

**Purdue School of Engineering and Technology  
Indiana University-Purdue University Indianapolis (IUPUI)**



**DEPARTMENT OF MECHANICAL  
AND ENERGY ENGINEERING**

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**SCHOOL OF ENGINEERING AND TECHNOLOGY**  
Indiana University—Purdue University  
Indianapolis

**Graduate Program Handbook**

for

**MSME  
On-Site ME PhD  
ME Graduate Certificates**

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# 1 Graduate Program at IUPUI MEE

## 1.1 Introduction

The Department of Mechanical and Energy Engineering (MEE) welcomes you to the IUPUI campus and the MEE Graduate Program. We expect your time here to be an experience of enriched learning, exploration and discovery, and professional and personal growth. We hope it will be an invigorating experience, which fosters a lifetime of learning. This handbook describes the requirements and regulations for the graduate degree programs in the Department of Mechanical and Energy Engineering (SL 260) of the Purdue School of Engineering and Technology at IUPUI. The guidelines and procedures set forth in this handbook will help you in preparing your Plan of Study (see Section 2.4 and 3.4) and in meeting the necessary degree requirements for both completing the program and graduating. We invite you to visit the Chair of the Graduate Program and academic advisor in the Department of Mechanical and Energy Engineering (SL 260) with questions about requirements, plans of study, or any other academic matters. Important announcements are also posted on the bulletin board outside the MEE Office (SL 260) and on Canvas MSME and PhD ME sites.

### **The Department offers the following degree programs:**

- Graduate Certificates
- Master of Science in Mechanical Engineering Degree (MSME)
- Doctor of Philosophy Degree (administered IUPUI Campus, Indianapolis)
- Doctor of Philosophy Degree (administered with the West Lafayette campus, see separate Handbook, Appendix E)

The graduate certificate program includes the offering of five certificates: Computer- Aided Mechanical Engineering, Energy Management and Assessment, Hybrid and Electric Vehicle Technology, Engineering Design Innovation, and Systems Engineering.

The master's degree program offers the following Purdue University master's degree: Master of Science in Mechanical Engineering (MSME). A detailed description of this degree and requirements are provided in Section 2 of this handbook. Your degree is granted by the Purdue University Graduate School upon successful completion of all degree requirements in the Department of Mechanical and Energy Engineering at IUPUI.

The PhD program in this handbook is administered on the IUPUI Campus, Indianapolis. The program is described in detail in Section 3.

Administration of the ME Graduate Program is shared between the MEE Department (SL 260, <http://www.engr.iupui.edu/departments/me/>), and the IUPUI Graduate Office (University Library, Room 1170; <http://www.iupui.edu/~gradoff/>). You should become familiar with the roles of both entities and the program procedures. If you are an international student, you will also have contact with the Office of International Affairs (OIA) at IUPUI (Education and Social Work Building (ES), Rm. 2126) regarding visas and immigration regulations. For more information on Purdue West Lafayette, please contact Monica Stahlhut, Jerry Mooney or the MEE Department Graduate Cha (SL 260).

## 1.2 Information for New Students

**Student ID:** Each admitted student at IUPUI is given a student identification number. Use that number to establish a student account, which will let you access your university academic record, financial information, personal information, campus life and general information through [one.iu.edu](http://one.iu.edu).

**Communication:** Email is the official form of communication with all students at IUPUI and is the primary mode of communication in use with our graduate students. Activate your IUPUI network and email account. All university email communication will be sent to your IUPUI email account. If you have another email that you prefer to use, you have the option of setting your IUPUI email to forward to your preferred account.

**Course Selection:** As a new student, one of the first questions to address is how to properly register for graduate classes. This process may begin as soon as you have received official notification of admission from the Purdue Graduate School. To prepare for registration you will use information about the program, its requirements, and the offered courses.

1. Refer to these three documents: **Graduate Program Handbook:** Specific program and requirement information

**Schedule of Classes:** Course offerings and schedule of classes at:

<http://registrar.iupui.edu/schedule.html>.

