machine Learning
- CS 42200 - Computer Networks
- CS 42600 - Computer Security
- CS 44800 - Introduction To Relational Database Systems
- CS 45600 - Programming Languages
- CS 47300 - Web Information Search And Management
- CS 48900 - Embedded Systems
- CS 49000 - Topics In Computer Sciences For Undergraduates
- DSO Distributed Systems
- SWS Software Security
- CS 51000 - Software Engineering
- CS 59000 - Topics In Computer Sciences
- SRS Software Reliability and Security

### Software Engineering Senior Project

- The Software Engineering Senior Project (CS 40700) must be completed in the student's last or next-to-last semester.
- It must be a team project involving 4-6 people.
- CS 30700 is a pre-requisite for the Software Engineering Senior Project.

### Track Notes

- No course can be counted both for a required and selective course within the same track.

## Other Departmental/Program Course Requirements (32-54 credits)

## COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

## Composition & Presentation

### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here** (ADD LINK IN ACALOG). (satisfies OC for core)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

\*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.

International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

## Computing

*Met with required major coursework.*

### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

### Great Issues In Science (3 credits)

Choose one from this list.



## Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core)*

- MA 16100 - Plane Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)  
or
- MA 16500 - Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society<sup>^\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦

## Team-Building and Collaboration

*Met with required major coursework.*

## Electives (16-42 credits)

*CS 19300 - Tools is a required freshman seminar course; corequisites with CS 18000. This is not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.*

## Grade Requirements

- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.

## GPA Requirements

- 2.0 Major and Graduation GPA required for Bachelor of Science degree.

## Course Requirements and Notes

- Enrollment in freshman seminar course CS 19300 is required with CS 18000. This is not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
  - The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
  - Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
  - Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
  - The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade.
- University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
  - Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or

- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \*\*\*
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00-4.00 (English Composition suggested.)
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00 (CS 19300 suggested.)

### 15-17 Credits

### Spring 1st Year

- CS 18200 - Foundations Of Computer Science ♦ \*\*\*
- CS 24000 - Programming In C ♦ \*\*\*
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00
- Electives - Credit Hours: 1.00 - 3.00

### 14-18 Credits

### Fall 2nd Year

- CS 25000 - Computer Architecture \*\*\*
- CS 25100 - Data Structures And Algorithms \*\*\*
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (CS 29100 recommended)

### 15-17 Credits

## Spring 2nd Year

- CS 25200 - Systems Programming \*\*\*
- MA 26500 - Linear Algebra or
- MA 35100 - Elementary Linear Algebra
- Science Core Selection - Credit Hours: 3.00 - 4.00 (COM 21700 suggested.)
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 16-17 Credits

## Fall 3rd Year

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦
- Software Engineering Concentration course - Credit Hours: 3.00 \*\*\*
- Software Engineering Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (CS 39100 recommended)
- Elective - Credit Hours: 3.00

## 16-17 Credits

## Spring 3rd Year

- Software Engineering Concentration course - Credit Hours: 3.00 \*\*\*
- Software Engineering Concentration course - Credit Hours: 3.00 \*\*\*
- Great Issues In Science Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

## Fall 4th Year

- Software Engineering Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00

## 16-18 Credits

## Spring 4th Year

- Software Engineering Concentration course - Credit Hours: 3.00 \*\*\*

- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Computer Science: Systems Software, BS

## About the Program

Purdue Computer Science is one of the country's top-ranked programs. Faculty members are shaping the future of information technology through cutting-edge research. Students can take courses that include such topics as graphics and animation, web programming, competitive programming, cryptography and security, networks, software engineering, distributed systems, information systems, artificial intelligence, and bioinformatics.

The flexible curriculum offers students the opportunity to be involved in a dynamic discipline that will continue to grow and to contribute significantly to progress in many other disciplines and ultimately to changes in human society that are nothing short of profound. Students learn communication skills, teamwork, and problem-solving skills and acquire the necessary technical skills for positions in computing throughout society.

Computer Science Website

## Computer Science Major Change (CODO) Requirements

Computer Science students begin by taking six core courses that teach them the fundamentals of computer science. Students then take coursework in a concentration, which allows them to deepen their understanding in a specific area. The Systems Software track is designed to prepare students to become programmers who can build...

- low-level software that uses or runs inside an operating system,
- system tools for other users (e.g., compilers and assemblers),
- programs that communicate over a computer network or the Internet (e.g., web servers).

## About the Program

Purdue Computer Science is one of the country's top-ranked programs. Faculty members are shaping the future of information technology through cutting-edge research. Students can take courses that include such topics as graphics and animation, web programming, competitive programming, cryptography and security, networks, software engineering, distributed systems, information systems, artificial intelligence, and bioinformatics.

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Computer Science Website

## Computer Science Major Change (CODO) Requirements

Computer Science students begin by taking six core courses that teach them the fundamentals of computer science. Students then take coursework in a concentration, which allows them to deepen their understanding in a specific area. The Systems Software track is designed to prepare students to become programmers who can build...

- low-level software that uses or runs inside an operating system,
- system tools for other users (e.g., compilers and assemblers),
- programs that communicate over a computer network or the Internet (e.g., web servers).

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.

- **Transfer Credit.** Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## **Computer Science Major Courses (46-50 credits)**

### **Required CS Major Math Courses (7-8 credits)**

Must have C or better to meet prerequisite for certain upper level CS courses

- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- MA 26500 - Linear Algebra or
- MA 35100 - Elementary Linear Algebra

### **Required CS Major Core Courses (21 credits)**

Must have C or better in all courses.

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ (satisfies Computing and Teambuilding requirements for College of Science core)
- CS 18200 - Foundations Of Computer Science ♦
- CS 24000 - Programming In C ♦
- CS 25000 - Computer Architecture
- CS 25100 - Data Structures And Algorithms
- CS 25200 - Systems Programming

## Systems Software Concentration (18 credits)

### Required Courses

- CS 35200 - Compilers: Principles And Practice
- CS 35400 - Operating Systems
- CS 42200 - Computer Networks

### Selectives

Choose 3 courses.

- CS 30700 - Software Engineering I
- CS 33400 - Fundamentals Of Computer Graphics
- CS 35100 - Cloud Computing
- CS 35300 - Principles Of Concurrency And Parallelism
- CS 38100 - Introduction To The Analysis Of Algorithms
- CS 42600 - Computer Security
- CS 44800 - Introduction To Relational Database Systems
- CS 45600 - Programming Languages
- CS 48900 - Embedded Systems
- CS 49000 - Topics In Computer Sciences For Undergraduates
- DSO Distributed Systems
- Senior Project

### Notes

- The track has three electives, chosen from the list provided. In addition to elective courses listed, other courses, including project and independent study courses, will be approved as electives, provided the course involves systems programming (as opposed to web page scripting, or other high-level application programming).

Faculty strongly recommend that students include a senior project as one of the electives.

- The Software Engineering Senior Project cannot be used as the Systems research project unless track chair approval from both track chairs is obtained.

- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.

## Other Departmental/Program Course Requirements (32-54 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS



^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

## Composition & Presentation

### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here** (ADD LINK IN ACALOG). (satisfies OC for core)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

\*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.

International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

## Computing

*Met with required major coursework.*

### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

### Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core)*

- MA 16100 - Plane Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)  
or
- MA 16500 - Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society<sup>^\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦

## Team-Building and Collaboration

*Met with required major coursework.*

## Electives (16-42 credits)

*CS 19300 - Tools is a required freshman seminar course; corequisites with CS 18000. This is not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.*

## Grade Requirements

- All major required courses, all track requirements and track selectives, and their pre-requisites, regardless of department, must be completed with a grade of C or better.

## GPA Requirements

- 2.0 Major and Graduation GPA required for Bachelor of Science degree.

## Course Requirements & Notes

- Enrollment in freshman seminar course CS 19300 is required with CS 18000. This is not a degree requirement. CS 29100 - Sophomore Development Seminar and CS 39100 - Junior Resources Seminar are optional but recommended.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
  - The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
  - Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
  - Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
  - The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade.
- University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
  - Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the Civics Literacy Proficiency [website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or

- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \*\*\*
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00-4.00 (English Composition suggested.)
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00 (CS 19300 suggested.)

### 15-17 Credits

### Spring 1st Year

- CS 18200 - Foundations Of Computer Science ♦ \*\*\*
- CS 24000 - Programming In C ♦ \*\*\*
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00
- Electives - Credit Hours: 1.00 - 3.00

### 14-18 Credits

### Fall 2nd Year

- CS 25000 - Computer Architecture \*\*\*
- CS 25100 - Data Structures And Algorithms \*\*\*
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (CS 29100 recommended)

### 15-17 Credits

## Spring 2nd Year

- CS 25200 - Systems Programming \*\*\*
- MA 26500 - Linear Algebra or
- MA 35100 - Elementary Linear Algebra
- Science Core Selection - Credit Hours: 3.00 - 4.00 (COM 21700 suggested.)
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 16-17 Credits

## Fall 3rd Year

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 51100 - Statistical Methods ♦
- Systems Software Concentration course - Credit Hours: 3.00 \*\*\*
- Systems Software Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (CS 39100 recommended)
- Elective - Credit Hours: 3.00

## 16-17 Credits

## Spring 3rd Year

- Systems Software Concentration course - Credit Hours: 3.00 \*\*\*
- Systems Software Concentration course - Credit Hours: 3.00 \*\*\*
- Great Issues In Science Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

## Fall 4th Year

- Systems Software Concentration course - Credit Hours: 3.00 \*\*\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00

## 16-18 Credits

## Spring 4th Year

- Systems Software Concentration course - Credit Hours: 3.00 \*\*\*

- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Data Science, BS (CS)

### About the Program

Majoring in data science at Purdue will place you at the forefront of an emerging field and prepare you for an exciting career at the intersection of computer science and statistics.

Created jointly by Purdue's Department of Computer Science and Department of Statistics, the data science major will open pathways to careers in virtually every area of society, from healthcare, security and sustainability to education, business and economics.

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## **Degree Requirements**

# **120 Credits Required**

## Data Science Major Courses (47-51 credits)

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ (*satisfies Computing, and Team-Building and Collaboration, for College of Science core*)
- CS 18200 - Foundations Of Computer Science
- CS 25100 - Data Structures And Algorithms
- CS 37300 - Data Mining And Machine Learning
- CS 38003 - Python Programming
- CS 44000 - Large Scale Data Analytics
- MA 35100 - Elementary Linear Algebra
- STAT 35500 - Statistics For Data Science (*satisfies Statistics for College of Science core*)
- STAT 41600 - Probability
- STAT 41700 - Statistical Theory
- CS 24200 - Introduction To Data Science or
- STAT 24200 - Introduction To Data Science
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus

## Ethics Selective (3 credits)

Choose one.

- ILS 23000 - Data Science And Society: Ethical Legal Social Issues (*satisfies 3.0 credits of GE for College of Science core*)
- PHIL 20700 - Ethics For Technology, Engineering, And Design (*satisfies Multidisciplinary Experience and 3.0 credits of GE for College of Science core*)
- PHIL 20800 - Ethics Of Data Science (*must be 3.00 Credit Hour option; satisfies Multidisciplinary Experience and 3.0 credits of GE for College of Science core*)

## CS Selectives (6 credits)

Choose two.

- CS 31400 - Numerical Methods
- CS 35500 - Introduction To Cryptography
- CS 43900 - Introduction To Data Visualization
- CS 47100 - Introduction to Artificial Intelligence
- CS 47300 - Web Information Search And Management
- CS 47500 - Human-Computer Interaction
- CS 30700 - Software Engineering I or
- CS 40800 - Software Testing
- CS 34800 - Information Systems or
- CS 44800 - Introduction To Relational Database Systems
- CS 38100 - Introduction To The Analysis Of Algorithms or
- CS 48300 - Introduction To The Theory Of Computation

## Statistics Selective (3 credits)

Choose one.



- MA 43200 - Elementary Stochastic Processes
- STAT 42000 - Introduction To Time Series
- STAT 50600 - Statistical Programming And Data Management
- STAT 51200 - Applied Regression Analysis
- STAT 51300 - Statistical Quality Control
- STAT 51400 - Design Of Experiments
- STAT 52200 - Sampling And Survey Techniques
- STAT 52500 - Intermediate Statistical Methodology

## Capstone Experience (3 credits)

CS 37300 must be completed with a grade of C or better prior to the start of the Capstone Experience.

*Choose one option below.*

### Credit Course Options

- CS 49000 - DSC--Data Science Capstone - DSC Section only - RECOMMENDED OPTION
- CS 49000 - Topics In Computer Science For Undergraduates (Individual Study) - a preapproved unpaid research opportunity in Data Science fulfills the capstone.
- *STAT 49000 and Data Mine projects/courses do not fulfill the Capstone requirement.*

### Zero Credit Option

**Students choosing a Zero-Credit Capstone Experience Option must complete an additional selective from either the CS Selectives or the Statistics Selectives lists.**

- CS 49000 - Topics In Computer Sciences For Undergraduates -- (Individual Study) - a preapproved paid research opportunity in Data Science fulfills the capstone.
- An approved paid research opportunity in Data Science fulfills the capstone.
- STAT 49000 and Data Mine projects/courses do not fulfill the Capstone requirement.

## Other Departmental/Program Course Requirements (29-52 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

#### Written Communication

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

#### Technical Writing And Presentation\* (0 or 3 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here** (ADD LINK IN ACALOG). (satisfies OC for core)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

\*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.

International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

## Computing

*Met with required major coursework.*

## Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

## General Education^ (6 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I (*Met with required major coursework*)
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (*satisfies Science for core*).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core)*

- MA 16100 - Plane Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)  
or
- MA 16500 - Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II (must have C or better to meet pre-requisite for STAT 35500)

## Science Technology & Society<sup>^\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics

*Met with required major coursework.*

## Team-Building and Collaboration

*Met with required major coursework.*

## Electives (17-44 credits)

Enrollment in freshman seminar course *CS 19300 - Tools* is required with CS 18000. *It is not a degree requirement.*

## Grade Requirements

- CS 37300 must be completed with a grade of C or better prior to the start of the Capstone Experience.
- \*For this degree, all major required courses, all major electives (selectives), and their pre-requisites, regardless of department, must be completed with a grade of C or better.

## GPA Requirements

- 2.0 Major and Graduation GPA required for Bachelor of Science degree.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
  - The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
  - Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
  - Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
  - The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade.
- University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.

- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## Computer Science Transfer Credit Policy

- Equivalent 10000 and 20000-level Computer Science (CS) transfer credit courses (including credit from regional campuses) may be used to meet degree requirements if those courses were taken prior to admission to the Purdue West Lafayette Data Science, B.S. CS program.
- CS transfer credit at the 30000-40000-level may not be used to meet degree requirements. As exception to this policy is the application of pre-approved Study Abroad coursework.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

### Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \*
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hour: 1.00 (CS 19300 strongly recommended)
- Elective - Credit Hour: 1.00
- Electives - Credit Hours: 3.00

### 16-18 Credits

### Spring 1st Year

- CS 18200 - Foundations Of Computer Science \*
- CS 38003 - Python Programming
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First Year Composition Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 1.00

### 15-18 Credits

### Fall 2nd Year

- STAT 35500 - Statistics For Data Science
- CS 24200 - Introduction To Data Science or
- STAT 24200 - Introduction To Data Science
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 - 3.00

### 14-18 Credits

### Spring 2nd Year

- CS 25100 - Data Structures And Algorithms

- MA 35100 - Elementary Linear Algebra
- STAT 41600 - Probability
- Ethics Selective♦ - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 - 2.00

## 16-18 Credits

### Fall 3rd Year

- CS 37300 - Data Mining And Machine Learning
- STAT 41700 - Statistical Theory
- COM 21700 - Science Writing And Presentation
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-16 Credits

### Spring 3rd Year

- CS Selective - Credit Hours 3.00
- Statistics Selective - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

### Fall 4th Year

- CS 44000 - Large Scale Data Analytics
- CS Selective - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00 - 3.00

## 16-17 Credits

### Spring 4th Year

- Capstone Experience/Course - Credit Hours: 0.00 - 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00

13-18 Credits

## Pre-Requisite Information

For pre-requisite information, click [here](#).

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

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## Minor

### Computer Science Minor

#### Application Process

Students must have completed with a 'C' grade or better both CS 18000 and a Math class as follows:

- CS 18000 (or receive a 4 or a 5 on the AP Computer Science test and pass the CS 18000 proficiency exam) **and**
  - MA 16100 or MA 16500 or (MA 16010 and MA 16020)
- or**
- prior to the Fall 2016 semester, MA 16300, or MA 16700, or (MA 16010 and MA MA 16020), or MA 16021
  - **or** establish credit for Calculus I through AP credit, Transfer Credit, or credit by exam.

### To apply:

1. Complete the CS Minor Application with your advisor during the semester you are enrolled in CS 18000 or after completing CS 18000.

2. If the application is approved, a minor in Computer Science will be granted upon completion of the following requirements:

- Five (5) CS courses from the list below. AP credit plus CS 18000 proficiency exam can be used for the minor application as described above, but will not count toward the five required CS courses.
- All courses' pre-requisites must be met in order to enroll in CS courses. Click the link for each course to see the required pre-requisites.
- All courses must be taken at the Purdue West Lafayette campus.
- A minimum grade of 'C' in all CS courses used towards the minor is required. (A 'C-' is not accepted.)
- **Enrollment in all CS courses and admission to the CS minor is subject to space availability.** CS Minors are expected to take CS courses during off-peak sessions. Students are responsible for maintaining an up-to-date minor plan of study, for knowing registration timelines, and for requesting space through the correct process. Computer Science majors are given priority in registering for CS classes.
- CS Minors may take a total of five (5) CS major courses and no more.

## Requirements for the Minor (16-18 credits)

### Required Courses (10 credits)

- CS 18000 - Problem Solving And Object-Oriented Programming \*
- CS 18200 - Foundations Of Computer Science \*\*
- CS 24000 - Programming In C

### Elective Courses - Choose Two (6-8 credits)

- CS 25000 - Computer Architecture
- CS 25100 - Data Structures And Algorithms
- CS 25200 - Systems Programming
- CS 30700 - Software Engineering I
- CS 31400 - Numerical Methods
- CS 33400 - Fundamentals Of Computer Graphics
- CS 34800 - Information Systems
- CS 35500 - Introduction To Cryptography
- CS 38100 - Introduction To The Analysis Of Algorithms
- CS 40800 - Software Testing
- CS 44800 - Introduction To Relational Database Systems
- CS 47100 - Introduction to Artificial Intelligence

## Notes



- \*Students with AP CS credit plus a passing score in the CS 18000 Proficiency Exam (as described above) may use their AP credit in place of CS 18000 as a pre-requisite for other CS courses, but **AP credit will not count** toward the five (5) CS courses. In this case, the student must choose three of the Elective Courses.
- \*\*Math majors may use MA 37500 in place of CS 18200 as a pre-requisite for other CS courses, but MA 37500 will not count toward the five (5) CS courses. In this case, the student must choose three of the Elective Courses.

## Disclaimer

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## Pre-Program

### Data Science First Year (CS)

#### Data Science First Year

#### Program Requirements (25-28 credits)

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \* (*satisfies Computing and Teambuilding for College of Science core*)
- CS 18200 - Foundations Of Computer Science \*
- CS 38003 - Python Programming
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First Year Composition Selection - Credit Hours: 3.00-4.00
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 4.00

#### Fall 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \*
- CS 19300 - Tools
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 3.00
- Electives - Credit Hours: 1.00

#### 16-18 Credits

## Spring 1st Year

- CS 18200 - Foundations Of Computer Science \*
- CS 38003 - Python Programming
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First Year Composition Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 1.00

## 15-17 Credits

## Notes

- CS 19300 - Tools is a required freshman seminar courses; corequisite with CS 18000. It is not a degree requirement.
- \*All CS, MA, and STAT courses required for the major, must be completed with a grade of "C" or better.
- \*All prerequisites to CS, MA, and STAT courses required for the major, regardless of department, must be completed with a grade of "C" or better.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

# Department of Earth, Atmospheric, and Planetary Sciences

## Overview

The Department of Earth, Atmospheric, and Planetary Sciences (EAPS) is dedicated to providing a top-rate education for undergraduate and graduate students, as well as being dedicated to contributing to our sciences through research. EAPS is the multidisciplinary department of the College of Science, requiring the use of mathematics, physics, chemistry, statistics, and computer science to research problems; along with state of the art computer and laboratory facilities for calculation, visualization, and experimentation. Our programs intersect disciplines, with faculty and students studying in fields such as energy and the environment, severe weather science, planetary exploration, and

geodata science. Our faculty, students and staff are dedicated to the department's mission, strategic plan, and fostering an environment of diversity and inclusivity. Guided by our values, we continue to expand, recruiting top-notch academic staff. I welcome you to contact us or check our website at [eaps.purdue.edu](http://eaps.purdue.edu) if you are interested in learning more about the work that we do and the programs that we offer.

Department of Earth, Atmospheric, and Planetary Sciences Website

## Faculty

# Contact Information

Earth, Atmospheric, and Planetary Sciences Department  
550 Stadium Mall Drive  
Purdue University  
West Lafayette, IN 47907-2051

Phone: 765 494-3258

Fax: 765 496-1210

# Graduate Information

For Graduate Information please see [Earth, Atmospheric, and Planetary Sciences Graduate Program Information](#).

## Baccalaureate

# Atmospheric Science, BS

## About the Program

Atmospheric science focuses on mathematics, physics, chemistry, computer science, and statistics as well as atmospheric science. In this major students have several elective credits which they can use to broaden and enhance their educational experience and to specialize in the areas of weather forecasting, research, environmental monitoring, business, or broadcasting. Students can also participate in real-world forecasting, field work, and related opportunities. Research is an integral part of the program, and the Earth, Atmospheric, and Planetary Sciences (EAPS) Department has an excellent faculty to student ratio which allows students to have one-to-one interaction with their professors.

[Atmospheric Science/Meteorology Website](#)

[Atmospheric Science Major Change \(CODO\) Requirements](#)

## Degree Requirements

# 120 Credits Required

[Curriculum and Degree Requirements for College of Science](#)

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## **Departmental/Program Major Courses (36 credits)**

### **Required Major Courses**

- EAPS 11700 - Introduction To Atmospheric Science ♦ (satisfies Science for core)

- EAPS 13700 - Freshman Seminar In Earth, Atmospheric, And Planetary Sciences ♦
- EAPS 22500 - Science Of The Atmosphere ♦ (satisfies Science for core)
- EAPS 22700 - Introduction To Atmospheric Observation And Measurements
- EAPS 23000 - Laboratory In Atmospheric Science
- EAPS 42100 - Atmospheric Thermodynamics
- EAPS 42200 - Atmospheric Dynamics I
- EAPS 42300 - Atmospheric Dynamics II
- EAPS 42501 - Physics Of Climate
- EAPS 50700 - Introduction To Analysis And Computing With Geoscience Data
- EAPS 53200 - Atmospheric Physics I
- EAPS 10000-level Earth System Selective - Credit Hours: 3.00
- EAPS 40000/50000 Selective - Credit Hours: 3.00

## Other Departmental/Program Course Requirements (68-77 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ Labeled as a Science Core Selection in the four year plan of study

\*Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

#### Composition & Presentation

##### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

##### Technical Writing And Presentation\* (0 or 3 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

##### Computing (3-4 credits)

- CS 17700 - Programming With Multimedia Objects ♦
- CS 17600 - Data Engineering In Python

##### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

## General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one course from this list.

## Laboratory Science (8 credits)

### Required

- PHYS 17200 - Modern Mechanics (satisfies Science for core)

### Choose one option.

- PHYS 27200 - Electric And Magnetic Interactions
- PHYS 24100 - Electricity And Optics and
- PHYS 25200 - Electricity And Optics Laboratory

## Mathematics (8-10 credits)

(satisfies Quantitative Reasoning for core; students should earn a minimum of a C-)

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society^\* (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

Choose one.

- EAPS 31000 - Introductory Statistics For Geosciences
- STAT 30100 - Elementary Statistical Methods
- STAT 35000 - Introduction To Statistics
- STAT 50300 - Statistical Methods For Biology
- STAT 51100 - Statistical Methods

## Team-Building and Collaboration

*Met with PHYS 17200.*

## Required Pre-Requisite Courses (14-16 credits)

- MA 26500 - Linear Algebra
- MA 26600 - Ordinary Differential Equations (Student should earn minimum of a C-.)
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- CHM 11500 - General Chemistry ♦ (satisfies Science for core) or
- CHM 12500 - Introduction To Chemistry I ♦ (satisfies Science for core)

## Electives (9-32 credits)

## Supplemental List

[Click for Atmospheric Science Supplemental Information.](#)

## Grade Requirements

- All courses, with the exception of Language & Culture, CS 17700, General Education, and Electives, must have a grade of C- or higher. All EAPS courses, regardless of area in plan of study, must have a grade of C- or higher.

## GPA Requirements

- 2.0 Graduation GPA required for Bachelor of Science degree
- 2.0 average in EAPS major classes required to graduate

## Course Requirements and Notes

- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
  - The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
  - Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
  - Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
  - The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade.
- University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.

- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

### Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan



## Fall 1st Year

- EAPS 11700 - Introduction To Atmospheric Science ♦
- EAPS 13700 - Freshman Seminar In Earth, Atmospheric, And Planetary Sciences ♦
- CHM 11500 - General Chemistry ♦ or
- CHM 12500 - Introduction To Chemistry I ♦
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00

15-17 Credits

## Spring 1st Year

- CS 17700 - Programming With Multimedia Objects ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00
- EAPS 10000-level Earth System Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00

15-17 Credits

## Fall 2nd Year

- EAPS 22500 - Science Of The Atmosphere ♦
- EAPS 22700 - Introduction To Atmospheric Observation And Measurements
- PHYS 17200 - Modern Mechanics ♦
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 1.00

17-18 Credits

## Spring 2nd Year

- EAPS 23000 - Laboratory In Atmospheric Science
- MA 26500 - Linear Algebra
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

15 Credits

## Fall 3rd Year

- COM 21700 - Science Writing And Presentation
- EAPS 42100 - Atmospheric Thermodynamics
- EAPS 50700 - Introduction To Analysis And Computing With Geoscience Data
- MA 26600 - Ordinary Differential Equations
- Science Core Selection - Credit Hours: 3.00

## 15 Credits

### Spring 3rd Year

- EAPS 42200 - Atmospheric Dynamics I
- EAPS 53200 - Atmospheric Physics I
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15 Credits

### Fall 4th Year

- EAPS 42300 - Atmospheric Dynamics II
- EAPS 42501 - Physics Of Climate
- Great Issues In Science Option - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15 Credits

### Spring 4th Year

- EAPS 40000/50000 Selective - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Electives - Credit Hours: 3.00
- Electives - Credit Hours: 3.00

## 15 Credits

### World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

### Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Environmental Geoscience, BS

### About the Program

The EAPS Environmental Geoscience major offers an interdisciplinary curriculum that immerses students in the fundamentals of geology, chemistry, atmospheric science, biology, math, and physics. This coursework prepares students so they can help solve challenging environmental problems such as climate change, emerging pollutants, shrinking and shifting energy resources, food production, and ecology. The Environmental Geoscience major at Purdue is flexible, allowing students to create their own coursework focus based on their particular scientific passion: air quality, soil and sediments, or hydrology. Undergraduate research is required in this major, and students have the opportunity to work directly with professors and industry leaders. Graduates develop quantitative problem-solving skills that make them highly competitive for further graduate school studies related to environmental science or careers in environmental monitoring, consulting, and decision support for environmental public policy.

Environmental Geoscience Website

Earth, Atmospheric, and Planetary Sciences Department Major Change (CODO) Requirements

### Degree Requirements

## 120 Credits Required

### Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## **Departmental/Program Major Courses (54 credits)**

### **Required Major Courses**

- AGRY 25500 - Soil Science
- CHM 22400 - Introductory Quantitative Analysis  
or
- CHM 32100 - Analytical Chemistry I
- EAPS 11800 - Introduction To Earth Sciences ♦
- EAPS 13700 - Freshman Seminar In Earth, Atmospheric, And Planetary Sciences
- EAPS 20000 - Water World: Processes And Challenges In Global Hydrology
- EAPS 22500 - Science Of The Atmosphere
- EAPS 24300 - Mineralogy

- EAPS 31500 - Biogeochemistry
- EEE 36000 - Environmental And Ecological Engineering Laboratory (Credit Hours: 3.00)
- ASM 54000 - Geographic Information System Application or
- FNR 21000 - Natural Resource Information Management
- EAPS 10900 - The Dynamic Earth ♦ or
- EAPS 12500 - Environmental Science And Conservation ♦
- AGECEC 20400 - Introduction To Resource Economics And Environmental Policy or
- POL 22300 - Introduction To Environmental Policy
- EAPS 38500 - Principles Of Engineering Geology or
- EEE 35500 - Engineering Environmental Sustainability
- EAPS 49700 - Earth And Atmospheric Sciences Undergraduate Readings And Research (Credit Hours: 3.00) or
- EAPS 41900 - Internship In Environmental Geosciences (Credit Hours: 3.00)
- Environmental Selective^ - Credit Hours: 12.00 total

## Other Departmental/Program Course Requirements (41-65 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ Labeled as a Science Core Selection in the four year plan of study

\*Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

#### Composition & Presentation

##### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

##### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **HERE**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

##### Computing (3-4 credits)

Choose one.

- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming

## Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

## General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one course from this list.

## Laboratory Science (8-10 credits)

*(satisfies Science for core)*

- CHM 11500 - General Chemistry ♦ or
- CHM 12500 - Introduction To Chemistry I ♦
- CHM 11600 - General Chemistry ♦ or
- CHM 12600 - Introduction To Chemistry II ♦

## Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core; students should earn a minimum of a C-)*

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society^\* (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

*Choose one.*

- EAPS 31000 - Introductory Statistics For Geosciences

- STAT 30100 - Elementary Statistical Methods
- STAT 35000 - Introduction To Statistics
- STAT 50300 - Statistical Methods For Biology
- STAT 51100 - Statistical Methods

## Team-Building and Collaboration\* (0-3 credits)

Choose one from this list.

*Can be met with PHYS 17200.*

## Required Pre-Requisite Course (4 credits)

**Physics Selective** - *Choose one option.*

- PHYS 17200 - Modern Mechanics ♦
- PHYS 22000 - General Physics ♦
- PHYS 23300 - Physics For Life Sciences I ♦ (if two semesters of Biology)

## Electives (1-25 credits)

## Supplemental List

Click for Environmental Geoscience Supplemental Information.

## Grade Requirements

- All courses, with the exception of Language & Culture, CS 17700, General Education, and Electives, must have a grade of C- or higher. All EAPS courses, regardless of area in plan of study, must have a grade of C- or higher.

## GPA Requirements

- 2.0 Graduation GPA required for Bachelor of Science degree
- 2.0 average in EAPS major courses required to graduate

## Course Requirements and Notes

- ^Environmental Selectives for advanced courses and specializations
- ^^Environmental Selectives with Labs for advanced courses and specializations
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.

- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
  - Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
  - The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade.
- University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
  - Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

### Upper Level Requirement



- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- EAPS 11800 - Introduction To Earth Sciences ♦
- EAPS 13700 - Freshman Seminar In Earth, Atmospheric, And Planetary Sciences
- CHM 11500 - General Chemistry ♦ or
- CHM 12500 - Introduction To Chemistry I ♦
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00-4.00

### 15-18 Credits

### Spring 1st Year

- CHM 11600 - General Chemistry ♦ or
- CHM 12600 - Introduction To Chemistry II ♦
- EAPS 10900 - The Dynamic Earth ♦ or
- EAPS 12500 - Environmental Science And Conservation ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00
- Elective - Credit Hours: 1.00

### 15-18 Credits

### Fall 2nd Year

- AGRY 25500 - Soil Science
- EAPS 22500 - Science Of The Atmosphere
- EAPS 24300 - Mineralogy
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00

### 16-18 Credits

### Spring 2nd Year

- EAPS 20000 - Water World: Processes And Challenges In Global Hydrology
- EAPS 31000 - Introductory Statistics For Geosciences or

- STAT 30100 - Elementary Statistical Methods or
- STAT 35000 - Introduction To Statistics or
- STAT 50300 - Statistical Methods For Biology or
- STAT 51100 - Statistical Methods
- PHYS 17200 - Modern Mechanics ♦ or
- PHYS 22000 - General Physics ♦ or
- PHYS 23300 - Physics For Life Sciences I ♦
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00

## 16 Credits

### Fall 3rd Year

- CHM 32100 - Analytical Chemistry I
- EAPS 31500 - Biogeochemistry
- EEE 36000 - Environmental And Ecological Engineering Laboratory
- EAPS 38500 - Principles Of Engineering Geology or
- EEE 35500 - Engineering Environmental Sustainability

## 13 Credits

### Spring 3rd Year

- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦
- AGECE 20400 - Introduction To Resource Economics And Environmental Policy or
- POL 22300 - Introduction To Environmental Policy
- Environmental Selective - Credit Hours 3.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15-16 Credits

### Fall 4th Year

- COM 21700 - Science Writing And Presentation
- ASM 54000 - Geographic Information System Application or
- FNR 21000 - Natural Resource Information Management
- Environmental Selective - Credit Hours: 3.00 ^
- Environmental Selective - Credit Hours: 3.00 ^
- Elective - Credit Hours: 3.00

## 15 Credits

### Spring 4th Year

- EAPS 49700 - Earth And Atmospheric Sciences Undergraduate Readings And Research or
- EAPS 41900 - Internship In Environmental Geosciences
- Great Issues In Science Selective - Credit Hours 3.00
- Environmental Selective - Credit Hours 3.00
- Science Core Selection - Credit Hours 3.00
- Science Core Selection - Credit Hours 3.00

15 Credits

## Prerequisite Information

For current pre-requisites for courses, click [here](#).

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Geology and Geophysics, BS

### About the Program

Within the geology and geophysics major, students study math, chemistry, physics, and enroll in course work in physical and historical geology, earth materials, surface processes, plate tectonics, structural geology, sedimentation and stratigraphy, computer-aided analysis, field methods, and a summer geology field camp. Students have a number of electives which can be used to take advanced coursework in seismology, crustal tectonics, engineering geology,

hydrogeology, and a wide variety of other topics relevant to geologists. Faculty led classes, labs, and field experiences as well as undergraduate research (encouraged) are all components of this program.

Geology and Geophysics Website

Earth, Atmospheric, and Planetary Sciences Department Major Change (CODO) Requirements

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### Earning Core Curricular Requirements through Experience

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating

experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## Degree Requirements

# 120 Credits Required

## Departmental/Program Major Courses

### Required Major Courses (46 credits)

- EAPS 11800 - Introduction To Earth Sciences ♦
- EAPS 13700 - Freshman Seminar In Earth, Atmospheric, And Planetary Sciences ♦
- EAPS 24300 - Mineralogy ♦ (satisfies Science for core)
- EAPS 24400 - Earth Materials II
- EAPS 30900 - Computer-Aided Analysis For Geosciences
- EAPS 35200 - Structural Geology
- EAPS 35300 - Earth And Planetary Surface Processes
- EAPS 35400 - Earth And Planetary Geophysics
- EAPS 47400 - Sedimentary Geology
- EAPS 59100 - Advanced Topics In Earth And Atmospheric Sciences - Geology Field Experience (*6 credits required*)
- EAPS 31900 - Exploring Earth Through Time ♦ (satisfies Science for core) or
- EAPS 11200 - Earth Through Time ♦ (satisfies Science for core)
- EAPS Professional Elective (EAPS 30000:59900) - Credit Hours: 3.00
- EAPS Professional Elective (EAPS 30000:59900) - Credit Hours: 3.00
- Science/Engineering Elective (Level 20000:59900) -Credit Hours: 3.00
- Science/Engineering Elective (Level 20000:59900) - Credit Hours: 3.00

## Other Departmental/Program Course Requirements (45-72 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ Labeled as a Science Core Selection in the four year plan of study

\*Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

## Composition & Presentation

### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **HERE**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

### Computing (3-4 credits)

- CS 15900 - C Programming ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦
- CS 17600 - Data Engineering In Python

### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

### Great Issues In Science (3 credits)

Choose one course from this list.

### Laboratory Science (8 credits)

*(satisfies Science for core)*

- PHYS 17200 - Modern Mechanics ♦ or
- PHYS 22000 - General Physics ♦
- PHYS 22100 - General Physics or
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory

### Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core; students should earn a minimum of a C-)*

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society<sup>^\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

*Choose one.*

- EAPS 31000 - Introductory Statistics For Geosciences
- STAT 30100 - Elementary Statistical Methods
- STAT 35000 - Introduction To Statistics
- STAT 50300 - Statistical Methods For Biology
- STAT 51100 - Statistical Methods

## Team-Building and Collaboration<sup>\*</sup> (0-3 credits)

Choose one from this list.

## Required Pre-Requisite Courses (8-10 credits)

- CHM 11500 - General Chemistry ♦ or
- CHM 12500 - Introduction To Chemistry I ♦
- CHM 11600 - General Chemistry or
- CHM 12600 - Introduction To Chemistry II

## Electives (0-27 credits)

## Grade Requirements

- All courses, with the exception of Language & Culture, CS 17700, General Education, and Electives, must have a grade of C- or higher. All EAPS courses, regardless of area in plan of study, must have a grade of C- or higher.

## GPA Requirements

- 2.0 Graduation GPA required for Bachelor of Science degree
- 2.0 average in EAPS major classes required to graduate

## Course Requirements and Notes

- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 5000-level general education requirement may be taken under the pass/not-pass option.
  - The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
  - Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
  - Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
  - The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade.
- University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
  - Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or



- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- EAPS 11800 - Introduction To Earth Sciences ♦
- EAPS 13700 - Freshman Seminar In Earth, Atmospheric, And Planetary Sciences ♦
- CHM 11500 - General Chemistry ♦ or
- CHM 12500 - Introduction To Chemistry I ♦
- MA 16100 - Plane Analytic Geometry And Calculus I (Student should earn minimum of a C-) or
- MA 16500 - Analytic Geometry And Calculus I (Student should earn minimum of a C-)
- Science Core Selection - Credit Hours: 3.00-4.00

### 15-18 Credits

### Spring 1st Year

- CHM 11600 - General Chemistry or
- CHM 12600 - Introduction To Chemistry II
- EAPS 11200 - Earth Through Time ♦ or
- EAPS 10900 - The Dynamic Earth ♦
- MA 16200 - Plane Analytic Geometry And Calculus II (Student should earn minimum of a C-) or
- MA 16600 - Analytic Geometry And Calculus II (Student should earn minimum of a C-)
- Science Core First-Year Composition Selection – Credit Hours: 3.00-4.00

### 14-17 Credits

### Fall 2nd Year

- EAPS 24300 - Mineralogy ♦
- PHYS 17200 - Modern Mechanics ♦ or
- PHYS 22000 - General Physics ♦
- Science Core Selection - Credit Hours: 3.00-4.00
- Science/Engineering Elective (Level 20000 to 59900) - Credit Hours: 3.00

## 14 Credits

### Spring 2nd Year

- EAPS 35400 - Earth And Planetary Geophysics
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 22100 - General Physics or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory
- Science/Engineering Elective (Level 20000 to 59900) - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 2.00

## 15 Credits

### Fall 3rd Year

- EAPS 35300 - Earth And Planetary Surface Processes
- EAPS 47400 - Sedimentary Geology
- CS 15900 - C Programming ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦
- Science Core Selection - Credit Hours: 3.00

## 13-14 Credits

### Spring 3rd Year

- EAPS 24400 - Earth Materials II
- EAPS 30900 - Computer-Aided Analysis For Geosciences
- EAPS 35200 - Structural Geology
- EAPS 31000 - Introductory Statistics For Geosciences or
- STAT 30100 - Elementary Statistical Methods or
- STAT 35000 - Introduction To Statistics or
- STAT 50300 - Statistical Methods For Biology or
- STAT 51100 - Statistical Methods
- Team-Building & Collaboration - Credit Hours: 3.00

## 15 Credits

### Summer 3rd Year

- EAPS 59100 - Advanced Topics In Earth And Atmospheric Sciences

## 6 Credits

### Fall 4th Year

- EAPS Professional Elective (EAPS 30000:59900) - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Great Issues In Science - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15 Credits

### Spring 4th Year

- COM 21700 - Science Writing And Presentation
- EAPS Professional Elective (EAPS 30000:59900) - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 12 Credits

### Prerequisite Information

For current pre-requisites for courses, [click here](#).

### World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

### Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

### Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## **Planetary Sciences, BS**

## About the Program

Planetary sciences is a multidisciplinary study of planetary dynamics and includes course work in planetary geology, planetary atmospheres, planetary physics, spacecraft design and operation, and astronomy with elective options in astrobiology, impact cratering, and related topics with which to focus their study. All students receive a strong background in math, chemistry, physics, computer science, geophysics, and remote sensing and are encouraged to get involved in undergraduate research in this unique program.

Planetary Sciences Website

Earth, Atmospheric, and Planetary Sciences Department Major Change (CODO) Requirements

## Degree Requirements

### 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)

- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

#### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## Departmental/Program Major Courses (35 credits)

### Required Major Courses (23 credits)

- EAPS 10500 - The Planets ♦ (satisfies Science for core)
- EAPS 11800 - Introduction To Earth Sciences ♦
- EAPS 13700 - Freshman Seminar In Earth, Atmospheric, And Planetary Sciences ♦
- EAPS 24300 - Mineralogy
- EAPS 35300 - Earth And Planetary Surface Processes
- EAPS 35400 - Earth And Planetary Geophysics
- EAPS 44500 - Spacecraft Design

### Skills Selective (3 credits)

- EAPS 30900 - Computer-Aided Analysis For Geosciences
- EAPS 57700 - Remote Sensing Of The Planets

### EAPS Selective (3 credits)

- Choose an EAPS course not taken above.
- EAPS 10000:59900 - (could satisfy Science, Technology, & Society for core) - Credit Hours: 3.00

### Planetary Science Selectives (9 credits)

Choose 9 credits from this list: Planetary Science Supplemental Information. One course cannot be used to meet both Major Course and Planetary Science Selective.

## Other Departmental/Program Course Requirements (53-80 credits)

## COLLEGE OF SCIENCE CORE REQUIREMENTS

^ Labeled as a Science Core Selection in the four year plan of study

\*Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

## Composition & Presentation

### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

### Computing (3-4 credits)

Choose one.

- CS 17700 - Programming With Multimedia Objects ♦
- CS 17600 - Data Engineering In Python

### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

### Great Issues In Science (3 credits)

Choose one course from this list.

## Laboratory Science (8 credits)

*(satisfies Science for core)*

- PHYS 17200 - Modern Mechanics ♦
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory

## Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core; students should earn a minimum of a C-)*

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society<sup>^\*</sup> (3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

*Choose one.*

- EAPS 31000 - Introductory Statistics For Geosciences
- STAT 30100 - Elementary Statistical Methods
- STAT 35000 - Introduction To Statistics
- STAT 50300 - Statistical Methods For Biology
- STAT 51100 - Statistical Methods

## Required Pre-Requisite Courses (16-18 credits)

- MA 26100 - Multivariate Calculus (Student should earn minimum of a C-)
- MA 26200 - Linear Algebra And Differential Equations
- CHM 11500 - General Chemistry or
- CHM 12500 - Introduction To Chemistry I
- CHM 11600 - General Chemistry or
- CHM 12600 - Introduction To Chemistry II

## Electives (5-32 credits)

## Grade Requirements

- All courses, with the exception of Language & Culture, CS 17700, General Education, and Electives, must have a grade of C- or higher. All EAPS courses, regardless of area in plan of study, must have a grade of C- or higher.

## GPA Requirements

- 2.0 Graduation GPA required for Bachelor of Science degree
- 2.0 average in EAPS major courses required to graduate

## Course Requirements and Notes

- One course cannot be used to meet both Major Course and Planetary Science Selective.
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)



## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the Civics Literacy Proficiency [website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Additional Information

- ^Planetary Science Selectives for advanced courses and specializations

## Sample 4-Year Plan

### Fall 1st Year

- EAPS 11800 - Introduction To Earth Sciences ♦
- EAPS 13700 - Freshman Seminar In Earth, Atmospheric, And Planetary Sciences ♦
- CHM 11500 - General Chemistry ♦ or
- CHM 12500 - Introduction To Chemistry I ♦
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection First-Year Composition - Credit Hours: 3.00 - 4.00

### 15-17 Credits

### Spring 1st Year

- EAPS 10500 - The Planets ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- CHM 11600 - General Chemistry or
- CHM 12600 - Introduction To Chemistry II
- Science Core Selection Language & Culture - Credit Hours: 3.00

## 14-15 Credits

### Fall 2nd Year

- EAPS 24300 - Mineralogy
- MA 26100 - Multivariate Calculus
- PHYS 17200 - Modern Mechanics ♦
- Science Core Selection Language & Culture - Credit Hours: 3.00

## 15 Credits

### Spring 2nd Year

- CS 17700 - Programming With Multimedia Objects
- MA 26200 - Linear Algebra And Differential Equations
- PHYS 27200 - Electric And Magnetic Interactions or
- PHYS 24100 - Electricity And Optics and PHYS 25200 - Electricity And Optics Laboratory
- Science Core Selection Language & Culture - Credit Hours: 3.00

## 15 Credits

### Fall 3rd Year

- EAPS 35300 - Earth And Planetary Surface Processes
- Science Core Selection TWTP (COM 21700 strongly recommended) - Credit Hours: 3.00
- Science Core Selection General Education - Credit Hours: 3.00
- Planetary Science OR Skills Selective^ - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15 Credits

### Spring 3rd Year

- EAPS 35400 - Earth And Planetary Geophysics
- EAPS 31000 - Introductory Statistics For Geosciences or
- STAT 30100 - Elementary Statistical Methods or
- STAT 35000 - Introduction To Statistics or
- STAT 50300 - Statistical Methods For Biology or
- STAT 51100 - Statistical Methods
- Planetary Science or Skills Selective^ - Credit Hours: 3.00
- Science Core Selection General Education - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15 Credits

### Fall 4th Year

- EAPS Selective - Credit Hours: 3.00
- Planetary Science or Skills Selective<sup>^</sup> - Credit Hours: 3.00
- Science Core Selection Multidisciplinary - Credit Hours: 3.00
- Elective - Credit Hours: 3.00 - 6.00

## 12-15 Credits

### Spring 4th Year

- EAPS 44500 - Spacecraft Design
- Planetary Science or Skills Selective - Credit Hours: 3.00
- Science Core Selection Great Issues in Science - Credit Hours: 3.00
- Science Core Selection General Education - Credit Hours: 3.00
- Electives - Credit Hours 3.00

## 15 Credits

## Prerequisite Information

For current pre-requisites for courses, [click here](#).

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Minor

# **Earth, Atmospheric, and Planetary Sciences Minor**

## **Requirements for the Minor (18 credits)**

### **Required Course (3 credits)**

- EAPS 10900 - The Dynamic Earth or
- EAPS 11700 - Introduction To Atmospheric Science or
- EAPS 11800 - Introduction To Earth Sciences

### **Additional EAPS Coursework (15 credits)**

- Two EAPS 10000-level or higher course - Credit Hours: 6.00
- Three EAPS 30000-level or higher courses - Credit Hours: 9.00

## **Notes**

- No more than one 10000-level EAPS course and no more than one 20000-level EAPS course may be applied toward the minor requirements.
- Credit allowed in no more than one EAPS 30100, EAPS 32700, EAPS 37500, EAPS 36000, or EAPS 36400 towards minor requirements
- No credit allowed in any EAPS 19100, EAPS 39100, or EAPS 59100 towards minor requirements
- No more than three (3) credits of EAPS EAPS 49700 towards minor requirements
- All courses for this minor must be taken at Purdue University West Lafayette

## **Disclaimer**

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## **Program Information**

### **Atmospheric Science Supplemental Information**

#### **EAPS 400/500 Selective**

- EAPS 43400 - Weather Analysis And Forecasting
- EAPS 49700 - Earth And Atmospheric Sciences Undergraduate Readings And Research
- EAPS 51500 - Geodata Science
- EAPS 52000 - Theory Of Climate
- EAPS 52100 - Atmospheric Chemistry
- EAPS 52300 - Radar Meteorology
- EAPS 52500 - Boundary Layer Meteorology

- EAPS 53000 - Extreme Weather And Climate: Science And Risk
- EAPS 53400 - Tropical Meteorology
- EAPS 53600 - Introduction To General Circulation
- EAPS 53900 - Mesoscale Meteorology

## **Environmental Geoscience Supplemental Information**

### **Environmental Selectives (12 Credits)**

- AGRY 33700 - Environmental Hydrology
  - AGRY 38500 - Environmental Soil Chemistry
  - CE 54200 - Hydrology
  - EAPS 22700 - Introduction To Atmospheric Observation And Measurements
  - EAPS 35300 - Earth And Planetary Surface Processes
  - EAPS 50700 - Introduction To Analysis And Computing With Geoscience Data
  - EAPS 51800 - Soil Biogeochemistry
  - EAPS 52100 - Atmospheric Chemistry
  - EAPS 58400 - Hydrogeology
  - ENGL 39300 - Interdisciplinary Approaches To Environmental And Sustainability Studies
  - MA 26100 - Multivariate Calculus
  - EAPS 38500 - Principles Of Engineering Geology or
  - EEE 35500 - Engineering Environmental Sustainability
- (one course cannot be used to meet both Major Course and Environmental Selective)

## **Planetary Science Supplemental Information**

### **Planetary Science Selectives - Choose three. (9 Credits)**

- ASTR 36300 - The Solar System
- EAPS 31500 - Biogeochemistry
- EAPS 35200 - Structural Geology
- EAPS 39500 - Astrobiology
- EAPS 47400 - Sedimentary Geology
- EAPS 55600 - Planetary Surface Processes
- EAPS 58000 - Geodynamics
- Any Other 30000-50000 level planetary science course.

## **Department of Mathematics**

### **Overview**

The Department of Mathematics is one of seven departments making up Purdue's College of Science. The Department has an international reputation as an outstanding center for mathematics.

The Department offers Bachelor of Science and Doctor of Philosophy degrees. Bachelor of Science programs include Actuarial Science, Applied Mathematics, Core Mathematics, Data Science, Honors Mathematics, Mathematics and Computer Science, Mathematics for Business, Mathematics Education, and Mathematics and Statistics.

The Department will introduce a new degree plan: Data Science. A major in data science puts graduates at the forefront of an emerging field and prepares them for an exciting career at the intersection of computer science and statistics. Data Science is the interdisciplinary field of inquiry that uses quantitative and analytical methods to help gain insights and predictions based on big data. Students learn about key computational methods and statistical techniques and develop the deep analytical thinking skills needed to reason reliably, intelligently and creatively from data. The vast amounts of data generated every day has created a data-rich and data-driven world. The data science major opens pathways to careers in virtually every area of society, from healthcare, security and sustainability to education, business and economics.

The Department's 70 professors are actively involved in current developments in many major areas of mathematics. Faculty research interests can be found in the Faculty Research Areas list in our Faculty directory.

Please explore our website or contact us directly (see below) for more information about our undergraduate or graduate programs, faculty, research, job opportunities or information on how to support us. The annual department newsletter, PURview, is a good place to read about Departmental news.

Department of Mathematics

### **Faculty**

## **Contact Information**

The Department's Main Office (Room 835 of the MATH building) is open from 8am to 5pm on all weekdays, except University holidays. The main office is closed from 12 to 1 p.m. in the summer. A phone number for the department is (765) 494-1901. The full address is:

Department of Mathematics  
Purdue University  
150 North University Street  
West Lafayette, Indiana 47907-2067

## **Undergraduate Programs**

[Undergraduate Mathematics Information](#)

[Admissions Information \(Includes application forms and online application\)](#)

## **Graduate Information**

For Graduate Information please see [Mathematics Graduate Program Information](#) .