**Faculty Research Expertise.** A list of faculty members with their respective research interests at <https://et.iupui.edu/departments/mee/people/>.

2. Study these documents and then consult with your advisor or the MEE Graduate Program Chair. All students are assigned an advisor (who may be temporary) when they are admitted to the MEE Graduate program. The purpose of the consultation is to begin planning **your** graduate program and decide which courses you should take in your first semester. The consultation also serves as the first step to selecting a major professor, the person who will serve as your academic advisor. Each graduate student is assigned or expected to choose a major professor/academic advisor before the end of the first semester, with the approval of the professor and the MEE Graduate Program Chair. Each student who is employed as a teaching assistant (TA), a graduate assistant (GA), or a research assistant (RA) on a particular research project will be assigned a major professor. If the thesis option is selected, the major professor will be the thesis advisor. The Graduate Program Chair is the academic advisor for non-thesis students. The major professor will serve as chair of the student's advisory committee (see Section 2.3).
3. All PhD students are assigned a major professor when they are admitted to the ME Graduate Program. Immediate consultation with the major professor is required for all new Ph.D. students. The purpose of the consultation is to begin planning your doctoral program and to decide which courses you should take in your first semester. The major professor will serve as the chair of the student's advisory committee (see Section 3.3).
4. After consulting with the academic advisor, prepare a tentative list of courses for the initial semester according to the web-based *“Course Offerings”* and *“Schedule of Classes”* for the particular semester. Online course offerings and the schedule of classes can be accessed through the Office of the Registrar website at [registrar.iupui.edu](http://registrar.iupui.edu). When you have your class schedule prepared, register directly via the web-based student center, [one.iu.edu](http://one.iu.edu).

**Registration:** Registration and fee information is available on both the Registrar's website and the Bursar's website:

<https://studentcentral.iupui.edu/register/index.html>

<https://studentcentral.iupui.edu/pay-bill/index.html>

**Late Registration Fees:** Students completing their registration after the first week of class are automatically assessed a late fee by the Bursar. Questions or problems regarding the registration process should be directed to the Office of the Registrar.

**Registration for Subsequent Semesters:** Students are required to meet with their major professor or academic advisor (Chair of Graduate Program) to discuss a tentative Plan of Study and to choose courses for registration.

Registration for Summer and Fall Semesters begins approximately the second week in March, and registration for the Spring Semester begins approximately the second week of October. Students should follow this registration procedure:

1. Access the Schedule of Classes at <http://one.iu.edu>.
2. Meet with your major professor or academic advisor to select courses.
3. Meet with your academic advisor to begin completion of the Registration Form
4. Get the signature of the major professor or temporary advisor for approval.
5. If a TA, GA or RA has been awarded, meet with the MEE Department Assistant to the Chair for completion of paperwork.
6. Submit Registration Form, and Tuition Waiver Form if applicable, to the MEE Department Assistant to the Chair.
7. Register online.

**Additional Registration Guidelines for Employed Students:** Students who have research assistantships, graduate assistantships, or teaching assistantships should always meet with the MEE Assistant to the Chair in SL 260 before completing the final steps for registration. Completion of this step each semester will ensure that proper documentation exists for the prompt payment of salary and, when appropriate, for payment of tuition (no reimbursement for student fees).

Students seldom register for more than nine (9) credits of course work in a single semester. Students who have a graduate assistantship, teaching assistantship, or research assistantship in the Department of Mechanical and Energy Engineering are required to register for a minimum of six credits for the fall and the spring semesters. Requests for exceptions to the requirement may be submitted to the Graduate Program Chair and are reviewed on a case-by-case basis.

### 1.3 Primary Area of Specialty and Related Area Courses

The Graduate Program in Mechanical Engineering consists of the following four areas of specialty:

- Solid Mechanics, Biomechanics and Design
- Fluid and Thermal Sciences
- Energy and Materials
- Mechatronics and Controls

The Solid Mechanics, Biomechanics and Design area includes study of strength of materials, dynamics, kinematics, vibration, structural mechanics, mechanical design, CAD/CAM, computational solid mechanics, and the mechanics of biological systems and materials (musculoskeletal systems, joint mechanics, dental mechanics, bio-fluid mechanics, bio-solids mechanics, and medical instrumentation). The Fluid and Thermal Sciences area includes study of fluid mechanics, heat transfer, thermodynamics, combustion, energy systems, thermal design, and computational fluid dynamics. Study in the Energy and

Materials area includes the design, fabrication, characterization, simulation of materials, and the conversion, transfer, distribution, and efficient use of energy. The Energy aspect includes the study of thermodynamics, heat and mass transfer, fluid mechanics, and their application in traditional and renewable energies as well as the energy related elements of physics, electrochemistry and materials science. The Mechatronics and Controls area includes study of mechanical systems, electro-mechanical systems, control theory, micro-controllers, sensors, and actuators.

All graduate students -- both master's and PhD students -- need to select primary and related courses in their Plan of Study. The graduate courses are classified under primary area and related area. Those courses directly related to the area of specialty are classified as primary and those courses outside the specialty area are classified as related area. This list may change occasionally, and the MEE Graduate Program Chair will have updated information. In addition, other courses in the primary and related areas may be offered by Purdue University's Engineering Professional Education (EPE, formerly CEE) through the IUPUI Course Offering.

### 1.3.1 Primary Area Courses

The following table summarizes the scheduling and area of specialty information of MEE Graduate Courses (500 and 600 level courses).

*Solid Mechanics, Biomechanics and Design (SBD)*

*Fluid and Thermal Science (FT)*

*Mechatronics and Controls (MC)*

*Energy and Materials (EM)*

*“x” in the table indicates that the course is the primary course of the areas of specialty.*

*Note: The courses may not be offered in the scheduled semesters due to instructor unavailability or low enrollment.*

Course number	Course title	Offering semester	Area of Specialty			
			SBD	FT	MC	EM
ME 50000	Advanced Thermodynamics	Every Spring		x		x
ME 50100	Statistical Thermodynamics	Occasionally		x		
ME 50101	Energy Assessment of Industrial Processes	Every Fall				x
ME 50102	Energy Management Principles	Every Spring				x
ME 50103	Industrial Energy Assessment: Tools and Applications	Every Fall				x
ME 50104	Powertrain Integration	Occasionally	x			
ME 50105	Hybrid and Electric Transportation	Every Fall			x	x
ME 50106	Industrial Energy Audit	Occasionally				x
ME 50300	Biomechanics of the Musculoskeletal System	Occasionally	x			
ME 50400	Automotive Control	Every Spring			x	
ME 50500	Intermediate Heat Transfer	Every Fall		x		x
ME 50600	Two-Phase Flow & Heat Transfer	Occasionally		x		
ME 50601	Design Optimization Method	Every Spring	x	x		
ME 50801	Orthopaedic Tissue Mechanics	Every Fall	x			
ME 50900	Intermediate Fluid Mechanics	Every Fall		x		