## **Baccalaureate**

# Actuarial Science Honors, BS

## About the Program

Actuarial Science is a joint program of Mathematics and Statistics that emphasizes course work in Mathematics, Statistics, Economics, and Management. Students can prepare for four to five of the nine course exams to become an actuary and also will be eligible for all three VEEs (Validation by Educational Experience) upon successful completion of all required and recommended courses. In addition, students also earn a second major in Statistics and most also earn a minor in Management.

Actuarial Science Website

Actuarial Science Major Change (CODO) Requirements (Students must first CODO into Actuarial Science before Honors.)

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the preceding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science

- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

#### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## Degree Requirements

# 120 Credits Required

## Departmental/Program Requirements (54 credits)

### Required Major Courses (54 credits)

- ECON 25100 - Microeconomics (satisfies General Education Option for College of Science Core)
- ECON 25200 - Macroeconomics (satisfies Behavioral/Social Science for core)
- MA 35100 - Elementary Linear Algebra
- MA 36600 - Ordinary Differential Equations
- MA 37300 - Financial Mathematics (satisfies Multidisciplinary Experience for College of Science Core)
- MGMT 20000 - Introductory Accounting
- MGMT 20100 - Management Accounting I
- MGMT 31000 - Financial Management
- STAT 49000 - Topics In Statistics For Undergraduates - Actuarial Science Capstone 3.00 credit hours required
- MGMT 41100 - Investment Management - Honors Investment Management is required if offered.
- STAT 41700 - Statistical Theory \*
- STAT 42000 - Introduction To Time Series
- STAT 47201 - Actuarial Models-Life Contingencies \* (satisfies Team-Building & Collaboration for College of Science core)
- STAT 47301 - Introduction To Arbitrage-Free Pricing Of Financial Derivatives \*
- STAT 47401 - Statistics For Risk Modeling \*
- STAT 47902 - Short Term Fundamental Actuarial Models \*
- STAT 49000 - Topics In Statistics For Undergraduates: Statistics For Risk Modeling II - Credit Hours: 3.00
- MA 41600 - Probability or
- STAT 41600 - Probability or
- STAT 51600 - Basic Probability And Applications
- STAT 47501 - Advanced Long Term Actuarial Mathematics \* or
- MA 49000 - Topics In Mathematics For Undergraduates: Advanced Short Term Actuarial Mathematics - Credit Hours 3.00\*

### Program Requirement (0 credits)



Documentation of passing two exams given by the Society of Actuaries

- Exam 1 - Credit Hours: 0.00
- Exam 2 - Credit Hours: 0.00

## Other Departmental Course Requirements (39-64 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

#### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

#### Technical Writing And Presentation\* (0 or 3 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

#### Computing (3-4 credits)

- CNIT 17500 - Visual Programming ♦ or
- CS 15900 - C Programming ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦

#### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

#### General Education^ (6 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I - *fulfilled by ECON 25100 in major.*
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

(satisfies Quantitative Reasoning for core)

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society (3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 35500 - Statistics For Data Science ♦

## Team-Building and Collaboration

*Fulfilled by STAT 47201 in major.*

## Required Pre-Requisite Course (4-5 Credits)

*Calculus III Option*

- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
  - should only be taken by first year (first semester) students that have credit for Calculus I and II. Students should talk to their advisor about this option.

## Electives (2-27credits)

## Grade Requirements

- Earn at least a "B-" in each of the following classes: ECON 25100, ECON 25200, MGMT 31000, and MGMT 41100.
- Earn grades of at least "B" in all of the MA and STAT classes in **Required Major Courses**.
- + Student should strive to earn a C or better.

## GPA Requirements

- Earn a cumulative GPA of at least 3.30.
- Earn a minimum GPA of 3.5 in the following set of classes: STAT 41700, STAT 47201, STAT 47301, STAT 47902, STAT 47401 SRM, STAT 47501 or MA 49000 ASTAM, STAT 49000-Actuarial Science Capstone, and STAT 49000 Statistics for Risk Modeling II (marked with a \*).
- Earn a 2.50 GPA among required MA/STAT/MGMT/ECON classes in **Required Major Courses**.

## Course Requirements and Notes

- No Count Courses are not allowed for credit
- Overlapping Course Content courses - only one course can be used for courses considered to have overlapping content.
- A course can only be used once in the Major Course area.
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## Non-course / Non-credit Requirements

Documentation of passing two exams given by the Society of Actuaries

- Exam 1 - Credit Hours: 0.00
- Exam 2 - Credit Hours: 0.00

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

# College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

### Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- ECON 25100 - Microeconomics

- MA 16100 - Plane Analytic Geometry And Calculus I + or
- MA 16500 - Analytic Geometry And Calculus I +
- College of Science Core First-Year Composition - Credit Hours: 3.00-4.00
- Science Core Selection - Credit Hours: 3.00-4.00
- Elective (MA 17000 or STAT 17000 strongly recommended) - Credit Hours: 2.00
- Elective (STAT 10100 or MA 10800 recommended) - Credit Hours: 1.00

## 16-18 Credits

### Spring 1st Year

- MA 37300 - Financial Mathematics +
- CNIT 17500 - Visual Programming ♦ or
- CS 15900 - C Programming ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00-4.00
- Elective - Credit Hours: 0.00-2.00

## 15-18 Credits

### Fall 2nd Year

- ECON 25200 - Macroeconomics
- MGMT 20000 - Introductory Accounting
- MA 26100 - Multivariate Calculus
- STAT 35000 - Introduction To Statistics ♦ or
- STAT 35500 - Statistics For Data Science ♦
- Science Core Selection - Credit Hours: 3.00-4.00

## 16-18 Credits

### Spring 2nd Year

- COM 21700 - Science Writing And Presentation
- MA 35100 - Elementary Linear Algebra
- MGMT 20100 - Management Accounting I
- MA 41600 - Probability or
- STAT 41600 - Probability
- Elective - Credit Hours: 2.00-3.00 (recommend STAT 25000)
- Elective - Credit Hours: 0-1.00

## 15 Credits

### Fall 3rd Year

- MGMT 31000 - Financial Management
- STAT 41700 - Statistical Theory \*
- STAT 47201 - Actuarial Models-Life Contingencies \*
- Science Core Selection - Credit Hours: 3.00-4.00
- Science Core Selection - Credit Hours: 3.00-4.00

## 16-18 Credits

### Spring 3rd Year

- STAT 47401 - Statistics For Risk Modeling \*
- STAT 42000 - Introduction To Time Series
- STAT 47902 - Short Term Fundamental Actuarial Models \*
- MGMT 41100 - Investment Management - Honors Investment Management is required if offered.
- Science Core Selection - Credit Hours: 3.00-4.00

## 15-16 Credits

### Fall 4th Year

- STAT 47301 - Introduction To Arbitrage-Free Pricing Of Financial Derivatives \*
  - STAT 49000 - Topics In Statistics For Undergraduates Statistics For Risk Modeling II - Credit Hours: 3.00
  - STAT 47501 - Advanced Long Term Actuarial Mathematics \*
- OR
- MA 49000 - Topics In Mathematics For Undergraduates MA 49000: Advanced Short Term Actuarial Mathematics - Credit Hours: 3.00\*
  - Great Issues In Science Option - Credit Hours: 3.00
  - Elective - Credit Hours: 3.00

## 15 Credits

### Spring 4th Year

- MA 36600 - Ordinary Differential Equations
- STAT 49000 - Topics In Statistics For Undergraduates Actuarial Science Capstone - Credit Hours: 3.00
- Science Core Course - Credit Hours: 3.00
- Electives - Credit Hours: 6.00

## 16 Credits

### World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Actuarial Science, BS

### About the Program

Actuarial Science is a joint program of Mathematics and Statistics that emphasizes course work in Mathematics, Statistics, Economics, and Management. Students can prepare for four to five of the nine course exams to become an actuary and also will be eligible for all three VEEs (Validation by Educational Experience) upon successful completion of all required and recommended courses. In addition, students also earn a second major in Statistics and most also earn a minor in Management.

Actuarial Science Website

Actuarial Science Major Change (CODO) Requirements

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## Degree Requirements

# 120 Credits Required

## Departmental/Program Major Courses (52 credits)

### Required Major Courses

- ECON 25100 - Microeconomics (satisfies General Education for College of Science core)
- ECON 25200 - Macroeconomics
- MA 35100 - Elementary Linear Algebra
- MA 36600 - Ordinary Differential Equations
- MA 37300 - Financial Mathematics (students SHOULD earn a C or better)
- MGMT 20000 - Introductory Accounting
- MGMT 20100 - Management Accounting I
- MGMT 31000 - Financial Management
- STAT 41700 - Statistical Theory
- STAT 42000 - Introduction To Time Series
- STAT 47201 - Actuarial Models-Life Contingencies (meets Teambuilding for College of Science Core)



- STAT 47301 - Introduction To Arbitrage-Free Pricing Of Financial Derivatives
- STAT 47401 - Statistics For Risk Modeling (students SHOULD earn a C or better)
- STAT 47902 - Short Term Fundamental Actuarial Models
- MA 41600 - Probability or
- STAT 41600 - Probability or
- STAT 51600 - Basic Probability And Applications (students SHOULD earn a C or better)
- STAT 47501 - Advanced Long Term Actuarial Mathematics or
- MA 49000 - Topics In Mathematics For Undergraduates -Advanced Short Term Actuarial Mathematics - Credit Hours: 3.00
- STAT 49000 - Topics In Statistics For Undergraduates Statistics For Risk Modeling II - Credit Hours: 3.00

## Other Departmental/Program Course Requirements (39-58 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

#### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

#### Technical Writing And Presentation\* (0 or 3 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

\*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.

International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

#### Computing (3-4 credits)

- CNIT 17500 - Visual Programming ♦ or
- CS 15900 - C Programming ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦

#### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (6 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I - *fulfilled by ECON 25100 in major.*
- General Education Option II
- General Education Option III

### Great Issues In Science (3 credits)

Choose one from this list.

### Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

### Mathematics (8-10 credits)

(satisfies Quantitative Reasoning for core)

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

### Science Technology and Society (3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

### Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 35500 - Statistics For Data Science ♦

### Team-Building and Collaboration

*Fulfilled by STAT 47201 in major.*

## Required Pre-Requisite Course (4-5 Credits)

### *Calculus III Option*

- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
  - should only be taken by first year (first semester) students that have credit for Calculus I and II. Students should talk to their advisor about this option.

## Electives (10-29 credits)

## Grade Requirements

- *Students SHOULD strive to earn a "C" or better.*

## GPA Requirements

- *2.5 average GPA in **Required Major Courses***
- *2.0 Graduation GPA required for Bachelor of Science degree.*

## Course Requirements and Notes

- No Count Courses are not allowed for credit
- Overlapping Course Content courses - only one course can be used for courses considered to have overlapping content.
- A course can only be used once in the Major Course area.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade.  
University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

### Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- ECON 25100 - Microeconomics
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I

- Science Core First-Year Composition - Credit hours: 3.00-4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 2.00 (MA 17000 or STAT 17000 strongly recommended)
- Elective - Credit Hours: 1.00 (MA 10800 or STAT 10100 strongly recommended)

## 16-17 Credits

### Spring 1st Year

- MA 37300 - Financial Mathematics
- CNIT 17500 - Visual Programming ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 15900 - C Programming ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 0-2.00

## 15-18 Credits

### Fall 2nd Year

- ECON 25200 - Macroeconomics
- MGMT 20000 - Introductory Accounting
- MA 26100 - Multivariate Calculus
- MA 27101 - Honors Multivariate Calculus
- STAT 35000 - Introduction To Statistics ♦ or
- STAT 35500 - Statistics For Data Science ♦
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 16-18 Credits

### Spring 2nd Year

- COM 21700 - Science Writing And Presentation
- MA 35100 - Elementary Linear Algebra
- MGMT 20100 - Management Accounting I
- MA 41600 - Probability or
- STAT 41600 - Probability
- Elective (STAT 25000 Problem Solving In Probability recommended) - Credit Hours: 2.00-3.00
- Elective - Credit Hours: 0-1.00

## 15 Credits

### Fall 3rd Year

- MGMT 31000 - Financial Management
- STAT 41700 - Statistical Theory
- STAT 47201 - Actuarial Models-Life Contingencies
- Science Core Selection - Credit Hours: 3.00-4.00
- Science Core Selection - Credit Hours: 3.00-4.00

## 15-17 Credits

### Spring 3rd Year

- STAT 47401 - Statistics For Risk Modeling
- STAT 42000 - Introduction To Time Series
- STAT 47902 - Short Term Fundamental Actuarial Models
- Science Core Selection - Credit Hours: 3.00
- Elective (MGMT 41100 Recommended) - Credit Hours: 3.00

## 15 Credits

### Fall 4th Year

- STAT 49000 - Topics In Statistics For Undergraduates Statistics For Risk Modeling II - Credit Hours: 3.00
  - STAT 47501 - Advanced Long Term Actuarial Mathematics
- OR
- MA 49000 - Topics In Mathematics For Undergraduates Advanced Short Term Actuarial Mathematics (ASTAM) - Credit Hours: 3.00
  - Science Core: Great Issues In Science - Credit Hours: 3.00
  - Elective - Credit Hours: 6.00

## 15 Credits

### Spring 4th Year

- STAT 47301 - Introduction To Arbitrage-Free Pricing Of Financial Derivatives
- MA 36600 - Ordinary Differential Equations
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 5.00

## 15 Credits

## Pre-Requisite Information

For pre-requisite information, [click here](#).

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL - American Sign Language;

ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Applied Mathematics, BS

### About the Program

Math students enjoy a great deal of personal attention. Most math classes for math majors are 40 students or less, and many upper-level classes have fewer than 25 students. In addition, the math curriculum is flexible enough that students can take classes in other interest areas or pursue double major or a minor without too much difficulty. Math specializations include:

- Applied Mathematics
- Mathematics / Business
- Mathematics
- Mathematics Teaching
- Mathematics with Computer Sciences
- Mathematics with Statistics

Important note: When applying for any specialization within Mathematics, select "Mathematics" as your major. You will have the opportunity to specialize as you progress through the curriculum.

Mathematics Website

Applied Mathematics Major Change (CODO) Requirements

### Degree Requirements

## 120 Credits Required

# Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

## College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

## Earning Core Curricular Requirements through Experience

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## Departmental/Program Major Courses



## Required Major Courses (34 credits)

- CS 31400 - Numerical Methods
- MA 30300 - Differential Equations And Partial Differential Equations For Engineering And The Sciences
- MA 35100 - Elementary Linear Algebra (students SHOULD earn a B- or better)
- MA 35301 - Linear Algebra II
- MA 36600 - Ordinary Differential Equations
- MA 42500 - Elements Of Complex Analysis
- MA 42800 - Introduction To Fourier Analysis
- MA 34100 - Foundations Of Analysis or
- MA 44000 - Honors Real Analysis I
- MA 45000 - Algebra Honors or
- MA 45300 - Elements Of Algebra I

## Math/Statistics Selective (6 credits)

- MA 34900 - Signals And Systems For Mathematicians
- MA 37300 - Financial Mathematics
- MA 37500 - Introduction To Discrete Mathematics
- MA 42100 - Linear Programming And Optimization Techniques
- MA 43200 - Elementary Stochastic Processes
- MA 44000 - Honors Real Analysis I
- MA 44200 - Honors Real Analysis II
- MA 49500 - Advanced Topics In Mathematics For Undergraduates (Any MA 49500 title is acceptable; course must be at least 3.0 credits to be used as a selective course.)
- MA 41600 - Probability or
- STAT 41600 - Probability or
- STAT 51600 - Basic Probability And Applications

## Other Departmental/Program Course Requirements (42-73 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

#### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

#### Technical Writing And Presentation\* (0 or 3 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

## Computing (3-4 credits)

- CS 15900 - C Programming ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦

## Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

## General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

(satisfies Quantitative Reasoning for core)

- MA 16100 - Plane Analytic Geometry And Calculus I (students SHOULD earn B- or better) or
- MA 16500 - Analytic Geometry And Calculus I (students SHOULD earn B- or better)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society (3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 35500 - Statistics For Data Science ♦

## Team-Building and Collaboration\* (0-3 credits)

Choose one from this list.

## Required Pre-Requisite Courses (4-5 credits)

### *Calculus III Option*

- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
  - should only be taken by first year (first semester) students that have credit for Calculus I and II. Students should talk to their advisor about this option.

## Electives (13-44 credits)

## Grade Requirements

- +Students should strive to earn a B- or better.

## GPA Requirements

- Average GPA in courses must be 2.00 in **Required Major Courses**.
- 2.0 Graduation GPA required for Bachelor of Science degree.

## Course Requirements

- No Count Courses are not allowed for credit
- Overlapping Course Content courses - only one course can be used for courses considered to have overlapping content.
- A course can only be used once in the Major Course area.
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.

- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
  - Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
  - Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
  - The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade.
- University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
  - Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

**The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the Civics Literacy Proficiency website.**

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 1.00 (MA 10800 - Mathematics As A Profession And A Discipline strongly recommended)
- Electives - Credit Hours: 4.00

### 15-18 Credits

### Spring 1st Year

- CS 15900 - C Programming ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 3.00
- Electives - Credit Hours: 2.00

### 15-18 Credits

### Fall 2nd Year

- MA 26100 - Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00 (MA 30100 recommended)
- Elective - Credit Hours: 2.00

### 15-18 Credits

### Spring 2nd Year

- COM 21700 - Science Writing And Presentation
- MA 35100 - Elementary Linear Algebra +
- STAT 35000 - Introduction To Statistics ♦ or

- STAT 35500 - Statistics For Data Science ♦
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-16 Credits

### Fall 3rd Year

- CS 31400 - Numerical Methods
- MA 34100 - Foundations Of Analysis or
- MA 44000 - Honors Real Analysis I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

### Spring 3rd Year

- MA 35301 - Linear Algebra II
- MA 36600 - Ordinary Differential Equations
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00 - 4.00

## 14-15 Credits

### Fall 4th Year

- MA 42500 - Elements Of Complex Analysis
- MA 45300 - Elements Of Algebra I or
- MA 45000 - Algebra Honors
- Math/Statistics Selective - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Great Issues In Science Option - Credit Hours: 3.00

## 15 Credits

### Spring 4th Year

- MA 30300 - Differential Equations And Partial Differential Equations For Engineering And The Sciences
- MA 42800 - Introduction To Fourier Analysis
- Math/Statistics Selective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15 Credits

## Pre-Requisite Information

For pre-requisite information, [click here](#).

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Data Science, BS (Mathematics)

### About the Program

Data science is one of the fastest-growing fields in the mathematical and computational sciences, with applications in almost every area of science, technology, and business. The Data Science track in Mathematics is designed to couple a foundation of mathematical training with the computational skills required to analyze large data sets to uncover and leverage predictive patterns and insights. Graduates will have learned to process and analyze continuous and discrete data, quantify uncertainty, construct hypotheses, design and validate models, and to explain these steps and put results in context. This major will open doors to Master's and Ph.D. programs in a variety of data-related fields and to a quickly-expanding range of careers in finance, industry, cybersecurity, medicine, and physical and social sciences.

Data Science (Mathematics) Major Change (CODO) Requirements

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## **Degree Requirements**

# **120 Credits Required**



## Data Science Major Courses (60-61 credits)

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ (*satisfies Computing, and Team-Building and Collaboration, for College of Science core*)
- CS 18200 - Foundations Of Computer Science
- CS 25100 - Data Structures And Algorithms
- CS 38003 - Python Programming
- MA 35100 - Elementary Linear Algebra
- MA 37500 - Introduction To Discrete Mathematics
- MA 42100 - Linear Programming And Optimization Techniques
- MA 43200 - Elementary Stochastic Processes
- STAT 35500 - Statistics For Data Science (*satisfies Statistics for College of Science core*)
- STAT 41700 - Statistical Theory
- CS 24200 - Introduction To Data Science or
- STAT 24200 - Introduction To Data Science
- CS 34800 - Information Systems or
- MA 34900 - Signals And Systems For Mathematicians
- CS 37300 - Data Mining And Machine Learning or
- MA 37400 - Mathematical Foundations For Machine Learning (*CS37300 must be taken if planning to complete Capstone Requirement with CS49000 Data Science Capstone course; CS37300 must be taken if planning to take CS44000 Large Scale Data Analytics to complete CS Selective*)
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- MA 34100 - Foundations Of Analysis or
- MA 44000 - Honors Real Analysis I
- MA 41600 - Probability or
- STAT 41600 - Probability

## Ethics Selective (3 credits)

Choose one.

- ILS 23000 - Data Science And Society: Ethical Legal Social Issues (*satisfies 3.0 credits of GE for College of Science core*)
- PHIL 20700 - Ethics For Technology, Engineering, And Design (*satisfies Multidisciplinary Experience and 3.0 credits of GE for College of Science core*)
- PHIL 20800 - Ethics Of Data Science (*must be 3.00 Credit Hour option; satisfies Multidisciplinary Experience and 3.0 credits of GE for College of Science core*)

## MA Selective (3 credits)

Choose one.

- MA 42800 - Introduction To Fourier Analysis
- MA 44200 - Honors Real Analysis II

## CS Selective (3 credits)

Choose one.

- CS 31400 - Numerical Methods
- CS 38100 - Introduction To The Analysis Of Algorithms
- CS 44000 - Large Scale Data Analytics
- CS 47100 - Introduction to Artificial Intelligence
- CS 47500 - Human-Computer Interaction

## Capstone (3 credits)

Students choosing a Zero-Credit Capstone Experience option must complete an additional selective from either the CS Selective or MA Selective course lists.

*Choose one option below.*

### Credit Course Options:

- MA 49000 - Topics In Mathematics For Undergraduates -- (Approved Research Project In Data Science) - Credit Hours: 3.00
- MA 49000 -- Data Science Capstone - Credit Hours: 3.00
- STAT 49000 - Topics In Statistics For Undergraduates -- (Approved Research Project In Data Science) - Credit Hours: 3.00
- STAT 49000 -- Data Science Capstone - Credit Hours: 3.00
- CS 49000 - Topics In Computer Sciences For Undergraduates - DSC-Data Science Capstone - Credit Hours: 3.00
- CS 49000 - Topics In Computer Sciences For Undergraduates (Approved Research Project in Data Science) - Credit Hours 3.00
- CS 43900 - Introduction To Data Visualization
- CS 30700 - Software Engineering I - Project must be approved.
- CS 49700 - Honors Research Project - Project must be approved.
- EPCS 41100 - Senior Design Participation In EPICS and
- EPCS 41200 - Senior Design Participation In EPICS - Project must be approved.

### Zero-Credit Options:

- CS 38600 - Professional Practice IV (must be approved in advance) or
- MA 38600 - Professional Practicum IV (must be approved in advance) or
- STAT 39499 - Extensive Cooperative Experience IV
- CS 48700 - Professional Practice V (must be approved in advance) or
- MA 48700 - Professional Practicum V (must be approved in advance) or
- STAT 39599 - Extensive Cooperative Experience V
- CS 49000 Research Project in Data Science (Project must be approved) - Credit Hours: 0.00 or
- STAT 49000 Research Project in Data Science (Project must be approved) - Credit Hours: 0.00

## Other Departmental/Program Course Requirements (29-49 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here** (ADD LINK IN ACALOG). (satisfies OC for core)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

\*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.

International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

### Computing

*Met with required major coursework.*

### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I (*Met with required major coursework*)
- General Education Option II
- General Education Option III

### Great Issues In Science (3 credits)

Choose one from this list.

### Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (*satisfies Science for core*).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core)*

- MA 16100 - Plane Analytic Geometry And Calculus I (Must have C or better to meet prerequisite for CS 18200)  
or
- MA 16500 - Analytic Geometry And Calculus I (Must have C or better to meet prerequisite for CS 18200)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology & Society

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics

*Met with required major coursework.*

## Team-Building and Collaboration

*Met with required major coursework.*

## Electives (10-31 credits)

*MA 10800 Mathematics As A Profession And A Discipline is a recommended elective and CS 19300 - Tools is a required freshman seminar course; corequisite with CS 18000. They are not degree requirements.*

## Grade Requirements

- \*All courses required for the major, regardless of department, must be completed with a grade of "C" or better.
- \*All prerequisites to CS, MA, and STAT courses required for the major, regardless of department, must be completed with a grade of "C" or better.

## GPA Requirements

- 2.0 Major and Graduation GPA required for Bachelor of Science degree.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).

- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## Transfer Credit Policy

- Equivalent 10000 and 20000-level Mathematics (MA) transfer credit courses (including credit from regional campuses) may be used to meet degree requirements if those courses were taken prior to admission to the Purdue West Lafayette Data Science, B.S. Mathematics program.
- Equivalent 10000 and 20000-level Computer Science (CS) transfer credit courses (including credit from regional campuses) may be used to meet degree requirements if those courses were taken prior to admission to the Purdue West Lafayette Data Science, B.S. Mathematics program.
- CS and MA transfer credit at the 30000-40000-level may not be used to meet degree requirements. As exception to this policy is the application of pre-approved Study Abroad coursework.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

### Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming
- CS 19300 - Tools
- MA 10800 - Mathematics As A Profession And A Discipline
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 3.00

### 16-18 Credits

### Spring 1st Year

- CS 18200 - Foundations Of Computer Science
- CS 38003 - Python Programming
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First-Year Composition Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 1.00

### 15-18 Credits

### Fall 2nd Year

- STAT 35500 - Statistics For Data Science
- CS 24200 - Introduction To Data Science or
- STAT 24200 - Introduction To Data Science
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 - 3.00

### 14-18 Credits

### Spring 2nd Year

- CS 25100 - Data Structures And Algorithms

- MA 35100 - Elementary Linear Algebra
- MA 41600 - Probability or
- STAT 41600 - Probability
- Ethics Selective♦ - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 - 2.00

## 16-18 Credits

### Fall 3rd Year

- COM 21700 - Science Writing And Presentation
- STAT 41700 - Statistical Theory
- CS 37300 - Data Mining And Machine Learning or
- MA 37400 - Mathematical Foundations For Machine Learning
- MA 34100 - Foundations Of Analysis or
- MA 44000 - Honors Real Analysis I
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15-16 Credits

### Spring 3rd Year

- MA 37500 - Introduction To Discrete Mathematics
- CS 34800 - Information Systems or
- MA 34900 - Signals And Systems For Mathematicians
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

### Fall 4th Year

- MA 42100 - Linear Programming And Optimization Techniques
- MA 43200 - Elementary Stochastic Processes
- CS Selective - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00

## 16-17 Credits

### Spring 4th Year

- Math Selective - Credit Hours: 3.00
- Capstone Experience/Course - Credit Hours: 0.00 - 3.00

- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00

## 13-18 Credits

## Pre-Requisite Information

For pre-requisite information, click [here](#).