ME 51000	Gas Dynamics	Every Spring	x		
ME 51201	Energy Storage Devices and Systems	Every Spring		x	
ME 52000	Imaging-Based Computational Analysis of Biomedical Flows	Occasionally	x		
ME 52301	Nanosystems Principles	Every Fall		x	
ME 52500	Combustion	Every Fall	x	x	
ME 52601	Integrated Nanotechnology Process and Devices	Every Spring			x
ME 52701	Kinetic Theory & Computational Modeling in Fluid Dynamics	Once Every 2 Years in the Spring	x		
ME 53501	Introduction to Systems Engineering	Every Fall	x		
ME 53502	Systems and Specialty Engineering	Every Spring	x		
ME 53503	Model-Based Systems Engineering	Every Spring	x		
ME 53504	Systems Driven Product Development	Every Fall	x		
ME 53800	Air Breathing Propulsion	Occasionally		x	
ME 54200	Introduction to Renewable Energy	Every Spring			x
ME 54600	CAD/CAM Theory and Advanced Applications	Occasionally	x	x	
ME 54800	Fuel Cell Science & Engineering	Occasionally			x
ME 55000	Advanced Stress Analysis	Every Spring	x		x
ME 55100	Finite Element Analysis	Every semester	x	x	x
ME 55200	Advanced Applications of Finite Element Methods	Occasionally	x		
ME 55300	Product and Process Design	Occasionally	x		
ME 55401	Design for IP Protection and Commercialization	Occasionally	x		
ME 55700	Design for Manufacturability	Occasionally	x		
ME 55800	Composite Materials	Once Every 2 Years in the Spring	x		x
ME 55801	Composite Materials for Automotive Applications	Every 2 Years in the Fall	x		x
ME 55802	Design and Analysis of Materials and Structures in Lightweight Vehicles	Occasionally	x		x
ME 56000	Kinematics	Occasionally	x		
ME 56100	Optimal Design - Theory	Occasionally	x		
ME 56200	Advanced Dynamics	Every Fall	x		
ME 56300	Mechanical Vibrations	Every Spring	x	x	
ME 56500	Vehicle Dynamics	Occasionally	x	x	
ME 56600	Mechanics of Machinery	Occasionally	x		

ME 56802	Ceramics Materials	Once Every 2 Years in the Spring				x
ME 56900	Mechanical Behavior of Materials	Every Spring	x			x
ME 56910	Multiscale Modeling and Simulation of Materials	Occasionally	x			x
ME 57000	Machine Design	Occasionally	x			
ME 57100	Reliability Based Design	Occasionally	x			
ME 57101	Probabilistic Engineering Design	Every Fall	x			
ME 57200	Analysis and Design of Robotic Manipulators	Occasionally	x		x	
ME 57201	Robotic Manipulators	Every 2 Years in the Fall	x		x	
ME 57301	Air Pollution and Emission Control	Occasionally			x	
ME 57400	Additive Manufacturing	Every Fall	x			x
ME 57500	Design of Control Systems	Occasionally			x	
ME 57700	Human Motion Kinematics	Occasionally	x			
ME 57800	Digital Control	Occasionally			x	
ME 58100	Numerical Methods in Mechanical Engineering	Every Fall	x	x	x	x
ME 58200	Thermal Stress Analysis	Occasionally		x		
ME 58600	Microprocessors in Electromechanical Systems	Occasionally			x	
ME 58901	Optimal Design of Mechatronic Systems: Robots & Interactive Structures	Occasionally				x
ME 59700	Advanced Topics in Manufacturing	Occasionally	x			
ME 59700	Applied Machine Learning in Mechanical Engineering	Occasionally	x			
ME 59700	Design and Analysis of Aerospace Structures	Every Spring	x			
ME 59700	Design of Complex and Origami Structures	Occasionally	x			
ME 59700	Design, Analysis and Experimental Characterization of Advanced Composite Materials	Occasionally	x			x
ME 59700	Dynamics and Simulation of Hybrid-electric Vehicles	Occasionally	x		x	
ME 59700	Electrochemistry for Engineering	Occasionally				x
ME 59700	Electromechanical Systems and Applied Mechatronics	Occasionally			x	
ME 59700	Introduction to Friction and Wear	Occasionally	x			
ME 59700	Introduction to Tribology	Occasionally	x			
ME 59700	Materials Characterization Techniques	Every Spring				x
ME 59700	Models of Musculoskeletal Load	Occasionally	x			
ME 59700	Principles of Turbomachinery	Occasionally		x		