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Mathematics Education, BS

### About the Program

Math students enjoy a great deal of personal attention. Most math classes for math majors have 40 or fewer students, and many upper-level classes have fewer than 25 students. In addition, the math curriculum is flexible enough that students can take classes in other interest areas or pursue a double major or a minor without too much difficulty. Math specializations include:

- Applied Mathematics
- Mathematics / Business



- Mathematics
- Mathematics Teaching
- Mathematics with Computer Science
- Mathematics with Statistics

Important note: When applying for any specialization within Mathematics, select "Mathematics" as your major. You will have the opportunity to specialize as you progress through the curriculum.

This program meets state and national licensure standards and is accredited by the Council for the Accreditation of Education Preparation (CAEP) and the State of Indiana, State Board of Education. Admission to and successful completion of the Teacher Education Program (TEP) are required. <https://www.education.purdue.edu/licensure/>

Mathematics Website

Mathematics Education Major Change (CODO) Requirements

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation

- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

#### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## Departmental/Program Major Courses (87-91 credits)

### Required Major Courses (43-47 credits)

#### **CONTENT COURSES**

*Average GPA in courses must be 2.50 or higher in **Required Major Courses**. (higher of grade between STAT 35000 and MA 48400 is used)*

- MA 35100 - Elementary Linear Algebra (student SHOULD earn a B- or better)
- MA 36600 - Ordinary Differential Equations
- MA 37500 - Introduction To Discrete Mathematics
- MA 46000 - Geometry
- MA 48400 - Seminar On Teaching College Algebra And Trigonometry
- STAT 31100 - Introductory Probability
- STAT 35000 - Introduction To Statistics ♦
- MA 30100 - An Introduction To Proof Through Real Analysis or
- MA 34100 - Foundations Of Analysis
- MA 45000 - Algebra Honors or
- MA 45300 - Elements Of Algebra I
- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦

#### Calculus I Option

- MA 16100 - Plane Analytic Geometry And Calculus I (student SHOULD earn a B- or better) or
- MA 16500 - Analytic Geometry And Calculus I (student SHOULD earn a B- or better)

#### Calculus II Option

- MA 16200 - Plane Analytic Geometry And Calculus II or

- MA 16600 - Analytic Geometry And Calculus II

## Calculus III Option

- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
  - should only be taken by first year (first semester) students that have credit for Calculus I and II. Students should talk to their advisor about this option.

## Professional Education Requirements (44 credits)

*All Professional Education courses, including Learn (Specialty) Pathway Concentration courses, are calculated into the Professional Education GPA ("B" average with no grade lower than a "C").*

- EDCI 20002 - Special Populations Seminar: English Language Learners And Students With Gifts And Talents
- EDCI 20500 - Exploring Teaching As A Career ♦ (2 credits required)
- EDCI 22550 - Mathematics Education Seminar
- EDCI 27000 - Introduction To Educational Technology And Computing (1 credit required)
- EDCI 28500 - Multiculturalism And Education ♦ (2 credits required)
- EDCI 30900 - Reading In Middle And Secondary Schools: Methods And Problems (1 credit required)
- EDCI 35000 - Community Issues & Applications For Educators (1 credit required)
- EDCI 37001 - Teaching And Learning English As A New Language (2 credits required)
- EDCI 42500 - Teaching Of Secondary Mathematics - Methods I
- EDCI 42600 - Teaching Of Secondary Mathematics - Methods II
- EDCI 49800 - Supervised Teaching (12 credits required)
- EDPS 20001 - Special Populations Seminar: Focus On Students With Disabilities And Differentiation Approaches
- EDPS 23500 - Learning And Motivation (2 credits required)
- EDPS 24000 - Children With Gifts, Creativity, And Talents
- EDPS 24800 - Differentiating Curriculum And Instruction
- EDPS 26501 - The Inclusive Classroom
- EDPS 32700 - Classroom Assessment (1 credit required)
- EDPS 36201 - Positive Behavioral Supports (2 credits required)
- EDPS 43010 - Secondary Creating And Managing Learning Environments (2 credits required)
- EDST 20010 - Educational Policies And Laws (1 credit required)

## Learner Pathway Selective (3 credits)

*Choose one course from one of the learner pathway areas below. Students can elect to take additional coursework to complete a full concentration if they choose, but is not required. See the links for concentration requirements.*

*If you desire additional information regarding the Learner Pathway Concentrations, please reach out to your academic advisor or visit the Learner Specialty Concentrations tab found here.*

### **English Language Learners**

- EDCI 51900 - Teaching English Language Learners
  - EDCI 52600 - Language Study For Educators
- High Ability** - All courses must be completed with a B- or better average.
- EDPS 54500 - Social And Affective Development Of Gifted Students

### **Special Education (SPED)**

- EDPS 21100 - Special Education Law, Policy, And Ethical Guidelines  
**Applied Behavior Analysis**
- EDPS 34100 - Introduction To Philosophical Underpinnings And Concepts Of Applied Behavior Analysis
- EDPS 34200 - Applied Behavior Analysis - Assessment And Intervention

## Optional Concentration

K-12 Integrated STEM Optional Concentration for Education

## Other Departmental/Program Course Requirements (24-48 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

## Composition & Presentation

### Written Communication

*Met with EDCI 20500 in major.*

### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

### Computing

*Met with required major coursework (CS 15900, CS 17600, CS 17700, CS 18000).*

### Cultural Diversity (Language & Culture)^\* (0-6 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I - *met with EDCI 28500 in major*
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (6 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I - *met with EDPS 23500 in major.*
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics

*Met with required major coursework (MA 16100/16500 and MA 16200/16600).*

## Science Technology and Society (3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics

*Met with required major coursework (STAT 35000).*

## Team-Building and Collaboration

*Met with EDCI 49800 in major.*

## Electives (0-11 credits)

## Grade Requirements

- *All Professional Education courses, including Learn (Specialty) Pathway Concentration courses, must be completed with no grade lower than a "C."*

## GPA Requirements

- *All Professional Education courses, including Learn (Specialty) Pathway Concentration courses, are calculated into the Professional Education GPA ("B" average with no grade lower than a "C").*
- *2.5 Graduation GPA required for Bachelor of Science degree.*

- Average GPA in courses must be 2.50 or higher in **Required Major Courses (MATH/STAT/CS CONTENT COURSES)**
- Average GPA in courses must be 3.00 or higher in **Required Major Courses (EDUCATIONAL CONTENT)**
- 2.5 Overall GPA is required for the Teacher Education Program and Indiana Licensure.
- 2.5 Content GPA, as calculated by the Office of Teacher Education and Licensure, is required for the Teacher Education Program and Indiana Licensure.
- 3.0 Professional Education GPA is required for the Teacher Education Program and Indiana Licensure.

## Course Requirements and Notes

- No Count Courses are not allowed for credit
- Overlapping Course Content courses - only one course can be used for courses considered to have overlapping content.
- A course can only be used once in the Major Course area.
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)

- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the Civics Literacy Proficiency website.

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- EDCI 20500 - Exploring Teaching As A Career ♦
- EDST 20010 - Educational Policies And Laws
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection (Language & Culture) - Credit Hours: 4.00
- Elective (MA 10800 strongly recommended) - Credit Hours: 1.00
- Elective - Credit Hours: 3.00 - 4.00

### 15-17 Credits

### Spring 1st Year

- EDCI 22550 - Mathematics Education Seminar
- EDCI 28500 - Multiculturalism And Education ♦
- EDCI 35000 - Community Issues & Applications For Educators
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

- Science Core Selection (Technical Writing/Technical Presentation) - Credit Hours: 3.00 - 4.00
- Science Core Selection (General Education) - Credit Hours: 3.00 - 4.00

## 14-17 Credits

### Fall 2nd Year

- EDCI 20002 - Special Populations Seminar: English Language Learners And Students With Gifts And Talents
- EDCI 37001 - Teaching And Learning English As A New Language
- EDPS 24000 - Children With Gifts, Creativity, And Talents
- EDPS 36201 - Positive Behavioral Supports
- MA 46000 - Geometry
- MA 26100 - Multivariate Calculus
- Science Core Selection (Science Laboratory) - Credit Hours: 3.00 - 4.00

## 16-18 Credits

### Spring 2nd Year

- EDPS 20001 - Special Populations Seminar: Focus On Students With Disabilities And Differentiation Approaches
- EDPS 23500 - Learning And Motivation
- EDPS 24800 - Differentiating Curriculum And Instruction
- EDPS 26501 - The Inclusive Classroom
- MA 37500 - Introduction To Discrete Mathematics
- STAT 31100 - Introductory Probability
- Science Core Selection (Laboratory Science) - Credit Hours: 3.00 - 4.00

## 15-16 Credits

### Fall 3rd Year

- EDCI 27000 - Introduction To Educational Technology And Computing
- EDCI 30900 - Reading In Middle And Secondary Schools: Methods And Problems
- MA 35100 - Elementary Linear Algebra
- CS 15900 - C Programming or
- CS 17700 - Programming With Multimedia Objects or
- CS 18000 - Problem Solving And Object-Oriented Programming
- MA 30100 - An Introduction To Proof Through Real Analysis or
- MA 34100 - Foundations Of Analysis
- Learner Specialty Pathway Course - Credit Hours: 3.00
- Science Core Selection (Language & Culture) - Credit Hours: 3.00



## 17-18 Credits

### Spring 3rd Year

- EDCI 42500 - Teaching Of Secondary Mathematics - Methods I
- MA 36600 - Ordinary Differential Equations
- STAT 35000 - Introduction To Statistics
- Science Core Selection (Great Issues) - Credit Hours: 3.00
- Science Core Selection (General Education) - Credit Hours: 3.00

## 16 Credits

### Fall 4th Year

- EDCI 42600 - Teaching Of Secondary Mathematics - Methods II
- EDPS 32700 - Classroom Assessment
- EDPS 43010 - Secondary Creating And Managing Learning Environments
- MA 48400 - Seminar On Teaching College Algebra And Trigonometry
- MA 45000 - Algebra Honors or
- MA 45300 - Elements Of Algebra I
- Science, Technology, Society Course - Credit Hours: 3.00

## 15-16 Credits

### Spring 4th Year

- EDCI 49800 - Supervised Teaching

## 12 Credits

### Pre-Requisite Information

For pre-requisite information, [click here](#).

### World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Mathematics Honors, BS

### About the Program

Math students enjoy a great deal of personal attention. Most math classes for math majors have 40 or fewer students, and many upper-level classes have fewer than 25 students. In addition, the math curriculum is flexible enough that students can take classes in other interest areas or pursue a double major or a minor without too much difficulty. Math specializations include:

- Applied Mathematics
- Mathematics / Business
- Mathematics
- Mathematics Teaching
- Mathematics with Computer Science
- Mathematics with Statistics

Important note: When applying for any specialization within Mathematics, select "Mathematics" as your major. You will have the opportunity to specialize as you progress through the curriculum.

Mathematics Website

Mathematics Major Change (CODO) Requirements (Students must CODO to Mathematics before Mathematics Honors.)

### Degree Requirements

## 120 Credits Required

### Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## **Departmental/Program Major Courses**

### **Required Major Courses (31 credits)**

- MA 35100 - Elementary Linear Algebra (students SHOULD earn a B- or better)

- MA 35301 - Linear Algebra II
- MA 36600 - Ordinary Differential Equations
- MA 42500 - Elements Of Complex Analysis
- MA 42800 - Introduction To Fourier Analysis
- MA 44000 - Honors Real Analysis I
- MA 44200 - Honors Real Analysis II
- MA 45000 - Algebra Honors

## MA Selectives (6 credits)

- Choose 6 credit hours.

## Computer Science

**Note:** *CS courses are space restricted. There is no guarantee of space availability in these courses for non-CS majors.*

- CS 24000 - Programming In C
- CS 25100 - Data Structures And Algorithms
- MA 34900 - Signals And Systems For Mathematicians
- MA 37400 - Mathematical Foundations For Machine Learning

## Discrete Mathematics, Foundations

- CS 38100 - Introduction To The Analysis Of Algorithms
- CS 48300 - Introduction To The Theory Of Computation
- MA 37500 - Introduction To Discrete Mathematics
- MA 38500 - Introduction To Logic

## Numerical Analysis

- CS 31400 - Numerical Methods
- CS 51400 - Numerical Analysis
- CS 51500 - Numerical Linear Algebra
- CS 52000 - Computational Methods In Optimization
- MA 42100 - Linear Programming And Optimization Techniques

## Statistics, Probability

- MA 41600 - Probability
- MA 43200 - Elementary Stochastic Processes
- STAT 41600 - Probability
- STAT 41700 - Statistical Theory
- STAT 51600 - Basic Probability And Applications
- STAT 51700 - Statistical Inference
- STAT 51900 - Introduction To Probability

## Advanced Topics Course

- MA 49500 - Advanced Topics In Mathematics For Undergraduates

Any MA 49500 title is acceptable; course must be at least 3.0 credits to be used as a selective course. The Mathematics Department will need to approve the category (Computer Science; Discrete Mathematics, Foundations; Numerical Analysis; Statistics, Probability) depending on course content. A course can only be used to meet one selective.

## Algebra Selectives

- MA 45401 - Galois Theory Honors

### Approved for MATH/MAED dual majors ONLY

*The course is repeatable, but only allowed once for degree requirements.*

- MA 48400 - Seminar On Teaching College Algebra And Trigonometry

### Approved for MATH/PHYS dual majors ONLY

*This option is a possibility for MATH/PHYS dual majors only. Students must meet qualifications per the Physics department to take these courses.*

- PHYS 60000 - Methods Of Theoretical Physics I
- PHYS 60100 - Methods Of Theoretical Physics II

## Other Departmental/Program Course Requirements (39-67 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

#### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

#### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here** (ADD LINK IN ACALOG). (satisfies OC for core)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

\*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.

International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

### Computing (3-4 credits)

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦

### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

### Great Issues In Science (3 credits)

Choose one from this list.

### Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

### Mathematics (8-10 credits)

(satisfies Quantitative Reasoning for core)

- MA 16100 - Plane Analytic Geometry And Calculus I or (students SHOULD earn a B- or better)
- MA 16500 - Analytic Geometry And Calculus I (students SHOULD earn a B- or better)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

### Science Technology and Society^\* (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

### Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 35500 - Statistics For Data Science ♦

### Team-Building and Collaboration\* (0-3 credits)

Choose one from this list.

### Required Pre-Requisite Course (4-5 Credits)

#### *Calculus III Option*

- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
  - should only be taken by first year (first semester) students that have credit for Calculus I and II. Students should talk to their advisor about this option.

### Electives (22-50 credits)

### Grade Requirements

- + *Student should strive to earn a B- or better.*

### GPA Requirements

- *Average GPA in courses must be 3.50 or higher in **Required Major Courses**.*
- *Average GPA in MA 44000, MA 44200 and MA 45000 must be 3.50 or higher.*
- *2.0 Graduation GPA required for Bachelor of Science degree.*

### Course Requirements and Notes

- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.
- No Count Courses are not allowed for credit
- Overlapping Course Content courses - only one course can be used for courses considered to have overlapping content.
- A course can only be used once in the Major Course area.

### College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.

- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
  - Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
  - The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade.
- University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
  - Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

### Upper Level Requirement



- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- MA 16100 - Plane Analytic Geometry And Calculus I + or
- MA 16500 - Analytic Geometry And Calculus I +
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (MA 10800 strongly recommended)
- Electives - Credit Hours: 4.00

### 15-18 Credits

### Spring 1st Year

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 5.00

### 15-18 Credits

### Fall 2nd Year

- MA 26100 - Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 5.00 (MA 30100 recommended)

### 15-18 Credits

## Spring 2nd Year

- COM 21700 - Science Writing And Presentation
- MA 35100 - Elementary Linear Algebra +
- MA 36600 - Ordinary Differential Equations
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 16-17 Credits

## Fall 3rd Year

- MA 42500 - Elements Of Complex Analysis
- MA 44000 - Honors Real Analysis I (*requires MA 35301 - students with calculus credit prior to beginning at Purdue may work with their advisor to alter their plan to meet pre-requisites for MA 44000 in Fall junior year. Students beginning in Calculus I first semester should plan to take MA 44000 in a later fall semester.*)
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 2.00

## 15-17 Credits

## Spring 3rd Year

- MA 35301 - Linear Algebra II
- STAT 35000 - Introduction To Statistics ♦ or
- STAT 35500 - Statistics For Data Science ♦
- MA 42800 - Introduction To Fourier Analysis
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-16 Credits

## Fall 4th Year

- MA 45000 - Algebra Honors

- MA Selective - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Great Issues In Science Option - Credit Hours: 3.00

## 15-18 Credits

### Spring 4th Year

- MA 44200 - Honors Real Analysis II  
(requires MA 35301)
- MA Selective - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15 Credits

### Pre-Requisite Information

For pre-requisite information, click [here](#).

### World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

### Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

### Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Mathematics, BS

## About the Program

Math students enjoy a great deal of personal attention. Most math classes for math majors have 40 or fewer students, and many upper-level classes have fewer than 25 students. In addition, the math curriculum is flexible enough that students can take classes in other interest areas or pursue a double major or a minor without too much difficulty. Math specializations include:

- Applied Mathematics
- Mathematics / Business
- Mathematics
- Mathematics Teaching
- Mathematics with Computer Science
- Mathematics with Statistics

Important note: When applying for any specialization within Mathematics, select "Mathematics" as your major. You will have the opportunity to specialize as you progress through the curriculum.

Mathematics Website

Mathematics Major Change (CODO) Requirements

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

#### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## Departmental/Program Major Courses

### Required Major Courses (28 credits)

- MA 35100 - Elementary Linear Algebra +
- MA 35301 - Linear Algebra II
- MA 36600 - Ordinary Differential Equations
- MA 42500 - Elements Of Complex Analysis
- MA 34100 - Foundations Of Analysis or
- MA 44000 - Honors Real Analysis I
- MA 45300 - Elements Of Algebra I or
- MA 45000 - Algebra Honors

### Math Selective (9 credits)

*No more than two courses in any one category.*

#### Analysis

- MA 42800 - Introduction To Fourier Analysis
- MA 44000 - Honors Real Analysis I
- MA 44200 - Honors Real Analysis II

#### Computer Science

**Note:** CS courses are space restricted. There is no guarantee of space availability in these courses for non-CS majors.

- CS 24000 - Programming In C
- CS 25100 - Data Structures And Algorithms
- MA 37400 - Mathematical Foundations For Machine Learning
- MA 34900 - Signals And Systems For Mathematicians

### Discrete Mathematics, Foundations

- CS 38100 - Introduction To The Analysis Of Algorithms
- CS 48300 - Introduction To The Theory Of Computation
- MA 37500 - Introduction To Discrete Mathematics
- MA 38500 - Introduction To Logic

### Numerical Analysis

- CS 31400 - Numerical Methods
- CS 51400 - Numerical Analysis
- CS 51500 - Numerical Linear Algebra
- CS 52000 - Computational Methods In Optimization
- MA 42100 - Linear Programming And Optimization Techniques

### Statistics, Probability

- MA 41600 - Probability
- MA 43200 - Elementary Stochastic Processes
- STAT 41600 - Probability
- STAT 41700 - Statistical Theory
- STAT 51600 - Basic Probability And Applications
- STAT 51700 - Statistical Inference
- STAT 51900 - Introduction To Probability

### Advanced Topics Course

- MA 49500 - Advanced Topics In Mathematics For Undergraduates Any MA 49500 title is acceptable; course must be at least 3.0 credits to be used as a selective course. The Mathematics Department will need to approve the category (Computer Science; Discrete Mathematics, Foundations; Numerical Analysis; Statistics, Probability) depending on course content. A course can only be used to meet one selective.

### Allowed for MATH/MAED dual majors ONLY

*The course is repeatable, but only allowed once for degree requirements.*

- MA 48400 - Seminar On Teaching College Algebra And Trigonometry

### Allowed for MATH/PHYS dual majors ONLY

*This option is a possibility for MATH/PHYS dual majors only. Students must meet qualifications per the Physics department to take these courses.*

- PHYS 60000 - Methods Of Theoretical Physics I

- PHYS 60100 - Methods Of Theoretical Physics II

## Other Departmental/Program Course Requirements (39-67 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

#### Composition & Presentation

##### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

##### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

##### Computing (3-4 credits)

- CS 15900 - C Programming ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦

##### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

##### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I

- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

(satisfies Quantitative Reasoning for core)

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society<sup>\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 35500 - Statistics For Data Science ♦

## Team-Building and Collaboration<sup>\*</sup> (0-3 credits)

Choose one from this list.

## Required Pre-Requisite Course (4-5 Credits)

*Calculus III Option*

- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
  - should only be taken by first year (first semester) students that have credit for Calculus I and II. Students should talk to their advisor about this option.

## Electives (25-53 credits)



## Grade Requirements

- + *Students should strive to earn a B- or better.*

## GPA Requirements

- *Average GPA in courses must be 2.00 or higher in **Required Major Courses**.*
- *2.0 Graduation GPA required for Bachelor of Science degree.*

## Course Requirements and Notes

- No Count Courses are not allowed for credit
- Overlapping Course Content courses - only one course can be used for courses considered to have overlapping content.
- A course can only be used once in the Major Course area.
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
  - The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
  - Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
  - Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
  - The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade.
- University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
  - Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)

- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- MA 16100 - Plane Analytic Geometry And Calculus I + or
- MA 16500 - Analytic Geometry And Calculus I +
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (MA 10800 strongly recommended)
- Elective - Credit Hours: 3.00 - 4.00

### 15-17 Credits

### Spring 1st Year

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦

- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 5.00

## 15-18 Credits

### Fall 2nd Year

- MA 26100 - Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00 (MA 30100 recommended)
- Elective - Credit Hours: 2.00

## 15-18 Credits

### Spring 2nd Year

- COM 21700 - Science Writing And Presentation
- MA 35100 - Elementary Linear Algebra +
- STAT 35000 - Introduction To Statistics ♦ or
- STAT 35500 - Statistics For Data Science ♦
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 - 3.00

## 15 Credits

### Fall 3rd Year

- MA 36600 - Ordinary Differential Equations
- MA 34100 - Foundations Of Analysis or
- MA 44000 - Honors Real Analysis I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 5.00

## 15-16 Credits

### Spring 3rd Year

- MA 35301 - Linear Algebra II
- Math Selective - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 6.00

## 15-16 Credits

## Fall 4th Year

- MA 42500 - Elements Of Complex Analysis
- MA 45300 - Elements Of Algebra I or
- MA 45000 - Algebra Honors
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Great Issues In Science Option - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 0.00 - 3.00

## 15-18 Credits

## Spring 4th Year

- Math Selective - Credit Hours: 3.00
- Math Selective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15 Credits

## Pre-Requisite Information

For pre-requisite information, [click here](#).

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## **Mathematics/Business, BS**

### About the Program

Math students enjoy a great deal of personal attention. Most math classes for math majors have 40 or fewer students, and many upper-level classes have fewer than 25 students. In addition, the math curriculum is flexible enough that students can take classes in other interest areas or pursue a double major or a minor without too much difficulty. Math specializations include:

- Applied Mathematics
- Mathematics / Business
- Mathematics
- Mathematics Teaching
- Mathematics with Computer Science
- Mathematics with Statistics

Important note: When applying for any specialization within Mathematics, select "Mathematics" as your major. You will have the opportunity to specialize as you progress through the curriculum.

Mathematics Website

Mathematics/Business Major Change (CODO) Requirements

### Degree Requirements

## **120 Credits Required**

### Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## **Departmental/Program Major Courses (40-43 credits)**

### **Required Major Courses (25 credits)**

*Average GPA in courses must be 2.00 or higher in **Required Major Courses**.*

- MA 35100 - Elementary Linear Algebra (student SHOULD earn a B- or better)
- MA 35301 - Linear Algebra II
- MA 36600 - Ordinary Differential Equations
- MA 37300 - Financial Mathematics
- STAT 51200 - Applied Regression Analysis
- MA 34100 - Foundations Of Analysis or
- MA 44000 - Honors Real Analysis I
- MA 41600 - Probability or
- STAT 41600 - Probability or
- STAT 51600 - Basic Probability And Applications
- MA 43200 - Elementary Stochastic Processes or
- STAT 41700 - Statistical Theory or
- STAT 51700 - Statistical Inference

## Minor Requirement (15-18 credits)

*Students must earn a minor in ACCOUNTING, ECONOMICS, BUSINESS ECONOMICS or MANAGEMENT to complete the major.*

## Other Departmental/Program Course Requirements (39-67 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

#### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

#### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

#### Computing (3-4 credits)

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦

#### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

#### General Education^ (6 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I - *Met with required minor course (ECON 25100, ECON 25200, MGMT 20000, or MGMT 21200)*
- General Education Option II
- General Education Option III

### Great Issues In Science (3 credits)

Choose one from this list.

### Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

### Mathematics (8-10 credits)

(satisfies Quantitative Reasoning for core)

- MA 16100 - Plane Analytic Geometry And Calculus I (student SHOULD earn a B- or better) or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

### Science Technology and Society<sup>^\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

### Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 35500 - Statistics For Data Science ♦

### Team-Building and Collaboration<sup>\*</sup> (0-3 credits)

Choose one from this list.

### Required Pre-Requisite Course (4-5 Credits)

*Calculus III Option*

- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus



- should only be taken by first year (first semester) students that have credit for Calculus I and II. Students should talk to their advisor about this option.

## Electives (10-41 credits)

## Grade Requirements

- + *Students should strive to earn a B- or better.*

## GPA Requirements

- *Average GPA in courses must be 2.00 or higher in **Required Major Courses**.*
- *2.0 Graduation GPA required for Bachelor of Science degree.*

## Course Requirements and Notes

- No Count Courses are not allowed for credit
- Overlapping Course Content courses - only one course can be used for courses considered to have overlapping content.
- A course can only be used once in the Major Course area.
- Only one introductory programming language course can be used for credit.
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
  - The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
  - Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
  - Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
  - The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade.
- University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
  - Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

## University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- MA 16100 - Plane Analytic Geometry And Calculus I + or
- MA 16500 - Analytic Geometry And Calculus I +
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (MA 10800 strongly recommended)
- Electives - Credit Hours: 3.00 - 5.00

### 16-17 Credits

## Spring 1st Year

- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 15900 - C Programming ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 5.00

## 15 Credits

## Fall 2nd Year

- MA 37300 - Financial Mathematics
- MA 26100 - Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Minor Course Selection - Credit Hours: 3.00 - 4.00
- Elective Credit Hours: 0-2.00

## 15-16 Credits

## Spring 2nd Year

- COM 21700 - Science Writing And Presentation
- MA 35100 - Elementary Linear Algebra +
- STAT 35000 - Introduction To Statistics ♦ or
- STAT 35500 - Statistics For Data Science ♦
- Minor Course Selection - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15 Credits

## Fall 3rd Year

- MA 41600 - Probability or
- STAT 41600 - Probability or
- STAT 51600 - Basic Probability And Applications
- MA 34100 - Foundations Of Analysis or
- MA 44000 - Honors Real Analysis I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 16-18 Credits

## Spring 3rd Year

- MA 35301 - Linear Algebra II
- Minor Course Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

## Fall 4th Year

- MA 36600 - Ordinary Differential Equations
- MA 43200 - Elementary Stochastic Processes or
- STAT 41700 - Statistical Theory or
- STAT 51700 - Statistical Inference
- Minor Course Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Great Issues Option - Credit Hours: 3.00

## 16-17 Credits

## Spring 4th Year

- STAT 51200 - Applied Regression Analysis
- Minor Course Selection - Credit Hours: 3.00
- Minor Course Selection or Elective - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15 Credits

## Pre-Requisite Information

For pre-requisite information, [click here](#).

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Mathematics/Computer Science, BS

### About the Program

Math students enjoy a great deal of personal attention. Most math classes for math majors have 40 or fewer students, and many upper-level classes have fewer than 25 students. In addition, the math curriculum is flexible enough that students can take classes in other interest areas or pursue a double major or a minor without too much difficulty. Math specializations include:

- Applied Mathematics
- Mathematics / Business
- Mathematics
- Mathematics Teaching
- Mathematics with Computer Science
- Mathematics with Statistics

Important note: When applying for any specialization within Mathematics, select "Mathematics" as your major. You will have the opportunity to specialize as you progress through the curriculum.

Mathematics Website

Mathematics/Computer Science Major Change (CODO) Requirements

### Degree Requirements

## 120 Credits Required

### Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major

- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## **Departmental/Program Major Courses**

### **Required Major Courses (31 credits)**

- CS 24000 - Programming In C
- CS 25100 - Data Structures And Algorithms
- CS 31400 - Numerical Methods
- MA 35100 - Elementary Linear Algebra (student SHOULD earn a B- or better)
- MA 36600 - Ordinary Differential Equations

- MA 37500 - Introduction To Discrete Mathematics

## MACS Math Selective (6 credits)

Choose two.

- MA 35301 - Linear Algebra II
- MA 38500 - Introduction To Logic
- MA 45000 - Algebra Honors
- MA 45300 - Elements Of Algebra I
- MA 49500 - Advanced Topics In Mathematics For Undergraduates
 

Any MA 49500 title is acceptable; course must be at least 3.0 credits to be used as a selective course. The Mathematics Department will need to approve the category (MACS Math Selective, CS Selective, or MA/STAT Selective) depending on course content. A course can only be used to meet one selective.

## CS Selective (3 credits)

Choose one.

- CS 33400 - Fundamentals Of Computer Graphics
- CS 37300 - Data Mining And Machine Learning
- CS 38100 - Introduction To The Analysis Of Algorithms
- CS 48300 - Introduction To The Theory Of Computation
- CS 51400 - Numerical Analysis
- CS 51500 - Numerical Linear Algebra
- CS 52000 - Computational Methods In Optimization
- MA 34900 - Signals And Systems For Mathematicians
- MA 37400 - Mathematical Foundations For Machine Learning
- MA 42100 - Linear Programming And Optimization Techniques
- MA 49500 - Advanced Topics In Mathematics For Undergraduates
 

Any MA 49500 title is acceptable; course must be at least 3.0 credits to be used as a selective course. The Mathematics Department will need to approve the category (MACS Math Selective, CS Selective, or MA/STAT Selective) depending on course content. A course can only be used to meet one selective.

## MA/STAT Selective (3 credits)

Choose one.

- MA 34100 - Foundations Of Analysis
- MA 44000 - Honors Real Analysis I
- MA 36200 - Topics In Vector Calculus
- MA 44200 - Honors Real Analysis II
- MA 45300 - Elements Of Algebra I
- MA 45000 - Algebra Honors
- MA 42500 - Elements Of Complex Analysis
- MA 49500 - Advanced Topics In Mathematics For Undergraduates
 

Any MA 49500 title is acceptable; course must be at least 3.0 credits to be used as a selective course. The Mathematics Department will need to approve the category (MACS Math Selective, CS Selective, or MA/STAT Selective) depending on course content. A course can only be used to meet one selective.
- STAT 42000 - Introduction To Time Series
- MA 41600 - Probability or

- STAT 41600 - Probability

## Other Departmental/Program Course Requirements (39-66 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

#### Composition & Presentation

##### First-Year Composition (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

##### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found [here](#). (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

##### Computing (4 credits)

- CS 18000 - Problem Solving And Object-Oriented Programming ♦

##### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

##### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III



## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

(satisfies Quantitative Reasoning for core)

- MA 16100 - Plane Analytic Geometry And Calculus I (student SHOULD earn a B- or better) or
- MA 16500 - Analytic Geometry And Calculus I (student SHOULD earn a B- or better)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society<sup>^\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics (3 credits)

- STAT 35000 - Introduction To Statistics ♦ or
- STAT 35500 - Statistics For Data Science ♦

## Team-Building and Collaboration<sup>\*</sup> (0-3 credits)

Choose one from this list.

## Required Pre-Requisite Course (4-5 Credits)

*Calculus III Option*

- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
  - should only be taken by first year (first semester) students that have credit for Calculus I and II. Students should talk to their advisor about this option.

## Electives (23-50 credits)

## Grade Requirements

- + *Students should strive to earn a B- or better.*

## GPA Requirements

- *Average GPA in courses must be 2.00 or higher in **Required Major Courses**.*
- *2.0 Graduation GPA required for Bachelor of Science degree.*

## Course Requirements and Notes

- No Count Courses are not allowed for credit
- Overlapping Course Content courses - only one course can be used for courses considered to have overlapping content.
- A course can only be used once in the Major Course area.
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
  - The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
  - Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
  - Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
  - The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade.
- University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
  - Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)

- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the Civics Literacy Proficiency website.

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- MA 16100 - Plane Analytic Geometry And Calculus I + or
- MA 16500 - Analytic Geometry And Calculus I +
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (MA 10800 strongly recommended)
- Electives - Credit Hours: 4.00

### 15-18 Credits

### Spring 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 4.00

### 15-17 Credits

### Fall 2nd Year

- MA 26100 - Multivariate Calculus
- STAT 35000 - Introduction To Statistics ♦ or
- STAT 35500 - Statistics For Data Science ♦
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 2.00

## 15-17 Credits

### Spring 2nd Year

- MA 35100 - Elementary Linear Algebra +
- MA 37500 - Introduction To Discrete Mathematics (used as CS 18200 pre-requisite)
- COM 21700 - Science Writing And Presentation
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15 Credits

### Fall 3rd Year

- CS 24000 - Programming In C
- MA 36600 - Ordinary Differential Equations
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 3.00
- Electives - Credit Hours: 2.00

## 15-16 Credits

### Spring 3rd Year

- CS 25100 - Data Structures And Algorithms
- MA 35301 - Linear Algebra II or
- MA 38500 - Introduction To Logic or
- MA 45000 - Algebra Honors or
- MA 45300 - Elements Of Algebra I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15-16 Credits

### Fall 4th Year

- CS 31400 - Numerical Methods or
- MA 51400 - Numerical Analysis
- MA 35301 - Linear Algebra II or

- MA 38500 - Introduction To Logic or
- MA 45000 - Algebra Honors or
- MA 45300 - Elements Of Algebra I
- Great Issue Option - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15 Credits

### Spring 4th Year

- MA/STAT Selective - Credit Hours: 3.00
- CS Selective - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 3.00 - 6.00

## 15-18 Credits

### Pre-Requisite Information

For pre-requisite information, [click here](#).

### World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

### Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

### Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

# Mathematics/Statistics, BS

## About the Program

Math students enjoy a great deal of personal attention. Most math classes for math majors are 40 students or less, and many upper level classes have fewer than 25 students. In addition, the math curriculum is flexible enough that students can take classes in other interest areas or pursue double major or a minor without too much difficulty. Math specializations include:

- Applied Mathematics
- Mathematics / Business
- Mathematics
- Mathematics Teaching
- Mathematics with Computer Sciences
- Mathematics with Statistics

Important note: When applying for any specialization within Mathematics, select "Mathematics" as your major. You will have the opportunity to specialize as you progress through the curriculum.

Mathematics Website

## Degree Requirements

### 120 Credits Required

#### Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the preceding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

#### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

#### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## Departmental/Program Major Courses (30-31 credits)

### Required Major Courses (21 credits)

*The average GPA in courses must be 2.00 in **Required Major Courses**. MA 37400 can only be used to meet one requirement in the Required Major Courses.*

- MA 35100 - Elementary Linear Algebra (student SHOULD earn a B- or better)
- MA 35301 - Linear Algebra II
- MA 43200 - Elementary Stochastic Processes
- STAT 51200 - Applied Regression Analysis
- STAT 35000 - Introduction To Statistics ♦ (satisfies Statistics Requirement for College of Science Core) or
- STAT 35500 - Statistics For Data Science ♦ (satisfies Statistics Requirement for College of Science Core) - this course is only an option for students in Data Science majors.
- MA 41600 - Probability or
- STAT 41600 - Probability or
- STAT 51600 - Basic Probability And Applications
- STAT 41700 - Statistical Theory or
- STAT 51700 - Statistical Inference
- MA 34100 - Foundations Of Analysis or
- MA 44000 - Honors Real Analysis I

### Advanced MA Selective (3-4 credits)

*Choose one below.*

- MA 34900 - Signals And Systems For Mathematicians

- MA 36600 - Ordinary Differential Equations
- MA 37400 - Mathematical Foundations For Machine Learning
- MA 37500 - Introduction To Discrete Mathematics
- MA 42100 - Linear Programming And Optimization Techniques
- MA 42500 - Elements Of Complex Analysis
- MA 42800 - Introduction To Fourier Analysis
- MA 44000 - Honors Real Analysis I
- MA 44200 - Honors Real Analysis II
- MA 45000 - Algebra Honors
- MA 45300 - Elements Of Algebra I
- MA 49500 - Advanced Topics In Mathematics For Undergraduates

Any MA 49500 title is acceptable; course must be at least 3.0 credits to be used as a selective course.

## STAT Selective (3 credits)

*Choose one below.*

- CS 37300 - Data Mining And Machine Learning (Data Science, Computer Science, Computer Science Honors majors only)
- IE 53000 - Quality Control
- MA 37400 - Mathematical Foundations For Machine Learning
- MA 43200 - Elementary Stochastic Processes (Cross-listed with STAT 43200)
- STAT 42000 - Introduction To Time Series
- STAT 51300 - Statistical Quality Control
- STAT 51400 - Design Of Experiments

One **3 credit** combination of the TDM courses below can be used to meet ONE STAT Selective

- TDM 10100 - The Data Mine Seminar I
- TDM 10200 - The Data Mine Seminar II
- TDM 20100 - The Data Mine Seminar III
- TDM 20200 - The Data Mine Seminar IV
- TDM 30100 - The Data Mine Seminar V
- TDM 30200 - The Data Mine Seminar VI
- TDM 40100 - The Data Mine Seminar VII
- TDM 40200 - The Data Mine Seminar VIII

## Other Departmental/Program Course Requirements (36-64 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

#### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)



## Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

## Computing (3-4 credits)

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦

## Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

## General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

(satisfies Quantitative Reasoning for core)

- MA 16100 - Plane Analytic Geometry And Calculus I (student SHOULD earn a B- or better) or
- MA 16500 - Analytic Geometry And Calculus I (student SHOULD earn a B- or better)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Multidisciplinary Experience<sup>^\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics

*Met with required major coursework (STAT 35000 or STAT 35500).*

## Team-Building and Collaboration\* (0-3 credits)

Choose one from this list.

## Required Pre-Requisite Course (4-5 Credits)

*Calculus III Option*

- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
  - should only be taken by first year (first semester) students that have credit for Calculus I and II. Students should talk to their advisor about this option.

## Electives (25-54 credits)

## Grade Requirements

- *Students should strive to earn a B- or better.*

## GPA Requirements

- *Average GPA in courses must be 2.00 in **Required Major Courses**.*
- *2.0 Graduation GPA required for Bachelor of Science degree.*

## Course Requirements and Notes

- Credits should be allowed in no more than one of STAT 30101, STAT 35000, STAT 35500, STAT 50100, and in no more than one of STAT 50300 and 51100.
- No Count Courses are not allowed for credit
- Overlapping Course Content courses - only one course can be used for courses considered to have overlapping content

- Only one introductory programming language course can be used for credit.
- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
  - The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
  - Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
  - Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
  - The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade.
- University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
  - Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or

- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- MA 16100 - Plane Analytic Geometry And Calculus I + or
- MA 16500 - Analytic Geometry And Calculus I +
- Science Core - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (MA 10800 strongly recommended)
- Electives - Credit Hours: 3.00-4.00

### 15-18 Credits

### Spring 1st Year

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 3.00
- Electives - Credit Hours: 2.00

### 15-18 Credits

### Fall 2nd Year

- MA 26100 - Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 5.00 (MA 30100 recommended)

## 15-18 Credits

### Spring 2nd Year

- COM 21700 - Science Writing And Presentation
- MA 35100 - Elementary Linear Algebra +
- STAT 35000 - Introduction To Statistics ♦ or
- STAT 35500 - Statistics For Data Science ♦
- Science Core Selection - Credit Hours: 3.00
- Electives - Credit Hours: 3.00

## 15 Credits

### Fall 3rd Year

- MA 34100 - Foundations Of Analysis or
- MA 44000 - Honors Real Analysis I
- MA 41600 - Probability or
- STAT 41600 - Probability or
- STAT 51600 - Basic Probability And Applications
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 3.00
- Electives - Credit Hours: 3.00

## 15-16 Credits

### Spring 3rd Year

- STAT 41700 - Statistical Theory or
- STAT 51700 - Statistical Inference
- MA 35301 - Linear Algebra II
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 3.00

## 15-17 Credits

### Fall 4th Year

- MA 43200 - Elementary Stochastic Processes
- STAT 51200 - Applied Regression Analysis
- Great Issues Option - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective (STS course recommended) - Credit Hours: 3.00

## 15-16 Credits

## Spring 4th Year

- Advanced MA Selective - Credit Hours: 3.00 - 4.00
- STAT Selective - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00-4.00
- Science Core Selection - Credit Hours: 3.00-4.00
- Electives - Credit Hours: 3.00

15-17 Credits

## Pre-Requisite Information

For pre-requisite information, click here.

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Minor

### **Mathematics Minor**

The Mathematics Minor provides a strong background in mathematics for students majoring in some other discipline.

### Requirements for the Minor (12-13 credits)

- Before undertaking this minor, the student must establish the prerequisites for the required minor courses.
- ALL COURSES REQUIRED FOR THIS MINOR MUST BE TAKEN AT PURDUE UNIVERSITY
- Transfer, AP, IB, and A LEVEL credit cannot be used for the minor.
- To qualify for the minor, courses must be completed with a C- or better (pass/no pass grade option is not allowed for the minor).
- The three courses used for Areas 2 and 3 cannot all be from the same group.

## Area 1 - Choose One (3 credits)

- MA 35100 - Elementary Linear Algebra
- MA 26500 - Linear Algebra (must be completed with a B- or better) \*
- MA 35301 - Linear Algebra II (recommended for students with TR or CR for MA 26500)

## Area 2 - Choose One (3 credits)

*The three courses used for Areas 2 and 3 cannot all be from the same group.*

### Algebra

- MA 45300 - Elements Of Algebra I
- MA 45000 - Algebra Honors

### Analysis

- MA 34100 - Foundations Of Analysis
- MA 44000 - Honors Real Analysis I

## Area 3 - Choose Two (6-7 credits)

*The three courses used for Areas 2 and 3 cannot all be from the same group.*

### Algebra

- MA 45000 - Algebra Honors
- MA 45300 - Elements Of Algebra I

### Analysis

- MA 30100 - An Introduction To Proof Through Real Analysis
- MA 34100 - Foundations Of Analysis
- MA 36200 - Topics In Vector Calculus
- MA 42500 - Elements Of Complex Analysis
- MA 42800 - Introduction To Fourier Analysis
- MA 44000 - Honors Real Analysis I
- MA 44200 - Honors Real Analysis II

### Computer Science

- CS 24000 - Programming In C or
- ECE 26400 - Advanced C Programming
- CS 25100 - Data Structures And Algorithms or
- ECE 36800 - Data Structures
- MA 37400 - Mathematical Foundations For Machine Learning
- MA 34900 - Signals And Systems For Mathematicians

## Differential Equations

*Only one differential equations course can be used in AREA 3.*

- MA 36600 - Ordinary Differential Equations or
- MA 26600 - Ordinary Differential Equations (must be completed with a B- or better)\*\* or
- MA 30300 - Differential Equations And Partial Differential Equations For Engineering And The Sciences

## Discrete Mathematics, Foundation

- CS 38100 - Introduction To The Analysis Of Algorithms
- CS 48300 - Introduction To The Theory Of Computation
- MA 37500 - Introduction To Discrete Mathematics
- MA 38500 - Introduction To Logic

## Linear Algebra

- MA 35301 - Linear Algebra II
- MA 42100 - Linear Programming And Optimization Techniques

## Numerical Analysis

- CS 31400 - Numerical Methods
- CS 51400 - Numerical Analysis
- CS 51500 - Numerical Linear Algebra
- CS 52000 - Computational Methods In Optimization

## Statistics, Probability

*Only one statistics, probability course can be used in AREA 3.*

- MA 41600 - Probability or
- STAT 41600 - Probability or
- STAT 41700 - Statistical Theory or
- STAT 51600 - Basic Probability And Applications or
- STAT 51900 - Introduction To Probability
- MA 43200 - Elementary Stochastic Processes

## Notes

- No substitutions are allowed.



- A course can only be used in one area.
- \*For many students, MA 26500 may not be adequate preparation for upper division mathematics classes. Students planning a Mathematics Minor should consider taking MA 35100 instead. Only students with a very firm grasp of the MA 26500 material (and a grade of B- or better) should contemplate taking MA 35301 without MA 35100.
- \*\* MA 26600 with at least a "B-" can be used in place of MA 36600 (only one of MA 26600/MA 36600/MA 30300 can be used in Area 3). MA 26200 will not be accepted for the minor.

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Pre-Program

### Data Science First Year (MA)

#### Data Science First Year

#### Program Requirements (25-28 credits)

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \* (*satisfies Computing and Teambuilding for College of Science core*)
- CS 18200 - Foundations Of Computer Science \*
- CS 38003 - Python Programming
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First Year Composition Selection - Credit Hours: 3.00-4.00
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 4.00

#### Fall 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \*
- CS 19300 - Tools
- MA 10800 - Mathematics As A Profession And A Discipline
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 3.00

#### 16-18 Credits

## Spring 1st Year

- CS 18200 - Foundations Of Computer Science \*
- CS 38003 - Python Programming
- MA 16600 - Analytic Geometry And Calculus II or
- MA 16200 - Plane Analytic Geometry And Calculus II
- Science Core First Year Composition Selection - Credit Hours: 3.00-4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 1.00

## 14-17 Credits

## Notes

- CS 19300 and MA 10800 are required freshman seminar courses; corequisites with CS 18000. They are not degree requirements.
- \*All MA, CS, and STAT courses required for the major, must be completed with a grade of "C" or better.
- All prerequisites to MA, CS, and STAT courses required for the major, regardless of department, must be completed with a grade of "C" or better.

# Department of Physics and Astronomy

## Overview

The Department of Physics and Astronomy serves the citizens of Indiana, the United States and the world through discovery that expands knowledge in the field of physics and closely related sciences, through conveyance of this knowledge to our students in an excellent learning environment, and through engagement in which we share our skills, knowledge, and enthusiasm with diverse communities beyond the University.

At present we have 60 faculty members, 22 postdocs and research scientists, 154 graduate students, and 231 undergraduate physics majors. These individuals conduct research across a broad spectrum of physics:

Accelerator mass spectrometry  
Applied physics, experimental  
Astrophysics, experimental and theoretical  
Atomic, molecular, and optical (AMO) physics, experimental and theoretical  
Biophysics, experimental and theoretical  
Condensed matter physics, experimental and theoretical  
Geophysics, experimental  
High energy nuclear physics, experimental and theoretical  
High energy particle physics, experimental and theoretical  
Physics education  
Planetary physics  
Quantum Information Science

Our faculty members are recognized as world leaders in their respective fields. Included in our ranks are a member of the National Academy of Sciences, a member of the national academy of engineering, a winner of the Hamburg Prize for Theoretical Physics, the immediate past president of the National Association for Research in Science Teaching, 3 AAAS fellows, and 10 APS fellows.

On campus, the department occupies two buildings, the "Physics Building" (originally named the Charles Benedict Stuart Laboratory of Applied Physics) and an attached two-story subterranean laboratory complex containing offices, work rooms, and laboratories dedicated to accelerator mass spectrometry, the Purdue Rare Isotope Measurement Laboratory (PRIME Lab). We also make use of campus facilities in Purdue's Discover Park, particularly the Birck Nanotechnology Center and the Bindley Bioscience Center. Off campus, we participate in research that occurs at the Large Hadron Collider at CERN, Argonne National Laboratory, Brookhaven National Laboratory, Fermilab, the Stanford Linear Accelerator, and several observatories around the globe.

Our department has undergraduate programs in Physics, Honors Physics, Applied Physics, Applied Honors Physics, and Physics Teaching. We also have undergraduate minors in both Astronomy and Physics. Our graduate program offers both M.S. and PH.D. Degrees with a wide variety of specializations.

All physics major students must complete the majority of upper level (300 level and above) physics courses in residence at Purdue. Students can use transfer credits for no more than 50 percent of the upper level physics courses in order to receive a Physics and Astronomy B.S. Degree.

Through our outreach programs we bring our love of physics to thousands of elementary and high school students and their teachers every year. Classroom visits are complete with demonstrations hands-on learning activities. Teachers receive high-quality, content-based professional development in our workshops and through summer research opportunities.

Department of Physics and Astronomy Website

#### **Faculty**

## **Contact Information**

#### **Mailing Address**

Department of Physics and Astronomy  
525 Northwestern Avenue  
West Lafayette, IN 47907-2036

#### **Telephone and Fax**

(765) 494-3000 (main office)  
(765) 494-2970 (undergraduate office)  
(765) 494-0706 (fax)

Department directory

#### **General questions**

physcontacts@purdue.edu

## **Graduate Information**

For Graduate Information please see Physics and Astronomy Graduate Program Information.

## **Baccalaureate**

# Applied Physics Honors, BS

## About the Program

Purdue Physics and Astronomy is an internationally recognized department for excellence in forefront research and undergraduate and graduate education. Our undergraduate classes for physics majors are taught by professors actively engaged in forefront research. Undergraduate research is strongly encouraged and opportunities exist as early as the second semester to work in a research group. These groups include experimental and theoretical condensed matter physics, high energy physics, nano-physics, nuclear physics, astrophysics, biological physics, geophysics, relativity, and interdisciplinary areas of material science, engineering, or computational science.

The department also helps undergraduates with external internships, particularly for the summers. Upon graduation our students are accepted for graduate programs at many of the top universities and are also sought after for positions in industry, particularly high-tech positions. Our graduates have an exceptional record of career accomplishment in a wide variety of settings, including academia and major industrial and government labs.

The specialties under the applied physics curriculum can range from different areas. Individually tailored specialties may be chosen by the student in consultation with an advisor. Currently available specialties include:

- Geophysics and Atmospheric Sciences
- Astrophysics
- Nuclear Physics
- Material Science & Engineering
- Medical Physics

In addition, many physics majors manage to complete dual or multiple major programs within the College of Science. This is possible because of a considerable overlap of the College of Science requirements. Popular dual majors with physics are: mathematics, planetary science, computer science and chemistry.