ME 60101	Computational Modeling of Turbulence	Occasionally	x			
ME 60601	Optimal Design of Complex Mechanical Systems	Every Spring	x			
ME 60602	Topology Optimization	Occasionally	x			
ME 60800	Numerical Methods in Heat/Mass/Momentum Transfer	Occasionally		x		
ME 61201	Continuum Mechanics	Occasionally	x	x		
ME 61400	Computational Fluid Dynamics	Every Spring		x		
ME 65100	Advanced Finite Element Method for Solids	Every Spring	x			
ME 65500	Computational Mechanics of Materials	Occasionally	x			x
ME 67500	Multivariable Control System Design	Occasionally			x	
ME 69700	Computational Fracture Mechanics	Every Spring	x			x
ME 69700	Numerical Methods for Ordinary and Differential Equations for Engineers	Once Every 2 Years in the Spring	x	x	x	x
ME 69700	Pulsatile Fluid Mechanics and Combustion Dynamics	Occasionally		x		x
BME 60100	Principles of Biomedical Engineering I		x			
BME 60200	Principles of Biomedical Engineering II		x			
ECE 53800	Digital Signal Processing I				x	
ECE 55400	Electronic Instrumentation and Control Circuits				x	
ECE 60200	Lumped System Theory				x	
ECE 62900	Introduction to Neural Networks				x	
ECE 68000	Modern Automatic Control				x	
ECE 68500	Introduction to Robust Control				x	
CSCI 54900	Intelligent Systems				x	
CSCI 55600	Fault-Tolerant Computing				x	

### 1.3.2 Related Area Courses

Any Mechanical Engineering graduate course outside the primary area is considered a related area course, with the exception of project courses specified below which are considered related area courses for non-thesis students only:

ME 59100 Mechanical Engineering Projects I (for non-thesis option only)

ME 69700 Mechanical Engineering Projects II (for non-thesis option only)

Additional related area courses outside of the MEE department:

MSE 54700 Introduction to Surface Science  
 MSE 59700 Materials and Devices for Solid-State Energy Conversion  
 MSE 57600 Corrosion  
 MSE 51000 Microstructural Characterization Techniques  
 ECE 59500 Materials and Devices for Solid-State Energy Conversion  
 MSE 59700 Materials and Devices for Solid-State Energy Conversion  
 ECE 59500 Materials and Devices for Solid-State Energy Conversion  
 ECE 53800 Digital Signal Processing I  
 ECE 62900 Introduction to Neural Networks  
 ECE 59500 Topics: Introduction to Computational Intelligence  
 ECE 59500 Topics: Parallel Processing Theory  
 ECE 59500 Topics: Electromechanical Systems and Applied Mechatronics  
 ECE 60000 Random Variables  
 ECE 60800 Computational Models and Systems  
 PHYS 51000 Physical Mechanics  
 PHYS 52200 Coherent Optics and Quantum Electronics  
 PHYS 54500 Solid State Physics  
 PHYS 55000 Introduction to Quantum Mechanics  
 PHYS 60000 Mathematical Methods in Physics  
 CHEM 54200 Inorganic Chemistry  
 CHEM 57500 Intermediate Physical Chemistry  
 CSCI 52000 Computational Methods in Analysis  
 CSCI 54900 Intelligent Systems  
 CSCI 55200 Advanced Graphics and Visualization  
 CSCI 58000 Algorithm Design and Implementation  
 CSCI 61400 Numerical Solution of Ordinary Differential Equations  
 CSCI 61500 Numerical Solution of Partial Differential Equations  
 BME 59500D Sensors & Implantable Devices  
 BME 59500E Medical Imaging  
 BME 59500J Molecular, Cellular Biomechanics

**1.3.3 Mathematics Courses**

Mathematics courses are required in the Plan of Study as a related area for both master's and PhD students. This requirement may be met by taking three-credit hour courses from the Mathematics Department (see the list below) or equivalent courses with a strong math content from another department, including MEE. The detailed requirement of mathematics courses for master's and PhD programs can be found in section 2.6 and 3.5. The following are acceptable mathematics courses:

MATH 53700	Applied Mathematics for Scientists and Engineers I
MATH 52800	Advanced Mathematics for Engineering and Physics II
MATH 51000	Vector Calculus
MATH 51100	Linear Algebra with Applications
MATH 52300	Introduction to Partial Differential Equations
MATH 57800	Mathematical Modeling of Physical Systems

Courses with strong mathematics content are

ME 55100	Finite Element Analysis
ME 65100	Advanced Applications of Finite Element Methods
ME 58100	Numerical Methods in Mechanical Engineering

ME 61400	Computational Fluid Dynamics
ECE 58000	Optimization Methods for Systems and Control
ECE 60000	Random Variables
PHYS 55000	Introduction to Quantum Mechanics
PHYS 60000	Mathematical Methods in Physics

*Note: MATH 53700 and MATH 52800 are the preferred math courses. GERC must be consulted for other math-related courses.*

### **1.3.4 Graduate Seminar**

All PhD and master's students receiving financial aid including research assistantship, teaching assistantship, graduate assistantship, tuition assistance, or fellowship awards must enroll in a zero credit hour seminar course for every semester (Fall and Spring) during their residency.

ME 59800 Topics: MEE Seminar

### **1.3.5 Transfer Courses**

Transfer courses placed on the Plan of Study receive the earned credit but the grade is not calculated into the GPA. The following rules apply for post-baccalaureate or transfer courses on the Plan of Study:

- All post-baccalaureate and transfer courses used on the Plan of Study must have a grade of B or better.
- For the master's program, a maximum of twelve semester credit hours of graduate coursework may be transferred from another institution or degree-awarding program. Completed courses must have a grade of B or better and must be approved by the student's advisory committee and the graduate chair.
- For the regular PhD program, a maximum of twelve semester credit hours of graduate coursework may be transferred from another institution or degree-awarding program. Completed courses must have a grade of B or better and must be approved by the student's advisory committee and the graduate chair.
- For the DPhD program, a maximum of twelve semester credit hours of graduate coursework may be transferred from another institution or degree-awarding program. Completed courses must have a grade of B or better and must be approved by the student's advisory committee and the graduate chair.
- The credit hours of the transfer courses are not recorded on the transcript until the course is listed on the approved Plan of Study and the official transcript from the institution has been accepted at Purdue.

## **1.4 English Language Proficiency Requirements for International Students**

### **1.4.1 Policy**

Per IUPUI policy, most international students who are non-native speakers of English must take the English for Academic Purposes (EAP) Placement Test prior to registration for classes even if the TOEFL test has been taken for admissions purposes. Those applicants who obtain a TOEFL iBT score of 100 or higher, and those who obtain an IELTS score of 7.5 or higher are EAP test exempt. **The student's letter of admission from the Office of International Affairs will indicate if s/he is required to take this test.**

Admitted students from countries where English is not the predominant native language are required to take an English for Academic Purposes (EAP) placement exam during new international student orientation held the week prior to both the fall and spring semesters. This exam is a separate requirement from the Proof of English Proficiency admissions requirement.

The EAP Exam is not an admission requirement but is a placement exam. IUPUI offers English for Academic Purposes (EAP) courses. The placement exam determines whether students are required to take any English courses. If so, students will take EAP courses alongside courses required for their academic program **within the first semesters of a degree program, and these EAP courses must be completed prior to graduation.** There is an additional cost for these courses.

In rare cases, an admitted student may place below IUPUI's EAP course offerings. If this happens, the student will be referred for intensive English study at the Program of Intensive English (PIE) before being allowed to begin the academic program at IUPUI.

After admission, graduate students must have permission from their program director / advisor to retake the EAP Test if they place into a course as a result of their initial exam. Only one retake is possible and will be granted only with a valid justification.

Students who fail to take the EAP exam or those who fail to enroll in an EAP course as required by their test results will have a hold placed on their enrollment for the next semester. Holds are not placed until after students complete their first semester: This provides students who willingly comply with the opportunity to take required EAP courses without the impact of registration holds until coursework has been completed. The IUPUI Graduate Office administers all Graduate EAP policy requirements and holds.

**Records will be monitored** at the end of each semester to ensure that courses were completed and holds are then removed/placed accordingly.