### **The following stipulations need to be met in order to be in, stay in and graduate in the Honors or Applied Honors Program:**

- No D+ or worse grade is allowed in any course for a student to stay in the Honors Programs.
  - No more than one C range grade is allowed in all physics courses taken for a student to graduate with Honor. Note that a course can be re-taken for the purpose of satisfying this guideline.
  - Both the physics AND overall GPAs of 3.0 or better are required for a student to graduate with Honor.
  - All the core courses (PHYS 17200, 27200, 30600, 30700, 34400, 34000, and 42200) be complete with a B or better.
- Physics Website

Physics Major Change (CODO) Requirements (Students must CODO into Physics before Honors.)

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## **Applied Physics Honors Major Courses (68-69 credits)**

### **Required Major Courses (44-45 credits)**

*Physics majors are required to take the Honors sections of PHYS 17200 in the fall and PHYS 27200 in the spring.*

- PHYS 17200 - Modern Mechanics ♦ (satisfies SCI for core; satisfies Teambuilding for College of Science core)
- PHYS 27200 - Electric And Magnetic Interactions ♦ (also satisfies SCI for core)
- PHYS 30600 - Mathematical Methods Of Physics I

- PHYS 30700 - Mathematical Methods Of Physics II
- PHYS 34000 - Modern Physics Laboratory
- PHYS 34400 - Introduction To Quantum Science
- PHYS 41000 - Physical Mechanics I Honors
- PHYS 41600 - Thermal And Statistical Physics Honors
- PHYS 42200 - Waves And Oscillations
- PHYS 43000 - Electricity And Magnetism I Honors
- PHYS 45000 - Intermediate Laboratory
- PHYS 46000 - Quantum Mechanics I Honors
- PHYS 59300 - Independent Research
- Calculus III Option - Select from:
- MA 26100 - Multivariate Calculus (satisfies Quantitative Reasoning for core) or
- MA 27101 - Honors Multivariate Calculus (satisfies Quantitative Reasoning for core)

### Major Selective\* - 24 credits

- Must be in chosen applied area(s) approved by the Physics and Astronomy Department
- Any >30000 level course taken for letter grade option (pass/no-pass option not approved) in the following course subjects:
- AAE, BIOL, CE, CHM, CS, EAPS, ECE, HSCI, ME, MSE

### Other Departmental/Program Course Requirements (37-66 credits)

#### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

#### Composition & Presentation

##### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

##### Technical Writing And Presentation\* (0 or 3 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

##### Computing (3-4 credits)

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦

## Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

## General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (8 credits)

(satisfies Science for core)

- CHM 11500 - General Chemistry ♦
- CHM 11600 - General Chemistry ♦

## Mathematics (8-10 credits)

(satisfies Quantitative Reasoning for core)

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society^ (0-3 credits)

Choose one from this list (select courses COULD satisfy Science, Technology, Society for core).

## Statistics (3 credits)

- STAT 30100 - Elementary Statistical Methods or

- STAT 35000 - Introduction To Statistics

## Team-Building and Collaboration

*Met with required major coursework (PHYS 17200) if taken at Purdue West Lafayette.*

## Electives (0-15 credits)

## Grade Requirements

- No more than one C grade (i.e., C+, C, or C-) is allowed in all physics courses taken
- No grade of D+ or worse is allowed in any course.
- ♦ Identified as a critical course. Students should earn minimum of a B- see advisor for further details
- No D+ or worse grade is allowed in any course for a student to stay in the Honors Programs.
- No more than one C range grade is allowed in all physics courses taken for a student to graduate with Honor. Note that a course can be re-taken for the purpose of satisfying this guideline.
- All the core courses (PHYS 17200, PHYS 27200, PHYS 30600, PHYS 30700, PHYS 34400, PHYS 34000, and PHYS 42200) be complete with a B or better.

## GPA Requirements

- 3.0 Graduation GPA required for Bachelor of Science degree.
- 3.0 average in PHYS/ASTR classes required to graduate.

## Course Requirements and Notes

- Physics majors are required to take the Honors sections of PHYS 17200 in the fall and PHYS 27200 in the spring.
  - Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.
- Courses below are considered to have overlapping course content. Only one instance of an overlapping content course will apply toward graduate requirements. Courses listed in blocks are representative of the overlapping relationship.*

### Group 1

- PHYS 17200 - Modern Mechanics
- PHYS 21800 - General Physics
- PHYS 22000 - General Physics
- PHYS 23300 - Physics For Life Sciences I
- PHYS 17200H
- PHYS P2010
- PHYS 20100 (will add titles & links at publish)

### Group 2

- PHYS 21900 - General Physics II
- PHYS 22100 - General Physics
- PHYS 23400 - Physics For Life Sciences II
- PHYS 24100 - Electricity And Optics



- PHYS 27200 - Electric And Magnetic Interactions
- PHYS P2020
- PHYS 27200H (will add titles & links at publish)

### Group 3

- PHYS 31000 - Intermediate Mechanics
- PHYS 41000 - Physical Mechanics I Honors
- PHYS 51000 - Physical Mechanics

### Group 4

- PHYS 32200 - Intermediate Optics
- PHYS 42200 - Waves And Oscillations

### Group 5

- PHYS 34200 - Modern Physics
- PHYS 34400 - Introduction To Quantum Science

### Group 6

- PHYS 33000 - Intermediate Electricity And Magnetism
- PHYS 43000 - Electricity And Magnetism I Honors
- PHYS 53000 - Electricity And Magnetism

### Group 7

- PHYS 36000 - Quantum Mechanics
- PHYS 46000 - Quantum Mechanics I Honors
- PHYS 55000 - Introduction To Quantum Mechanics

### Group 8

- PHYS 41600 - Thermal And Statistical Physics Honors
- PHYS 51500 - Thermal And Statistical Physics

## Non-course / Non-credit Requirements

### Earning Core Curricular Requirements through Experience

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
  - The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
  - Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
  - Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
  - The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade.
- University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
  - Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

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## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

**The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the Civics Literacy Proficiency website.**

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Additional Information

*Only one instance of an overlapping content course will apply towards graduation requirements. See: [https://www.purdue.edu/science/Current\\_Students/curriculum\\_and\\_degree\\_requirements/Overlap-Courses.pdf](https://www.purdue.edu/science/Current_Students/curriculum_and_degree_requirements/Overlap-Courses.pdf)*

## Sample 4-Year Plan

### Fall 1st Year

- CHM 11500 - General Chemistry ♦
- PHYS 17200 - Modern Mechanics ♦ (Honors sections)
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00

### 15-17 Credits

### Spring 1st Year

- PHYS 27200 - Electric And Magnetic Interactions ♦ (Honors sections)
- CHM 11600 - General Chemistry ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00 - 4.00

### 15-17 Credits

### Fall 2nd Year

- PHYS 30600 - Mathematical Methods Of Physics I
- PHYS 34000 - Modern Physics Laboratory
- PHYS 34400 - Introduction To Quantum Science
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00

### 15-17 Credits

## Spring 2nd Year

- PHYS 30700 - Mathematical Methods Of Physics II
  - PHYS 42200 - Waves And Oscillations
  - CS 15900 - C Programming or
  - CS 17600 - Data Engineering In Python or
  - CS 17700 - Programming With Multimedia Objects or
  - CS 18000 - Problem Solving And Object-Oriented Programming
- 
- STAT 30100 - Elementary Statistical Methods ♦ or
  - STAT 35000 - Introduction To Statistics ♦
  - Science Core Selection - Credit Hours: 3.00

16 Credits

## Fall 3rd Year

- COM 21700 - Science Writing And Presentation
- PHYS 41000 - Physical Mechanics I Honors
- PHYS 45000 - Intermediate Laboratory
- PHYS 46000 - Quantum Mechanics I Honors
- Science Core Selection - Credit Hours: 3.00

15-16 Credits

## Spring 3rd Year

- PHYS 43000 - Electricity And Magnetism I Honors
- Major Selective - Credit Hours: 3.00
- Major Selective - Credit Hours: 3.00
- Major Selective - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00

17 Credits

## Fall 4th Year

- PHYS 41600 - Thermal And Statistical Physics Honors
- PHYS 59300 - Independent Research
- Major Selective - Credit Hours: 3.00
- Major Selective - Credit Hours: 3.00
- Great Issues Option - Credit Hours: 3.00

16 Credits

## Spring 4th Year

- Major Selective - Credit Hours: 3.00
- Major Selective - Credit Hours: 3.00
- Major Selective - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00

## 16 Credits

## Pre-Requisite Information

For pre-requisite information, click [here](#).

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Applied Physics, BS

### About the Program

Purdue Physics and Astronomy is an internationally recognized department for excellence in forefront research and undergraduate and graduate education. Our undergraduate classes for physics majors are taught by professors actively engaged in forefront research. Undergraduate research is strongly encouraged and opportunities exist as early as the second semester to work in a research group. These groups include experimental and theoretical condensed matter physics, high energy physics, nano-physics, nuclear physics, astrophysics, biological physics, geophysics, relativity, and interdisciplinary areas of material science, engineering, or computational science.

The department also helps undergraduates with external internships, particularly for the summers. Upon graduation our students are accepted for graduate programs at many of the top universities and are also sought after for positions in industry, particularly high-tech positions. Our graduates have an exceptional record of career accomplishment in a wide variety of settings, including academia and major industrial and government labs.

The specialties under the applied physics curriculum can range from different areas. Individually tailored specialties may be chosen by the student in consultation with an advisor. Currently available specialties include:

- Geophysics and Atmospheric Sciences
- Astrophysics
- Nuclear Physics
- Material Science & Engineering
- Medical Physics

In addition, many physics majors manage to complete dual or multiple major programs within the College of Science. This is possible because of a considerable overlap of the College of Science requirements. Popular dual majors with physics are: mathematics, planetary sciences, computer science and chemistry.

Physics Website

Physics Major Change (CODO) Requirements (Students must CODO into Physics before Applied.)

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

#### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## Applied Physics Major Courses (64 - 66 credits)

### Required Major Courses (40-42 credits)

*Physics majors are required to take the Honors sections of PHYS 17200 and PHYS 27200.*

- PHYS 17200 - Modern Mechanics ♦ (satisfies Science for core; satisfies Teambuilding for College of Science core)
  - PHYS 27200 - Electric And Magnetic Interactions ♦ (satisfies Science for core)
  - PHYS 30600 - Mathematical Methods Of Physics I
  - PHYS 30700 - Mathematical Methods Of Physics II
  - PHYS 31000 - Intermediate Mechanics
  - PHYS 33000 - Intermediate Electricity And Magnetism
  - PHYS 34000 - Modern Physics Laboratory
  - PHYS 34400 - Introduction To Quantum Science
  - PHYS 36000 - Quantum Mechanics
  - PHYS 42200 - Waves And Oscillations
  - PHYS 45000 - Intermediate Laboratory
  - PHYS 51500 - Thermal And Statistical Physics
- Calculus III Option - Select from:
- MA 26100 - Multivariate Calculus (satisfies Quantitative Reasoning for core) or
  - MA 27101 - Honors Multivariate Calculus (satisfies Quantitative Reasoning for core)

### Major Selective\* - (24 credits)

- Any >30000 level course taken for letter grade option (pass/no-pass option not approved) in the following course subjects, as approved by the Physics and Astronomy Department:

- AAE, BIOL, CE, CHM, CS, EAPS, ECE, HSCI, ME, MSE

## Other Departmental/Program Course Requirements (37-66 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

#### Composition & Presentation

##### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

##### Technical Writing And Presentation\* (0 or 3 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found [here](#). (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

##### Computing (3-4 credits)

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦

##### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

##### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).



- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (8 credits)

(satisfies Science for core)

- CHM 11500 - General Chemistry ♦
- CHM 11600 - General Chemistry ♦

## Mathematics (8-10 credits)

(satisfies Quantitative Reasoning for core)

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society<sup>^\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here (satisfies STS for core).

## Statistics (3 credits)

- STAT 30100 - Elementary Statistical Methods ♦ or
- STAT 35000 - Introduction To Statistics ♦

## Team-Building and Collaboration

*Met with required major coursework (PHYS 17200) if taken at Purdue West Lafayette.*

## Electives (1-19 credits)

## Grade Requirements

- ♦ Identified as a critical course. Students should earn minimum of a B- see advisor for further details

## GPA Requirements

- 2.0 Graduation GPA required for Bachelor of Science degree.
- 2.0 average in PHYS/ASTR classes required to graduate.

# Course Requirements and Notes

- Physics majors are required to take the Honors sections of PHYS 17200 in the fall and PHYS 27200 in the spring.
  - Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.
- Courses below are considered to have overlapping course content. Only one instance of an overlapping content course will apply toward graduate requirements. Courses listed in blocks are representative of the overlapping relationship.*

## Group 1

- PHYS 17200 - Modern Mechanics
- PHYS 21800 - General Physics
- PHYS 22000 - General Physics
- PHYS 23300 - Physics For Life Sciences I
- PHYS 17200H
- PHYS P2010
- PHYS 20100

## Group 2

- PHYS 21900 - General Physics II
- PHYS 22100 - General Physics
- PHYS 23400 - Physics For Life Sciences II
- PHYS 24100 - Electricity And Optics
- PHYS 27200 - Electric And Magnetic Interactions
- PHYS P2020
- PHYS 27200H

## Group 3

- PHYS 31000 - Intermediate Mechanics
- PHYS 41000 - Physical Mechanics I Honors
- PHYS 51000 - Physical Mechanics

## Group 4

- PHYS 32200 - Intermediate Optics
- PHYS 42200 - Waves And Oscillations

## Group 5

- PHYS 34200 - Modern Physics
- PHYS 34400 - Introduction To Quantum Science

## Group 6

- PHYS 33000 - Intermediate Electricity And Magnetism
- PHYS 43000 - Electricity And Magnetism I Honors

- PHYS 53000 - Electricity And Magnetism

## Group 7

- PHYS 36000 - Quantum Mechanics
- PHYS 46000 - Quantum Mechanics I Honors
- PHYS 55000 - Introduction To Quantum Mechanics

## Group 8

- PHYS 41600 - Thermal And Statistical Physics Honors
- PHYS 51500 - Thermal And Statistical Physics

## Non-course / Non-credit Requirements

### Earning Core Curricular Requirements through Experience

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

## University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Additional Information

Only one instance of an overlapping content course will apply towards graduation requirements. See:

[https://www.purdue.edu/science/Current\\_Students/curriculum\\_and\\_degree\\_requirements/Overlap-Courses.pdf](https://www.purdue.edu/science/Current_Students/curriculum_and_degree_requirements/Overlap-Courses.pdf)

## Sample 4-Year Plan

### Fall 1st Year

- PHYS 17200 - Modern Mechanics ♦ (Honors sections)
- CHM 11500 - General Chemistry ♦
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00

## 15-17 Credits

### Spring 1st Year

- PHYS 27200 - Electric And Magnetic Interactions ♦ (Honors sections)
- CHM 11600 - General Chemistry ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15-17 Credits

### Fall 2nd Year

- PHYS 30600 - Mathematical Methods Of Physics I
- PHYS 34000 - Modern Physics Laboratory
- PHYS 34400 - Introduction To Quantum Science
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15-17 Credits

### Spring 2nd Year

- PHYS 30700 - Mathematical Methods Of Physics II
- PHYS 42200 - Waves And Oscillations
- STAT 30100 - Elementary Statistical Methods ♦ or
- STAT 35000 - Introduction To Statistics ♦
  
- CS 15900 - C Programming or
- CS 17600 - Data Engineering In Python or
- CS 17700 - Programming With Multimedia Objects or
- CS 18000 - Problem Solving And Object-Oriented Programming
  
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 16-18 Credits

### Fall 3rd Year

- COM 21700 - Science Writing And Presentation
- PHYS 31000 - Intermediate Mechanics
- PHYS 33000 - Intermediate Electricity And Magnetism
- PHYS 45000 - Intermediate Laboratory
  
- Science Core Selection - Credit Hours: 3.00

## 16-17 Credits

### Spring 3rd Year

- PHYS 36000 - Quantum Mechanics
- PHYS 51500 - Thermal And Statistical Physics
- Major Selective - Credit Hours: 3.00
- Major Selective - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00

## 15 Credits

### Fall 4th Year

- Major Selective - Credit Hours: 3.00
- Major Selective - Credit Hours: 3.00
- Major Selective - Credit Hours: 3.00
- Great Issues Option - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00

## 14 Credits

### Spring 4th Year

- Major Selective - Credit Hours: 3.00
- Major Selective - Credit Hours: 3.00
- Major Selective - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Electives - Credit Hours: 2.00

## 14 Credits

## Pre-Requisite Information

For pre-requisite information, [click here](#).

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Physics Honors, BS

### About the Program

Purdue Physics and Astronomy is an internationally recognized department for excellence in forefront research and undergraduate and graduate education. Our undergraduate classes for physics majors are taught by professors actively engaged in forefront research. Undergraduate research is strongly encouraged and opportunities exist as early as the second semester to work in a research group. These groups include experimental and theoretical condensed matter physics, high energy physics, nano-physics, nuclear physics, astrophysics, biological physics, geophysics, relativity, and interdisciplinary areas of material science, engineering, or computational science.

The department also helps undergraduates with external internships, particularly for the summers. Upon graduation our students are accepted for graduate programs at many of the top universities and are also sought after for positions in industry, particularly high-tech positions. Our graduates have an exceptional record of career accomplishment in a wide variety of settings, including academia and major industrial and government labs.

The honors program offers an intensive concentration in physics that provides a solid foundation for advanced studies. Successful graduates of this challenging program are recognized for both the depth and breadth of their physics education, and they have gone on to the premier graduate schools in the country and, ultimately, to many different career choices.

The honors program provides a solid theoretical and experimental background in mechanics, electromagnetism, waves and oscillations, thermal physics, quantum mechanics, and the micro-structure of matter.

A very important feature of this plan is a senior research project (PHYS 59300) with a written report in some area of modern physics, such as condensed matter physics, nuclear physics, elementary particle physics, biophysics, geophysics, etc. Students receive individual supervision and guidance from a faculty member whose specialty matches the area of their research project. PHYS 59300 introduces students to the type of research atmosphere they later might encounter as professional physicists, and it promotes self-motivation and independence in their work.

The Honors Program in the Department of Physics and Astronomy begins in the Junior Year. All physics majors typically start by taking PHYS 17200 and PHYS 27200 as freshmen. Students from other majors who have taken PHYS 17200/PHYS 27200 may switch into the Honors Physics major. Admission to, and continuation in, the honors program requires that all the core courses (PHYS 17200, PHYS 27200, PHYS 30600, PHYS 30700, PHYS 34400, PHYS 34000, and PHYS 42200) be complete with a B or better, or special permission from the Physics Undergraduate Committee.

**The following stipulations need to be met in order to be in, stay in and graduate in the Honors or Applied Honors Program:**

- No D+ or worse grade is allowed in any course for a student to stay in the Honors Programs.
- No more than one C range grade is allowed in all physics courses taken for a student to graduate with Honor. Note that a course can be re-taken for the purpose of satisfying this guideline.
- Both the physics AND overall GPAs of 3.0 or better are required for a student to graduate with Honor.
- All the core courses (PHYS 17200, PHYS 27200, PHYS 30600, PHYS 30700, PHYS 34400, PHYS 34000, and PHYS 42200) be complete with a B or better.

Physics Website

Physics Major Change (CODO) Requirements (Students must CODO into Physics before moving into Physics Honors.)

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing



- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

#### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## Physics Honors Major Courses (66-68 credits)

### Required Major Courses (51-52 credits)

- PHYS 17200 - Modern Mechanics ♦ (Physics majors are required to take the honors sections; satisfies Science for core; satisfies Teambuilding Experience for College of Science core)
- PHYS 27200 - Electric And Magnetic Interactions ♦ (Physics majors are required to take the honors sections; also satisfies Science for core)
- PHYS 30600 - Mathematical Methods Of Physics I
- PHYS 30700 - Mathematical Methods Of Physics II
- PHYS 34000 - Modern Physics Laboratory
- PHYS 34400 - Introduction To Quantum Science
- PHYS 41000 - Physical Mechanics I Honors
- PHYS 41100 - Physical Mechanics II Honors
- PHYS 41600 - Thermal And Statistical Physics Honors
- PHYS 42200 - Waves And Oscillations
- PHYS 43000 - Electricity And Magnetism I Honors
- PHYS 43100 - Electricity And Magnetism II Honors
- PHYS 45000 - Intermediate Laboratory
- PHYS 46000 - Quantum Mechanics I Honors
- PHYS 46100 - Quantum Mechanics II Honors
- PHYS 59300 - Independent Research

#### **Calculus III Options** - Credit Hours: 4-5

- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus

### Major Selective\* (15-16 credits)

#### **Advanced Lab Options**

- PHYS 53600 - Electronic Techniques For Research or
- PHYS 58000 - Computational Physics
- PHYS/ASTR Selective  $\geq$  500 level - Credit Hours: 3.00
- PHYS/ASTR Selective  $\geq$  500 level - Credit Hours: 3.00

- Science/Engineering Selective  $\geq$  300 level ( could be met by Statistics for College of Science core) - Credit Hours: 3.00
- Science/Engineering Selective  $\geq$  300 level ( could be met by Statistics for College of Science core) - Credit Hours: 3.00

## Other Departmental/Program Course Requirements (43-62 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

#### Composition & Presentation

##### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

##### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found [here](#). (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

##### Computing (3-4 credits)

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦

##### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

##### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (8 credits)

(satisfies Science for core)

- CHM 11500 - General Chemistry ♦
- CHM 11600 - General Chemistry ♦

## Mathematics (8-10 credits)

(satisfies Quantitative Reasoning for core)

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Multidisciplinary Experience<sup>^\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here (satisfies STS for core).

## Statistics (3 credits)

- STAT 30100 - Elementary Statistical Methods ♦ or
- STAT 35000 - Introduction To Statistics ♦

## Team-Building and Collaboration

*Met with required major coursework (PHYS 17200) if taken at Purdue West Lafayette.*

## Electives (1-17 credits)

## Grade Requirements

- No more than one C grade (i.e., C+, C, or C-) is allowed in all physics courses taken
- No grade of D+ or worse is allowed in any course.
- ♦ Identified as a critical course. Students should earn minimum of a B- see advisor for further details
- No D+ or worse grade is allowed in any course for a student to stay in the Honors Programs.

- No more than one C range grade is allowed in all physics courses taken for a student to graduate with Honor. Note that a course can be re-taken for the purpose of satisfying this guideline.
- All the core courses (PHYS 17200, PHYS 27200, PHYS 30600, PHYS 30700, PHYS 34400, PHYS 34000, and PHYS 42200) be complete with a B or better.

## GPA Requirements

- Both the physics AND overall GPAs of 3.0 or better are required for a student to graduate with Honor.
- 3.0 Graduation GPA required for Bachelor of Science degree.
- 3.0 average in PHYS/ASTR classes required to graduate.

## Course Requirements and Notes

- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements.
- Courses below are considered duplicate content.

### Group 1

- PHYS 17200 - Modern Mechanics
- PHYS 21800 - General Physics
- PHYS 22000 - General Physics
- PHYS 23300 - Physics For Life Sciences I
- PHYS 17200H
- PHYS P2010
- PHYS 20100

### Group 2

- PHYS 21900 - General Physics II
- PHYS 22100 - General Physics
- PHYS 23400 - Physics For Life Sciences II
- PHYS 24100 - Electricity And Optics
- PHYS 27200 - Electric And Magnetic Interactions
- PHYS P2020
- PHYS 27200H

### Group 3

- PHYS 31000 - Intermediate Mechanics
- PHYS 41000 - Physical Mechanics I Honors
- PHYS 51000 - Physical Mechanics

### Group 4

- PHYS 32200 - Intermediate Optics
- PHYS 42200 - Waves And Oscillations

## Group 5

- PHYS 34200 - Modern Physics
- PHYS 34400 - Introduction To Quantum Science

## Group 6

- PHYS 33000 - Intermediate Electricity And Magnetism
- PHYS 43000 - Electricity And Magnetism I Honors
- PHYS 53000 - Electricity And Magnetism

## Group 7

- PHYS 36000 - Quantum Mechanics
- PHYS 46000 - Quantum Mechanics I Honors
- PHYS 55000 - Introduction To Quantum Mechanics

## Group 8

- PHYS 41600 - Thermal And Statistical Physics Honors
- PHYS 51500 - Thermal And Statistical Physics

## Non-course / Non-credit Requirements

### Earning Core Curricular Requirements through Experience

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click here.

([http://www.science.purdue.edu/Current\\_Students/curriculum\\_and\\_degree\\_requirements/earning-requirements-through-experience.html](http://www.science.purdue.edu/Current_Students/curriculum_and_degree_requirements/earning-requirements-through-experience.html) )

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

# College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

### Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

### Additional Information

Only one instance of an overlapping content course will apply towards graduation requirements. See: [https://www.purdue.edu/science/Current\\_Students/curriculum\\_and\\_degree\\_requirements/Overlap-Courses.pdf](https://www.purdue.edu/science/Current_Students/curriculum_and_degree_requirements/Overlap-Courses.pdf)

# Sample 4-Year Plan

## Fall 1st Year

- PHYS 17200 - Modern Mechanics ♦ (Honors sections)
- CHM 11500 - General Chemistry ♦
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core First-Year Composition Selection - Credit Hours: 3.00 - 4.00

## 15-17 Credits

## Spring 1st Year

- CHM 11600 - General Chemistry ♦
- PHYS 27200 - Electric And Magnetic Interactions ♦ (Honors sections)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15-17 Credits

## Fall 2nd Year

- PHYS 30600 - Mathematical Methods Of Physics I
- PHYS 34000 - Modern Physics Laboratory
- PHYS 34400 - Introduction To Quantum Science
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15-17 Credits

## Spring 2nd Year

- PHYS 30700 - Mathematical Methods Of Physics II
- PHYS 42200 - Waves And Oscillations
- STAT 30100 - Elementary Statistical Methods ♦ or
- STAT 35000 - Introduction To Statistics ♦
  
- CS 15900 - C Programming or
- CS 17600 - Data Engineering In Python or
- CS 17700 - Programming With Multimedia Objects or
- CS 18000 - Problem Solving And Object-Oriented Programming
  
- Science/Engineering Selective  $\geq 300$  - Credit Hours: 3.00

## 15-16 Credits

### Fall 3rd Year

- COM 21700 - Science Writing And Presentation
- PHYS 41000 - Physical Mechanics I Honors
- PHYS 45000 - Intermediate Laboratory
- PHYS 46000 - Quantum Mechanics I Honors
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 1.00

## 15 Credits

### Spring 3rd Year

- PHYS 41100 - Physical Mechanics II Honors
- PHYS 43000 - Electricity And Magnetism I Honors
- PHYS 46100 - Quantum Mechanics II Honors
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 1.00

## 16-17 Credits

### Fall 4th Year

- PHYS 41600 - Thermal And Statistical Physics Honors
- PHYS 43100 - Electricity And Magnetism II Honors
- PHYS 59300 - Independent Research
- Science/Engineering Selective  $\geq 300$  - Credit Hours: 3.00
- Great Issues Option - Credit Hours: 3.00

## 15 Credits

### Spring 4th Year

- PHYS 53600 - Electronic Techniques For Research or
- PHYS 58000 - Computational Physics
- PHYS/ASTR Selective  $\geq 500$  - Credit Hours: 3.00
- PHYS/ASTR Selective  $\geq 500$  - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00

## 15 Credits

## Pre-Requisite Information



For pre-requisite information, click [here](#).