Students who wish to retake the test must provide their director / advisor valid justification. The program director / advisor will notify the student of the decision by e-mail and will copy both Melanie Mundy (mjcurfma@iupui.edu) of the EAP Program and the IUPUI Graduate Office (gradoff@iupui.edu). With adequate justification, one re-take can be granted to a student within the first two weeks of classes. The scores of the second exam stand.

#### **1.4.2 SPEAK Test for International Graduate Teaching Assistants:**

All non-native speaking students who will be given instructional roles that entail direct student contact (TA's, tutors, lab instructors, etc.) are required to take the SPEAK test through the EAP Program the week before classes begin.

**Students who obtain a score of 50 or above on the SPEAK test may be given primary responsibility for a class or lab. Those with scores of 40-49 may serve as a tutor, grader, class assistant, or lab assistant while taking G520 in the EAP Program. Students who obtain a score lower than 40 must take G520 prior to holding any position with direct student contact.**

### **1.5 Residency and Load**

#### **1.5.1 Semester Load**

To qualify as a full-time student, a student must either be enrolled for at least eight (8) credit hours or hold a *Student Academic Appointment* as a graduate, research or teaching assistantship and be enrolled for at least six (6) credit hours.

**All international students must be enrolled full-time to maintain visa status.**

### **1.5.2 Residency Requirements**

The total number of hours of academic credit used to satisfy residency requirements consists of all course credit hours that appear on the Plan of Study taken at IUPUI while enrolled in a graduate degree program and passed with grades of "C" or better in addition to thesis/ dissertation research credit hours that appear on the transcript. At least eighteen (18) of the total credit hours used to satisfy degree requirements must be earned in residence on the IUPUI campus where the degree is to be granted.

## **1.6 Changes in Academic Program**

As a student's academic program progresses, conditions may arise and make it necessary to amend the program and/ or the Plan of Study. Such changes, when based on appropriate academic reasons, may be acceptable. However, there are regulations to observe when amending either the program or the Plan of Study.

### **1.6.1 Change to the Academic Program**

A course may not be removed from an approved Plan of Study once the course has been taken and a grade of "D" or lower is received. This is a Graduate School rule. Any change to a Plan of Study requires approval of the student's advisory committee and the MEE Graduate Chair.

### **1.6.2 Change to the Plan of Study**

To make electronic changes to an approved Plan of Study, go to the Purdue Graduate School Database to *Request a Change to the Plan of Study*. This *e-form* is also used to request a change of major professor and/or other advisory committee members, or for a change of the PhD degree option. The e-form is available from the Purdue Graduate School Database. See the website below:

[https://www.purdue.edu/gradschool/gsdb/wpu\\_stuin\\_php/pu\\_dispauth\\_std.php](https://www.purdue.edu/gradschool/gsdb/wpu_stuin_php/pu_dispauth_std.php)

## **1.7 Inactive Academic Status**

Students who do not enroll in classes for three (3) consecutive academic sessions, including summer sessions, will be automatically placed on ***inactive academic status***.

Students on inactive academic status are required to submit a new graduate application for readmission to the program before they are permitted to enroll again. Completing and submitting a new application is a formal procedure to reactivate inactive academic status. Not all supporting application materials are *required* for re-admission.

The Purdue University Graduate School must officially approve any application for readmission before a student can enroll in classes. Registration activities, which take place while on inactive academic status and before the application for re-admission has been officially approved by the Graduate School are considered invalid registrations and will not count toward graduate credit.

## **1.8 Petitions to the Graduate Committee**

All graduate students have the right to petition the Mechanical and Energy Engineering GERC for exceptions to an existing rule, if they feel that circumstances are sufficiently unusual to warrant special considerations. Such petitions should be delivered in writing to the Chair of the GERC and must include the approval (or disapproval) of each member of the student's advisory committee.