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Physics, BS

### About the Program

Purdue Physics and Astronomy is an internationally recognized department for excellence in forefront research and undergraduate and graduate education. Our undergraduate classes for physics majors are taught by professors actively engaged in forefront research. Undergraduate research is strongly encouraged and opportunities exist as early as the second semester to work in a research group. These groups include experimental and theoretical condensed matter physics, high energy physics, nano-physics, nuclear physics, astrophysics, biological physics, geophysics, relativity, and interdisciplinary areas of material science, engineering, or computational science.

The department also helps undergraduates with external internships, particularly for the summers. Upon graduation our students are accepted for graduate programs at many of the top universities and are also sought after for positions in industry, particularly high-tech positions. Our graduates have an exceptional record of career accomplishment in a wide variety of settings, including academia and major industrial and government labs.

This program offers a specialization in physics as the core of a broad general education. The core courses provide a solid foundation in Classical Mechanics, Electricity and Magnetism, Waves and Oscillations, Quantum Mechanics, Thermal and Statistical Physics, Modern Physics, Relativity, Electronics, and Computational Physics.

By using electives in the program, a student can include concentrations in condensed matter physics (PHYS 54500), nuclear physics (PHYS 55600), astrophysics (PHYS 56000), particle physics (PHYS 56400), and other areas. Students

also are encouraged to participate in one or two semesters of individual research projects with a selected faculty member (PHYS 39000, PHYS 49000, or PHYS 59000).

Opportunities for employment in fields related to physics will also be enhanced by taking electives in additional science courses such as biological sciences, chemistry, computer science, geosciences, meteorology, and in various branches of engineering. With assistance from an advisor, a student can prepare an individualized program suited to career plans by selecting electives from these areas or from any other area within the University. Normally, students take such electives as juniors and seniors.

Physics Website

Physics Major Change (CODO) Requirements

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)

- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

#### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please click [here](#).

## Physics Major Courses (52-55 credits)

### Required Major Courses (40-42 credits)

- PHYS 17200 - Modern Mechanics ♦ (Physics majors required to take honors sections; satisfies Science for core; satisfies Teambuilding for College of Science core)
- PHYS 27200 - Electric And Magnetic Interactions ♦ (Physics majors required to take honors sections; satisfies Science for core)
- PHYS 30600 - Mathematical Methods Of Physics I
- PHYS 30700 - Mathematical Methods Of Physics II
- PHYS 31000 - Intermediate Mechanics
- PHYS 33000 - Intermediate Electricity And Magnetism
- PHYS 34000 - Modern Physics Laboratory
- PHYS 34400 - Introduction To Quantum Science
- PHYS 36000 - Quantum Mechanics
- PHYS 42200 - Waves And Oscillations
- PHYS 45000 - Intermediate Laboratory
- PHYS 51500 - Thermal And Statistical Physics
- **Calculus III Option** - Credit Hours: 4-5
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus (satisfies Quantitative Reasoning for core)

### Major Selective\* (12-13 credits)

#### **Advanced Lab Option**

- PHYS 53600 - Electronic Techniques For Research or
- PHYS 58000 - Computational Physics
- PHYS/ASTR  $\geq 300$  level - Credit Hours: 3.00
- Science/Engineering Elective  $\geq 300$  level (could be met by Statistics for College of Science core) - Credit Hours: 3.00
- Science/Engineering Elective  $\geq 300$  level (could be met by Great Issues for College of Science core) - Credit Hours: 3.00

## Other Departmental/Program Course Requirements (43-62 credits)

# COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

## Composition & Presentation

### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found [here](#). (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

### Computing (3-4 credits)

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦

### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (8 credits)

(satisfies Science for core)

- CHM 11500 - General Chemistry ♦
- CHM 11600 - General Chemistry ♦

## Mathematics (8-10 credits)

(satisfies Quantitative Reasoning for core)

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society<sup>^\*</sup> (0-3 credits)

Choose one from this list (select courses COULD satisfy Science, Technology, Society for core).

## Statistics (3 credits)

- STAT 30100 - Elementary Statistical Methods ♦ or
- STAT 35000 - Introduction To Statistics ♦

## Team-Building and Collaboration<sup>\*</sup> (0-3 credits)

*Met with required major coursework (PHYS 17200) if taken at Purdue West Lafayette.*

## Electives (3-24 credits)

## GPA Requirements

- 2.0 Graduation GPA required for Bachelor of Science degree.
- 2.0 average in PHYS/ASTR classes required to graduate.

## Course Requirements and Notes

- Courses cannot double count between General Education, Culture and Diversity, and Great Issues requirements. *Courses below are considered to have overlapping course content. Only one instance of an overlapping content course will apply toward graduate requirements. Courses listed in blocks are representative of the overlapping relationship.*

## Group 1

- PHYS 17200 - Modern Mechanics
- PHYS 21800 - General Physics
- PHYS 22000 - General Physics
- PHYS 23300 - Physics For Life Sciences I
- PHYS 17200H
- PHYS P2010
- PHYS 20100 (will add titles & links at publish)

## Group 2

- PHYS 21900 - General Physics II
- PHYS 22100 - General Physics
- PHYS 23400 - Physics For Life Sciences II
- PHYS 24100 - Electricity And Optics
- PHYS 27200 - Electric And Magnetic Interactions
- PHYS P2020
- PHYS 27200(H) (will add titles & links at publish)

## Group 3

- PHYS 31000 - Intermediate Mechanics
- PHYS 41000 - Physical Mechanics I Honors
- PHYS 51000 - Physical Mechanics

## Group 4

- PHYS 32200 - Intermediate Optics
- PHYS 42200 - Waves And Oscillations

## Group 5

- PHYS 34200 - Modern Physics
- PHYS 34400 - Introduction To Quantum Science

## Group 6

- PHYS 33000 - Intermediate Electricity And Magnetism
- PHYS 43000 - Electricity And Magnetism I Honors
- PHYS 53000 - Electricity And Magnetism

## Group 7

- PHYS 36000 - Quantum Mechanics
- PHYS 46000 - Quantum Mechanics I Honors
- PHYS 55000 - Introduction To Quantum Mechanics

## Group 8

- PHYS 41600 - Thermal And Statistical Physics Honors
- PHYS 51500 - Thermal And Statistical Physics

## Non-course / Non-credit Requirements

Earning Core Curricular Requirements through Experience

*Students may meet selected core curriculum requirements through approved experiential learning opportunities.*

*Interested*

*students should contact their academic advisor for more information on this option and incorporating experiential learning*

*into their four-year program of study. For more information on earning requirements through experience, please click here.* ([http://www.science.purdue.edu/Current\\_Students/curriculum\\_and\\_degree\\_requirements/earning-requirements-through-experience.html](http://www.science.purdue.edu/Current_Students/curriculum_and_degree_requirements/earning-requirements-through-experience.html)) **ADD LINK AT PUBLISH**

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
  - The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
  - Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
  - Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
  - The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade.
- University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
  - Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)

- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the Civics Literacy Proficiency website.

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Additional Information

Only one instance of an overlapping content course will apply towards graduation requirements. See: [https://www.purdue.edu/science/Current\\_Students/curriculum\\_and\\_degree\\_requirements/Overlap-Courses.pdf](https://www.purdue.edu/science/Current_Students/curriculum_and_degree_requirements/Overlap-Courses.pdf)

## Sample 4-Year Plan

### Fall 1st Year

- CHM 11500 - General Chemistry ♦
- PHYS 17200 - Modern Mechanics ♦ (Honors sections)
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core First-Year Composition Selection - Credit Hours: 3.00-4.00

### 15-17 Credits

### Spring 1st Year

- CHM 11600 - General Chemistry ♦
- PHYS 27200 - Electric And Magnetic Interactions ♦ (Honors sections)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00 - 4.00



## 15-17 Credits

### Fall 2nd Year

- PHYS 30600 - Mathematical Methods Of Physics I
- PHYS 34000 - Modern Physics Laboratory
- PHYS 34400 - Introduction To Quantum Science
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15-17 Credits

### Spring 2nd Year

- PHYS 30700 - Mathematical Methods Of Physics II
- PHYS 42200 - Waves And Oscillations
- STAT 30100 - Elementary Statistical Methods ♦ or
- STAT 35000 - Introduction To Statistics ♦
  
- CS 15900 - C Programming or
- CS 17600 - Data Engineering In Python or
- CS 17700 - Programming With Multimedia Objects or
- CS 18000 - Problem Solving And Object-Oriented Programming
  
- Science Core Selection - Credit Hours: 3.00 - 4.00

## 15-16 Credits

### Fall 3rd Year

- PHYS 31000 - Intermediate Mechanics
- PHYS 33000 - Intermediate Electricity And Magnetism
- PHYS 45000 - Intermediate Laboratory
- COM 21700 - Science Writing And Presentation
- Science Core Selection - Credit Hours: 3.00

## 16 Credits

### Spring 3rd Year

- PHYS 36000 - Quantum Mechanics
- PHYS 51500 - Thermal And Statistical Physics
- Science Core Selection\* - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15-16 Credits

### Fall 4th Year

- PHYS/ASTR Selective  $\geq$  300 level - Credit Hours: 3.00
- Science/Engineering Selective  $\geq$  300 - Credit Hours: 3.00
- Great Issues In Science Option - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15 Credits

### Spring 4th Year

- PHYS 53600 - Electronic Techniques For Research or
- PHYS 58000 - Computational Physics
- Science/Engineering Selective  $\geq$  300 - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Electives - Credit Hours: 3.00
- Electives - Credit Hours: 2.00

## 14-15 Credits

## Pre-Requisite Information

For pre-requisite information, [click here](#).

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## **Minor**

### **Astronomy Minor**

#### **Requirements for the Minor (15-16 credits)**

Before undertaking this minor, the student must establish the prerequisites for the required minor courses.

- MA 16100 or MA 16500
- MA 16200 or MA 16600
- PHYS 17200
- PHYS 27200 or PHYS 24100

#### **Required Courses (12-13 credits)**

- ASTR 36300 - The Solar System
- ASTR 36400 - Stars And Galaxies
- ASTR 37000 - Cosmology
- PHYS 34200 - Modern Physics or
- PHYS 34400 - Introduction To Quantum Science

#### **Additional Course - Choose One (3 credits)**

- ASTR 56000 - Stellar Evolution
- PHYS 56000 - Stellar Evolution
- ASTR 56100 - Galaxies And Large Scale Structure
- PHYS 56100 - Galaxies And Large Scale Structure
- ASTR 56200 - Introduction To High Energy Astrophysics
- PHYS 56200 - Introduction To High Energy Astrophysics
- ASTR 56300 - Astroparticle Physics
- PHYS 56300 - Astroparticle Physics
- ASTR 56700 - Observational Techniques In Astronomy
- PHYS 56700 - Observational Techniques In Astronomy
- PHYS/ASTR - Approved 40000- level or above - Credit Hours: 3.00

## **Notes**

- A student must receive a GPA of 2.0 or higher in required minor courses.
- In addition, GPA over all PHYS and ASTR courses must be 2.0 or higher. (These requirements apply to students who matriculate at Purdue in or after Fall 2011.)
- ALL REQUIRED COURSES FOR THIS MINOR MUST BE TAKEN AT PURDUE UNIVERSITY.
- No course may be taken pass/fail.

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Physics Minor

### Requirements for the Minor (10-11 credits)

Before undertaking this minor, the student must establish the prerequisites for the required minor courses.

Least amount of prerequisites required.

Math: MA 16100 (16500) MA 16200(16600)

Physics: PHYS 17200, 27200 (24100)

PHYS 30000-level or above: Check prerequisites for each course.

### Required Courses (4-5 credits)

- PHYS 34000 - Modern Physics Laboratory
- PHYS 34200 - Modern Physics or
- PHYS 34400 - Introduction To Quantum Science

### Physics and Astronomy courses 30000-level or above (6 credits)

- PHYS 30000-59999
- ASTR 50000-59999
- (Except PHYS 31700, PHYS 32300, PHYS 32400, PHYS 39000, PHYS 49000, PHYS 59000, or PHYS 59300)

## Notes

- A student must receive a GPA of 2.0 or higher in required minor courses.
- These requirements apply to students who matriculate at Purdue in or after Fall 2011.
- ALL REQUIRED COURSES FOR THIS MINOR MUST BE TAKEN AT PURDUE UNIVERSITY
- No course may be taken pass/fail.

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

# Department of Statistics

## Overview

Purdue University's Department of Statistics is one of the first dedicated Statistics programs in the country. From its inception as a Statistical Laboratory in 1947, it has been a prominent center of statistical research and has grown to become one of the largest Statistics departments in the United States. By pursuing foundational research in probability, statistical theory and methodology, and computational statistics, combined with interdisciplinary research in statistical genetics and bioinformatics, machine learning, computational finance, industrial Statistics, and other fields across Purdue University's campus, the Department of Statistics continues the proud tradition of making fundamental contributions to science while developing new methodologies, theories, and algorithms for statistics and machine learning. It has been a consistently top-ranked department among Statistics departments in the United States. In a world where data are being generated faster than they can be analyzed, the Department of Statistics promotes the design of meaningful experiments, observational studies, and surveys for data collection, the development of analysis and modeling methodologies for performing rigorous and valid inferences from the collected data, as well as the computational algorithms necessary to perform rigorous and valid inferences from the collected data and informed decision making based on the results of data analyses.

Housed in both Haas Hall and the Mathematical Sciences Building, the department's diverse faculty work to advance the frontiers of statistical science and data science in both theory and applications. They seek to provide learning environments that produce well-educated data scientists, statisticians, probabilists, and quantitatively literate people. They have a long history of providing cutting-edge learning environments conducive to successful and impactful graduates: <https://www.stat.purdue.edu/alumni/profiles/index.html>. Through their interdisciplinary partnerships, the faculty, staff, and students of the department bring the strengths of the statistical sciences to address significant societal needs.

The department offers an undergraduate degree in Statistics, allowing students to focus on either Applied Statistics or Mathematical Statistics. Partnership with the Department of Mathematics also provides the opportunity to major in Actuarial Science, while a collaboration with the Department of Computer Science enables undergraduates to pursue a Data Science major. Undergraduates from a range of disciplines can minor in Statistics as well. Graduate students have access to an array of certificate, MS, and PhD programs with distinct concentrations and collaborative opportunities.

As of March 2021, there are 36 tenured and tenure-track professors, 5 emeriti faculty, 12 adjunct and courtesy faculty members, 5 visiting professors, and 16 lecturers who form the Department of Statistics faculty. The department has approximately 538 undergraduate students majoring in Statistics and/or Actuarial Science (a joint major with the Department of Statistics), and 410 student have the major Data Science. The department has 173 graduate students, 95 are Ph.D. students and 78 are M.S. students.

Department of Statistics Website

### Faculty

## Contact Information

### Department of Statistics

Purdue University  
250 N. University Street  
West Lafayette, IN 47907-2066  
USA

Phone: 1-765-494-6030

Fax: 1-765-494-0558

### **Administrative Contacts**

**Department Head:** Hao Zhang zhanghao@purdue.edu

**Associate Head:** Tom Sellke tsellke@purdue.edu

**Assistant to the Head:** Julie Wise jlwise@purdue.edu

## **Graduate Information**

For Graduate Information please see Statistics Graduate Program Information.

## **Baccalaureate**

### **Applied Statistics, BS**

#### About the Program

Statistics at Purdue University is one of the largest (students and faculty) in the United States. It is consistently rated by U.S. News and World Report as one of the top departments in the country. It offers courses in fundamental statistics and probability, and also courses that focus on statistical computation to train students as future data scientists. Students enjoy a great deal of interaction with faculty as well as small classes. The department offers a master's program in which a student can earn both a bachelor's degree and a master's degree in five years.

The statistics major consists of two options:

- Applied statistics
  - Mathematical statistics (Mathematical statistics usually leads to a double major in mathematics and statistics.)
- Statistics - Applied Statistics Website

Applied Statistics Major Change (CODO) Requirements

#### Degree Requirements

## **120 Credits Required**

### Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.

- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## **Departmental/Program Major Courses (24-25 credits)**

### **Required Major Courses (18 credits)**

*The average GPA in courses must be 2.00 in **Required Major Courses**. STAT 42000 can only be used to meet one requirement in the Required Major Courses.*

- MA 35100 - Elementary Linear Algebra
- STAT 51200 - Applied Regression Analysis or
- STAT 47401 - Statistics For Risk Modeling - only allowed if student is a dual major in Actuarial Science or Actuarial Science Honors major.
- STAT 35000 - Introduction To Statistics ♦ (satisfies Statistics requirement for College of Science core) or
- STAT 35500 - Statistics For Data Science ♦ - this course is only an option for students in Data Science majors.
- MA 36200 - Topics In Vector Calculus or
- STAT 42000 - Introduction To Time Series

- MA 41600 - Probability + or
- STAT 41600 - Probability + or
- STAT 51600 - Basic Probability And Applications +
- STAT 41700 - Statistical Theory or
- STAT 51700 - Statistical Inference

## Applied Statistics Selective (6-7 credits)

Choose 2 courses from the list below. (Check with advisor for additional approved courses.) Note: STAT 42000 can only be used to meet one requirement in the major.

- STAT 51300 - Statistical Quality Control
- STAT 51400 - Design Of Experiments
- STAT 42000 - Introduction To Time Series
- STAT 47201 - Actuarial Models-Life Contingencies
- STAT 47301 - Introduction To Arbitrage-Free Pricing Of Financial Derivatives
- STAT 50600 - Statistical Programming And Data Management
- STAT 52200 - Sampling And Survey Techniques

One **3 credit** combination of the TDM courses below can be used to meet ONE STAT Selective

- TDM 10100 - The Data Mine Seminar I
- TDM 10200 - The Data Mine Seminar II
- TDM 20100 - The Data Mine Seminar III
- TDM 20200 - The Data Mine Seminar IV
- TDM 30100 - The Data Mine Seminar V
- TDM 30200 - The Data Mine Seminar VI
- TDM 40100 - The Data Mine Seminar VII
- TDM 40200 - The Data Mine Seminar VIII

## Other Departmental/Program Course Requirements (36-64 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

### Composition & Presentation

#### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

#### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)



- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- **International Students Only:** International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

### Computing (3-4 credits)

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming

### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

### Great Issues In Science (3 credits)

Choose one from this list.

### Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

### Mathematics (8-10 credits)

(satisfies Quantitative Reasoning for core)

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or

- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society Requirement^ (0-3 credits)

Choose one from this list (select courses COULD satisfy Science, Technology, Society for core).

### Statistics

*Met with required major coursework: STAT 35000 or STAT 35500.*

## Team-Building and Collaboration\* (0-3 credits)

Choose one from this list.

## Required Pre-Requisite Course (4-5 Credits)

*Calculus III Option; Students should earn a C or better.*

- MA 26100 - Multivariate Calculus + or
- MA 27101 - Honors Multivariate Calculus +; should only be taken by first year (first semester) students that have credit for Calculus I and II. Students should talk to their advisor about this option.

## Electives (31-60 credits)

## Grade Requirements

- + Students should strive to earn a C or better.

## GPA Requirements

- Average GPA in courses must be 2.00 in **Required Major Courses**.
- 2.0 Graduation GPA required for Bachelor of Science degree.

## Course Requirements and Notes

- Credits should be allowed in no more than one of STAT 30101, STAT 35000, STAT 35500, STAT 50100, and in no more than one of STAT 50300 and 51100.
- STAT 42000 can only be used to meet one requirement in the Required Major Courses.
- Courses cannot double count across General Education, Language and Culture, and Great Issues requirements.
- No Count Courses are not allowed for credit
- Overlapping Course Content courses - only one course can be used for courses considered to have overlapping content

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
  - The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
  - Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
  - Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
  - The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade.
- University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
  - Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

**The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the Civics Literacy Proficiency website.**

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (STAT 10100 strongly recommended)
- Elective - Credit Hours: 4.00

### 15-18 Credits

### Spring 1st Year

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00-4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 2.00

### 15-18 Credits

### Fall 2nd Year

- MA 26100 - Multivariate Calculus +
- Science Core Selection First-Year Composition - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 2.00

### 15-18 Credits

### Spring 2nd Year

- COM 21700 - Science Writing And Presentation
- MA 35100 - Elementary Linear Algebra
- STAT 35000 - Introduction To Statistics ♦ or
- STAT 35500 - Statistics For Data Science ♦
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15 Credits

### Fall 3rd Year

- MA 41600 - Probability + or
- STAT 41600 - Probability + or
- STAT 51600 - Basic Probability And Applications +
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15-16 Credits

### Spring 3rd Year

- STAT 41700 - Statistical Theory or
- STAT 51700 - Statistical Inference
- Applied Statistics Selective - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

### Fall 4th Year

- STAT 51200 - Applied Regression Analysis or
- STAT 47401 - Statistics For Risk Modeling - this course is only allowed to meet the requirement for students dual majoring in Actuarial Science or Actuarial Science Honors
- Great Issues Option - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Elective (recommended STS course) - Credit Hours: 3.00
- Electives - Credit Hours: 3.00

## 15 Credits

### Spring 4th Year

- MA 36200 - Topics In Vector Calculus or

- STAT 42000 - Introduction To Time Series
- Applied Statistics Selective - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15-18 Credits

## Pre-Requisite Information

For pre-requisite information, click [here](#).

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

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The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Data Science, BS (Statistics)

### About the Program

Majoring in data science at Purdue will place you at the forefront of an emerging field and prepare you for an exciting career at the intersection of computer science and statistics.

Created jointly by Purdue's Department of Computer Science and Department of Statistics, the data science major will open pathways to careers in virtually every area of society, from healthcare, security and sustainability to education, business and economics.

Data Science Major

Data Science (Statistics) Major Change (CODO) Requirements

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### College of Science Core Requirements

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### Earning Core Curricular Requirements through Experience

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## Degree Requirements

# 120 Credits Required

### Data Science Major Courses (47-51 credits)

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ (*satisfies Computing, and Team-Building and Collaboration, for College of Science core*)
- CS 18200 - Foundations Of Computer Science
- CS 25100 - Data Structures And Algorithms
- CS 37300 - Data Mining And Machine Learning
- CS 38003 - Python Programming
- CS 44000 - Large Scale Data Analytics
- MA 35100 - Elementary Linear Algebra
- STAT 35500 - Statistics For Data Science (*satisfies Statistics for College of Science core*)
- STAT 41600 - Probability
- STAT 41700 - Statistical Theory
- CS 24200 - Introduction To Data Science or
- STAT 24200 - Introduction To Data Science
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus

### Ethics Selective (3 credits)

Choose one.

- ILS 23000 - Data Science And Society: Ethical Legal Social Issues (*satisfies 3.0 credits of GE for College of Science core*)
- PHIL 20700 - Ethics For Technology, Engineering, And Design (*satisfies Multidisciplinary Experience and 3.0 credits of GE for College of Science core*)
- PHIL 20800 - Ethics Of Data Science (*must be 3.00 Credit Hour option; satisfies Multidisciplinary Experience and 3.0 credits of GE for College of Science core*)

### CS Selectives (6 credits)

Choose two.

- CS 31400 - Numerical Methods
- CS 35500 - Introduction To Cryptography
- CS 43900 - Introduction To Data Visualization
- CS 47100 - Introduction to Artificial Intelligence
- CS 47300 - Web Information Search And Management
- CS 47500 - Human-Computer Interaction
- CS 30700 - Software Engineering I or
- CS 40800 - Software Testing
- CS 34800 - Information Systems or
- CS 44800 - Introduction To Relational Database Systems
- CS 38100 - Introduction To The Analysis Of Algorithms or



- CS 48300 - Introduction To The Theory Of Computation

## Statistics Selective (3 credits)

Choose one.

- MA 43200 - Elementary Stochastic Processes
- STAT 42000 - Introduction To Time Series
- STAT 50600 - Statistical Programming And Data Management
- STAT 51200 - Applied Regression Analysis
- STAT 51300 - Statistical Quality Control
- STAT 51400 - Design Of Experiments
- STAT 52200 - Sampling And Survey Techniques
- STAT 52500 - Intermediate Statistical Methodology

## Capstone Experience (3 credits)

CS 37300 must be completed with a grade of C or better prior to the start of the Capstone Experience.

**Students choosing a Zero-Credit Capstone Experience Option must complete an additional selective from either the CS Selectives or the Statistics Selectives course lists.**

*Choose one option below.*

### Credit Course Options:

- STAT 49000 - Topics In Statistics For Undergraduates
  - Approved Research Project In Data Science - Credit Hours: 3.00
  - Data Science Capstone - Credit Hours: 3.00
- CS 49000 - Topics In Computer Sciences For Undergraduates
  - DSC Data Science Capstone - Credit Hours: 3.00
- CS 43900 - Introduction To Data Visualization (Cannot be used to meet both Capstone and as CS Selective)
- CS 30700 - Software Engineering I - Project must be approved; cannot be used to meet both Capstone and as CS elective.
- CS 49700 - Honors Research Project - project must be approved.
- EPCS 41100 - Senior Design Participation In EPICS and
- EPCS 41200 - Senior Design Participation In EPICS - project must be approved.

### Zero-Credit Options:

- CS 38600 - Professional Practice IV
- CS 48700 - Professional Practice V
- CS 49000 Research Project in Data Science-Project must be approved. - Credit Hours: 0.00 or
- STAT 49000 Research Project in Data Science-Project must be approved. - Credit Hours: 0.00

## Other Departmental/Program Course Requirements (29-52 credits)

## COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

## Composition & Presentation

### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here** (ADD LINK IN ACALOG). (satisfies OC for core)

**Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.

\*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.

International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

## Computing

*Met with required major coursework.*

### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I (*Met with required major coursework*)
- General Education Option II
- General Education Option III

### Great Issues In Science (3 credits)

Choose one from this list.

### Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (*satisfies Science for core*).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

*(satisfies Quantitative Reasoning for core)*

- MA 16100 - Plane Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- or
- MA 16500 - Analytic Geometry And Calculus I (must have C or better to meet prerequisite for CS 18200)
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II (must have C or better to meet pre-requisite for STAT 35500)

## Science Technology & Society<sup>^\*</sup> (0-3 credits)

Choose one from the Science Technology and Society list here, excluding those on the College of Science No Count list (satisfies STS for core).

## Statistics

*Met with required major coursework.*

## Team-Building and Collaboration

*Met with required major coursework.*

## Electives (17-44 credits)

CS 19300 is a required freshman seminar course; corequisite with CS 18000. It is not a degree requirement.

## Grade Requirements

- CS 37300 must be completed with a grade of C or better prior to the start of the Capstone Experience.
- \*All courses required for the major, regardless of department, must be completed with a grade of "C" or better.
- \*All prerequisites to CS, MA, and STAT courses required for the major, regardless of department, must be completed with a grade of "C" or better.

## GPA Requirements

- 2.0 Major and Graduation GPA required for Bachelor of Science degree.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.

- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
  - Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
  - The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade.
- University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
  - Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## Transfer Credit Policy

- Equivalent 10000 and 20000-level Computer Science (CS) transfer credit courses (including credit from regional campuses) may be used to meet degree requirements if those courses were taken prior to admission to the Purdue West Lafayette Data Science, B.S. Statistics program.
- CS transfer credit at the 30000-40000-level may not be used to meet degree requirements. As exception to this policy is the application of pre-approved Study Abroad coursework.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

**The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the Civics Literacy Proficiency website.**

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

### Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hour: 1.00 (CS 19300 strongly recommended)
- Elective - Credit Hour: 1.00
- Elective - Credit Hours: 3.00

### 16-18 Credits

### Spring 1st Year

- CS 18200 - Foundations Of Computer Science
- CS 38003 - Python Programming
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First Year Composition Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Electives - Credit Hours: 1.00

### 15-18 Credits

### Fall 2nd Year

- STAT 35500 - Statistics For Data Science
- CS 24200 - Introduction To Data Science or
- STAT 24200 - Introduction To Data Science
- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 - 3.00

### 14-18 Credits

### Spring 2nd Year

- CS 25100 - Data Structures And Algorithms

- MA 35100 - Elementary Linear Algebra
- STAT 41600 - Probability
- Ethics Selective♦ - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 - 2.00

## 16-18 Credits

### Fall 3rd Year

- COM 21700 - Science Writing And Presentation
- CS 37300 - Data Mining And Machine Learning
- STAT 41700 - Statistical Theory
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-16 Credits

### Spring 3rd Year

- CS Selective - Credit Hours 3.00
- Statistics Selective - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

### Fall 4th Year

- CS 44000 - Large Scale Data Analytics
- CS Selective - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00 - 3.00

## 16-17 Credits

### Spring 4th Year

- Capstone Experience/Course - Credit Hours: 0.00 - 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00

13-18 Credits

## Pre-Requisite Information

For pre-requisite information, click [here](#).

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL -American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Statistics - Math Emphasis, BS

### About the Program

Statistics at Purdue University is one of the largest (students and faculty) in the United States. It is consistently rated by *U.S. News and World Report* as one of the top departments in the country. It offers courses in fundamental statistics and probability, and also courses that focus on statistical computation to train students as future data scientists. Students enjoy a great deal of interaction with faculty as well as small classes. The department offers a master's program in which a student can earn both a bachelor's degree and a master's degree in five years.

The statistics major consists of two options:

- Applied statistics
- Mathematical statistics (Mathematical statistics usually leads to a double major in mathematics and statistics.)

[Statistics - Applied Statistics Website](#)

[Statistics - Math Emphasis Major Change \(CODO\) Requirements](#)

## Degree Requirements

# 120 Credits Required

## Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating



experiential learning into their four-year program of study. For more information on earning requirements through experience, please click here.

## Departmental/Program Major Courses (30-31 credits)

### Required Major Courses (21 credits)

*The average GPA in courses must be 2.00 in **Required Major Courses**. MA 37400 can only be used to meet one requirement in the Required Major Courses.*

- MA 35100 - Elementary Linear Algebra
- MA 35301 - Linear Algebra II
- MA 43200 - Elementary Stochastic Processes
- STAT 51200 - Applied Regression Analysis
- STAT 35000 - Introduction To Statistics ♦ (satisfies Statistics Requirement for College of Science Core) or
- STAT 35500 - Statistics For Data Science ♦ (satisfies Statistics Requirement for College of Science Core) - this course is only an option for students in Data Science majors.
- MA 41600 - Probability + or
- STAT 41600 - Probability + or
- STAT 51600 - Basic Probability And Applications +
- STAT 41700 - Statistical Theory or
- STAT 51700 - Statistical Inference
- MA 34100 - Foundations Of Analysis or
- MA 44000 - Honors Real Analysis I

### Advanced Math Selective (3-4 credits)

*Choose one.*

- MA 34900 - Signals And Systems For Mathematicians
- MA 36600 - Ordinary Differential Equations
- MA 37400 - Mathematical Foundations For Machine Learning
- MA 37500 - Introduction To Discrete Mathematics
- MA 42100 - Linear Programming And Optimization Techniques
- MA 42500 - Elements Of Complex Analysis
- MA 42800 - Introduction To Fourier Analysis
- MA 44000 - Honors Real Analysis I
- MA 44200 - Honors Real Analysis II
- MA 45000 - Algebra Honors
- MA 45300 - Elements Of Algebra I
- MA 49500 - Advanced Topics In Mathematics For Undergraduates

Any MA 49500 title is acceptable; course must be at least 3.0 credits to be used as a selective course.

### Statistics Selective (3 credits)

*Choose one.*

- CS 37300 - Data Mining And Machine Learning (Data Science, Computer Science, Computer Science Honors majors only)
- IE 53000 - Quality Control

- MA 37400 - Mathematical Foundations For Machine Learning
- MA 43200 - Elementary Stochastic Processes Cross-listed with STAT 43200
- STAT 42000 - Introduction To Time Series
- STAT 51300 - Statistical Quality Control
- STAT 51400 - Design Of Experiments

One **3 credit** combination of the TDM courses below can be used to meet ONE STAT Selective

- TDM 10100 - The Data Mine Seminar I
- TDM 10200 - The Data Mine Seminar II
- TDM 20100 - The Data Mine Seminar III
- TDM 20200 - The Data Mine Seminar IV
- TDM 30100 - The Data Mine Seminar V
- TDM 30200 - The Data Mine Seminar VI
- TDM 40100 - The Data Mine Seminar VII
- TDM 40200 - The Data Mine Seminar VIII

## Other Departmental/Program Course Requirements (36-64 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

#### Composition & Presentation

##### Written Communication (3-4 credits)

Choose one course from this list. (satisfies Written Communication and Information Literacy for core)

##### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found **here**. (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

##### Computing (3-4 credits)

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦

##### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

### Great Issues In Science (3 credits)

Choose one from this list.

### Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

### Mathematics (8-10 credits)

(satisfies Quantitative Reasoning for core)

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

### Science Technology and Society^ (0-3 credits)

Choose one from this list (satisfies STS for core).

### Statistics

*Met with required major coursework: STAT 35000 or STAT 35500.*

### Team-Building and Collaboration\* (0-3 credits)

Choose one from this list.

### Required Pre-Requisite Course (4-5 Credits)

*Calculus III Option; student should earn a C or better.*

- MA 26100 - Multivariate Calculus + or
- MA 27101 - Honors Multivariate Calculus +; should only be taken by first year (first semester) students that have credit for Calculus I and II. Students should talk to their advisor about this option.

## Electives (25-54 credits)

## Grade Requirements

- + Student should strive to earn a C or better.

## GPA Requirements

- Average GPA in courses must be 2.00 in **Required Major Courses**.
- 2.0 Graduation GPA required for Bachelor of Science degree.

## Course Requirements and Notes

- Credits should be allowed in no more than one of STAT 30101, STAT 35000, STAT 35500, STAT 50100, and in no more than one of STAT 50300 and 51100.
- MA 37400 can only be used to meet one requirement in the Required Major Courses.
- No Count Courses are not allowed for credit
- Overlapping Course Content courses - only one course can be used for courses considered to have overlapping content

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

# University Requirements

## University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (STAT 10100 strongly recommended)
- Elective - Credit Hours: 3.00 - 4.00

## 15-17 Credits

### Spring 1st Year

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦ or
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 2.00

## 15-18 Credits

### Fall 2nd Year

- MA 26100 - Multivariate Calculus +
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00 (MA 30100 recommended)
- Elective - Credit Hours: 2.00

## 15-18 Credits

### Spring 2nd Year

- MA 35100 - Elementary Linear Algebra
- COM 21700 - Science Writing And Presentation
- STAT 35000 - Introduction To Statistics ♦ or
- STAT 35500 - Statistics For Data Science ♦
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15 Credits

### Fall 3rd Year

- MA 34100 - Foundations Of Analysis or
- MA 44000 - Honors Real Analysis I
- MA 41600 - Probability + or
- STAT 41600 - Probability + or
- STAT 51600 - Basic Probability And Applications
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15-16 Credits

### Spring 3rd Year

- STAT 41700 - Statistical Theory or
- STAT 51700 - Statistical Inference
- MA 35301 - Linear Algebra II
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

### Fall 4th Year

- MA 43200 - Elementary Stochastic Processes
- STAT 51200 - Applied Regression Analysis
- Great Issues Option - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-16 Credits

### Spring 4th Year

- Advanced Math Selective - Credit Hours: 3.00
- Statistics Selective - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15-17 Credits

## Pre-Requisite Information

For pre-requisite information, [click here](#).

## World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Statistics Honors, BS

### About the Program

Statistics at Purdue University is the only doctorate-granting program in statistics in Indiana and is one of the largest (students and faculty) in the United States. It is consistently rated by *U.S. News and World Report* as one of the top departments in the country. Students enjoy a great deal of interaction with faculty as well as small classes. For students with excellent preparation in high school, the department offers a master's program in which a student can earn both a bachelor's degree and a master's degree in five years.

The statistics major consists of two options:

- Applied statistics
- Mathematical statistics (Mathematical statistics usually leads to a double major in mathematics and statistics.)

Statistics - Applied Statistics Website

Statistics - Math Emphasis Major Change (CODO) Requirements (*Students wishing to CODO to Statistics Honors must first CODO to Statistics - Math Emphasis.*)

### Degree Requirements

## 120 Credits Required

### Curriculum and Degree Requirements for College of Science

A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

- Major
- Science Core Curriculum
- Electives

Students may use any of the following options to meet College of Science degree requirements:



- Purdue Coursework
- AP, IB, and CLEP credit. The use of AP and IB coursework varies between College of Science degree plans.
- Transfer Credit. Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete minors, second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- Composition and Presentation
- Computing
- Cultural Diversity (Language and Culture)
- General Education
- Great Issues in Science
- Laboratory Science
- Mathematics
- Science Technology and Society
- Statistics
- Teambuilding and Collaboration
- No Count List

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## **Departmental/Program Major Courses (30-31 credits)**

### **Required Major Courses (21 credits)**

- *Average GPA in courses must be 2.00 in Required Major Courses.*
- *An Average GPA in MA 44000, MA 44200, MA 45000, STAT 51600 or STAT 51700 must be 3.5 or higher - must take three of these five courses\*.*
- *MA 37400 can only be used to meet one requirement in the Required Major Courses.*
- MA 35100 - Elementary Linear Algebra
- MA 35301 - Linear Algebra II
- MA 43200 - Elementary Stochastic Processes
- STAT 51200 - Applied Regression Analysis
- STAT 35000 - Introduction To Statistics ♦ or

- STAT 35500 - Statistics For Data Science ♦ - this course is only an option for students in Data Science majors.
- MA 41600 - Probability + or
- STAT 41600 - Probability + or
- STAT 51600 - Basic Probability And Applications \* + or
- STAT 41700 - Statistical Theory or
- STAT 51700 - Statistical Inference \*
- MA 34100 - Foundations Of Analysis or
- MA 44000 - Honors Real Analysis I \*

## Advanced Math Selective (3-4 credits)

*Choose one. Course can only be used once to meet a major requirement.*

- MA 34900 - Signals And Systems For Mathematicians
- MA 36600 - Ordinary Differential Equations
- MA 37400 - Mathematical Foundations For Machine Learning
- MA 37500 - Introduction To Discrete Mathematics
- MA 42100 - Linear Programming And Optimization Techniques
- MA 42500 - Elements Of Complex Analysis
- MA 42800 - Introduction To Fourier Analysis
- MA 44000 - Honors Real Analysis I
- MA 44200 - Honors Real Analysis II
- MA 45000 - Algebra Honors \*
- MA 52000 - Boundary Value Problems Of Differential Equations
- Check with advisor for additional approved courses.
- MA 49500 - Advanced Topics In Mathematics For Undergraduates  
Any MA 49500 title is acceptable; course must be at least 3.0 credits to be used as a selective course.

## Statistics Selective (3 credits)

*Choose one.*

- MA 37400 - Mathematical Foundations For Machine Learning
- MA 43200 - Elementary Stochastic Processes Cross-listed with STAT 43200
- STAT 51300 - Statistical Quality Control
- STAT 51400 - Design Of Experiments
- STAT 42000 - Introduction To Time Series
- IE 53000 - Quality Control
- CS 37300 - Data Mining And Machine Learning (Data Science, Computer Science, Computer Science Honors majors only)

One **3 credit** combination of the TDM courses below can be used to meet ONE STAT Selective

- TDM 10100 - The Data Mine Seminar I
- TDM 10200 - The Data Mine Seminar II
- TDM 20100 - The Data Mine Seminar III
- TDM 20200 - The Data Mine Seminar IV
- TDM 30100 - The Data Mine Seminar V
- TDM 30200 - The Data Mine Seminar VI
- TDM 40100 - The Data Mine Seminar VII
- TDM 40200 - The Data Mine Seminar VIII

## Other Departmental/Program Course Requirements (36-64 credits)

### COLLEGE OF SCIENCE CORE REQUIREMENTS

^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

#### Composition & Presentation

##### Written Communication (3-4 credits)

Choose one course from the Written Communication list here. (satisfies Written Communication and Information Literacy for core)

##### Technical Writing And Presentation\* (0-6 credits)

Students may elect to take one course (COM 21700), a combination of courses, or experiences to meet the TWTP requirement. The list of approved courses and experiences can be found [here](#). (satisfies OC for core)

- **Special Note:** Students completing both COM 11400 (elective) and COM 21700 (Technical Writing and Presentation requirement) may use both courses to meet degree requirements.
- \*Students wishing to meet the Technical Presentation and/or Technical Writing requirement through experience are required to complete the Experiential Learning Contract process.
- International Students Only: International students whose primary high school/equivalent instruction was not in English may meet this requirement with a course option only.

##### Computing (3-4 credits)

- CS 15900 - C Programming ♦ or
- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦

##### Cultural Diversity (Language & Culture)^\* (0-9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III

##### General Education^ (9 credits)

Choose courses from this list to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I

- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

Choose one from this list.

## Laboratory Science (6-8 credits)

Choose courses from this list to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

(satisfies Quantitative Reasoning for core)

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II

## Science Technology and Society^ (0-3 credits)

Choose one from this list: College of Science Core: Science Technology and Society Requirement (satisfies STS for core).

## Statistics

*Met with required major coursework: STAT 35000 or 35500.*

## Team-Building and Collaboration\* (0-3 credits)

Choose one from this list.

## Required Pre-Requisite Course (4-5 Credits)

*Calculus III Option; student should earn a C or better.*

- MA 26100 - Multivariate Calculus or
- MA 27101 - Honors Multivariate Calculus
  - should only be taken by first year (first semester) students that have credit for Calculus I and II. Students should talk to their advisor about this option.

## Electives (25-54 credits)

## Grade Requirements

- + Student should strive to earn a C or better.

## GPA Requirements

- Average GPA in courses must be 2.00 in **Required Major Courses**.
- \* - Average GPA in MA 44000, MA 44200, MA 45000, STAT 51600 or STAT 51700 must be 3.5 or higher - must take three of these five courses.
- 2.0 Graduation GPA required for Bachelor of Science degree.

## Course Requirements and Notes

- Credits should be allowed in no more than one of STAT 30101, STAT 35000, STAT 35500, STAT 50100, and in no more than one of STAT 50300 and 51100.
- MA 37400 can only be used to meet one requirement in the Required Major Courses.
- No Count Courses are not allowed for credit
- Overlapping Course Content courses - only one course can be used for courses considered to have overlapping content

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.
- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

### University Core Requirements

For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

## Civics Literacy Proficiency Requirement

The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the [Civics Literacy Proficiency website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or
- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of **these approved courses** (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

### Fall 1st Year

- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 1.00 (STAT 10100 strongly recommended)
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 1.00-2.00

### 15-18 Credits

### Spring 1st Year

- CS 15900 - C Programming ♦ or

- CS 17600 - Data Engineering In Python ♦ or
- CS 17700 - Programming With Multimedia Objects ♦ or
- CS 18000 - Problem Solving And Object-Oriented Programming ♦
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 2.00

## 15-18 Credits

### Fall 2nd Year

- MA 26100 - Multivariate Calculus +
- Science Core Selection - Credit Hours: 3.00-4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00 (MA 30100 recommended)
- Elective - Credit Hours: 2.00

## 15-18 Credits

### Spring 2nd Year

- COM 21700 - Science Writing And Presentation
- MA 35100 - Elementary Linear Algebra
- STAT 35000 - Introduction To Statistics ♦ or
- STAT 35500 - Statistics For Data Science ♦
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15 Credits

### Fall 3rd Year

- MA 34100 - Foundations Of Analysis or
- MA 44000 - Honors Real Analysis I \*
- MA 41600 - Probability + or
- STAT 41600 - Probability + or
- STAT 51600 - Basic Probability And Applications +\*
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15-16 Credits

### Spring 3rd Year

- STAT 41700 - Statistical Theory or
- STAT 51700 - Statistical Inference \*
- Advanced MA Selective - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00
- Elective - Credit Hours: 3.00

## 15-16 Credits

### Fall 4th Year

- MA 43200 - Elementary Stochastic Processes
- STAT 51200 - Applied Regression Analysis
- Great Issues Option - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective (STS course recommended) - Credit Hours: 3.00

## 15-16 Credits

### Spring 4th Year

- MA 35301 - Linear Algebra II
- Statistics Selective - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 15 Credits

### Pre-Requisite Information

For pre-requisite information, [click here](#).

### World Language Courses

World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

### Critical Course

The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student



must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful. These would be identified by the institutions for each degree program".

## Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

## Minor

### Statistics Minor

#### Requirements for the Minor (15 credits)

- Before undertaking this minor, the student must establish the prerequisites for the required minor courses.
- ALL COURSES REQUIRED FOR THIS MINOR MUST BE TAKEN AT PURDUE UNIVERSITY
- Transfer, AP, IB, and A LEVEL credit cannot be used for the minor.
- P/NP option is not allowed for the minor
- Students must earn a 2.0 average in MA/STAT/IE/MGMT courses required for the minor.

#### Area 1 - Choose One (3 credits)

- STAT 35000 - Introduction To Statistics
- STAT 35500 - Statistics For Data Science
- STAT 50300 - Statistical Methods For Biology
- STAT 51100 - Statistical Methods
- MGMT 30500 - Business Statistics (School of Management Majors Only; B- or better required)
- IE 33000 - Probability And Statistics In Engineering II (Industrial Engineering Majors Only; B- or better required)

#### Area 2 - Choose One (3 credits)

- STAT 22500 - Introduction To Probability Models
- STAT 31100 - Introductory Probability
- STAT 41600 - Probability
- MA 41600 - Probability
- IE 23000 - Probability And Statistics In Engineering I (Industrial Engineering Majors Only; B- or better required)

#### Area 3 (3 credits)

- STAT 51200 - Applied Regression Analysis

## Area 4 - Choose Two (6 credits)

- IE 33600 - Operations Research - Stochastic Models
- STAT 41700 - Statistical Theory
- STAT 51400 - Design Of Experiments
- STAT 51300 - Statistical Quality Control or
- IE 53000 - Quality Control

## Due to Minor Requirements and Pre-requisites, Below are the Suggested Pathways for Specific Majors

### Krannert School of Management Majors

- MGMT 30500 - Business Statistics \*
- STAT 31100 - Introductory Probability or
- STAT 22500 - Introduction To Probability Models
- STAT 51200 - Applied Regression Analysis
- STAT 51300 - Statistical Quality Control
- STAT 51400 - Design Of Experiments

\*B- or better required

### Industrial Engineering Majors

- IE 33000 - Probability And Statistics In Engineering II (B- or better required)
- IE 23000 - Probability And Statistics In Engineering I (B- or better required)
- STAT 51200 - Applied Regression Analysis
- STAT 51400 - Design Of Experiments
- STAT 51300 - Statistical Quality Control or
- IE 53000 - Quality Control

### Pharmacy, Nursing, Biology, Agriculture Majors (Majors that utilize STAT 50300)

- STAT 50300 - Statistical Methods For Biology
- STAT 22500 - Introduction To Probability Models or
- STAT 31100 - Introductory Probability
- STAT 51200 - Applied Regression Analysis
- STAT 51300 - Statistical Quality Control
- STAT 51400 - Design Of Experiments

### Majors that require MA 26100 (Calculus III)

*If your specific major is not listed, but your major requires you to take Calculus III, this is the suggested pathway through the minor. Mathematics majors should consider a dual major in Mathematics with Statistics instead of adding a Statistics minor.*

- STAT 35000 - Introduction To Statistics

- STAT 41600 - Probability
- STAT 51200 - Applied Regression Analysis
- STAT 41700 - Statistical Theory
- STAT 51400 - Design Of Experiments

## Majors that do not require MA 26100 (Calculus III)

*If your specific major is not listed, but your major DOES NOT require you to take Calculus III, this is the suggested pathway through the minor.*

- STAT 35000 - Introduction To Statistics or
- STAT 51100 - Statistical Methods
- STAT 22500 - Introduction To Probability Models
- STAT 51200 - Applied Regression Analysis
- STAT 51300 - Statistical Quality Control
- STAT 51400 - Design Of Experiments

## Notes

- AT LEAST 9 credits of the 15 credit hour minor must be STAT courses. IE 53000 and MA 41600 are considered STAT courses due to cross-listing
- Students Majoring in Actuarial Science, Actuarial Science Honors, Data Science, Applied Statistics, Mathematical Statistics, Statistics with Math Emphasis, and/or Statistics Honors **cannot** complete this minor.
- Courses that do not require calculus, such as PSY 20100 and SOC 38200 are not equivalent to the courses listed.
- Credit for the STAT minor is not allowed for more than one course in each group (per Course Catalog descriptions):
- STAT 22500, STAT 31100, STAT 41600 or MA 41600
- STAT 35000, STAT 35500, STAT 50100
- STAT 50300 and STAT 51100

## Disclaimer

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## Pre-Program

## Data Science First Year (Statistics)

### Data Science First Year

### Program Requirements (25-28 credits)

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \* (*satisfies Computing and Teambuilding for College of Science core*)

- CS 18200 - Foundations Of Computer Science \*
- CS 38003 - Python Programming
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First Year Composition Selection - Credit Hours: 3.00-4.00
- Science Core Selection - Credit Hours: 3.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 4.00

## Fall 1st Year

- CS 18000 - Problem Solving And Object-Oriented Programming ♦ \*
- CS 19300 - Tools
- MA 16100 - Plane Analytic Geometry And Calculus I or
- MA 16500 - Analytic Geometry And Calculus I
- Science Core Selection - Credit Hours: 3.00 - 4.00
- Elective - Credit Hours: 3.00

## 16-18 Credits

## Spring 1st Year

- CS 18200 - Foundations Of Computer Science
- CS 38003 - Python Programming
- MA 16200 - Plane Analytic Geometry And Calculus II or
- MA 16600 - Analytic Geometry And Calculus II
- Science Core First Year Composition Selection - Credit Hours: 3.00-4.00
- Science Core Selection - Credit Hours: 3.00
- Elective - Credit Hours: 1.00

## 15-17 Credits

## Notes

- CS 19300 is a required freshman seminar course; corequisite with CS 18000. It is not a degree requirement.
- \*All MA, CS, and STAT courses required for the major, must be completed with a grade of "C" or better.
- \*All prerequisites to MA, CS, and STAT courses required for the major, regardless of department, must be completed with a grade of "C" or better.

## College of Science Pass/No Pass Option Policy

- Only free electives and courses at the 50000-level general education requirement may be taken under the pass/not-pass option.

- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
  - Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
  - Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
  - The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade.
- University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
  - Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.