## 2 Master's Degree Program in Mechanical Engineering

### 2.1 Introduction

The Department of Mechanical and Energy Engineering offers the following master's degree programs:

**Master of Science in Mechanical Engineering (MSME):** Students who are graduates of recognized programs in Engineering, Science, or Technology and who meet the minimum requirements for undergraduate proficiency in Mechanical Engineering are qualified to apply for this degree. The minimum requirements are listed in Appendix A of this handbook.

**Combined BS-MS Program:** Outstanding undergraduate students in the IUPUI Mechanical and Energy Engineering, Physics and other designated programs, may apply for admission to the MSME program while still in those BS programs. The requirements for the master's degree remain the same but allow special admission, credit transfer and mutual program adjustments. These are specified in Sections 2.7 and 2.8.

### 2.2 Admission Requirements

In all cases, applicants are required to have a minimum undergraduate GPA of 3.00/4.00 for admission to the program. International applicants who are graduates of non-US institutions and whose first language is not English are required to take the TOEFL or IELTS exam and achieve the minimum scores as shown below.

	TOEFL Internet-based	TOEFL Paper-delivered	IELTS
Reading	19	19	6.5
Writing	18	18	5.5
Speaking	18	n/a	6.0
Listening	14	14	6.0
Total	80	n/a	6.5

All applicants are required to take the GRE (Graduate Record Examination) and report the scores. Preferred GRE scores are at least 155 on the quantitative section and a 3.0 on the analytical writing section.

### 2.3 Master's Advisory Committee

All thesis students must have a Master's Advisory Committee consisting of at least three graduate faculty members. The duties of this committee are to assist the student in the preparation of the Plan of Study, advise the student on research related to the master's thesis, and conduct examination on the master's thesis. During the first semester of enrollment, the student shall select a major professor who will serve as Chair of the Advisory Committee. The major professor-student relationship must be established by mutual consent, and consent is presumed by acceptance of a research assistantship if offered. With the agreement of the major professor, the student will select other advisory members to be on the committee. The major professor and at least one additional member of the committee must be members from the MEE graduate faculty (see the current list in Appendix B).

- All **non-thesis students** will include the MEE Graduate Chair as the **sole committee chair**.
- **No other committee members are required.**

The advisory committee is expected to be established at the beginning of the second semester of

enrollment. The advisory committee, as agreed by the major professor and the student, shall be recorded in a Plan of Study and presented to the Dean of the IUPUI or Purdue Graduate School for approval and formal appointment. The dean may appoint additional members, if it is advisable. After the Plan of Study is approved, (see Section 1.6) any changes to the advisory committee would require a change to the Plan of Study.

## 2.4 Master's Plan of Study (POS)

All master's degree students must file a POS before the end of the second semester. The master's degree POS is available in electronic form through the Purdue Graduate School database. Students can gain access to the database after Purdue ID's are assigned approximately eight weeks into the first semester.

Important: The draft POS must be submitted as a "final" to be approved. Keep in mind that the POS must be approved before the end of the second semester of the degree program.

A master's POS is filed electronically in the Purdue Graduate School Database. In all cases, the POS must be filed and approved by the Graduate School before the start of the final semester of graduation. The student can submit a POS change to alter advisory committee members, to delete/add courses, or to change the choice of master's non-thesis or thesis options. The POS should be kept current at all times. Any final changes required in the POS must be made before the end of the second week of classes of the semester in which the degree is expected and candidacy registration has taken place.

The following guidelines must be observed in preparing a POS. Additional guidelines and information on filling out the POS are given in Section 2.5 of the handbook.

- 1) Indicate courses in your primary area with a "P" in the left-most column labeled "Area". List primary area courses together as a group.
- 2) Related area courses should be indicated with an "R" in the "Area" column. List related area courses together as a group.
- 3) Mathematics courses are also indicated with an "R" on the POS, in the "Area" column.
- 4) Graduate level credits earned while in non-degree status at IUPUI may be used toward the master's degree -- up to a maximum of 12 credits -- if they meet degree requirements.
- 5) Graduate level credits earned at another recognized university may be used toward the master's degree with the approval of the student's advisory committee and the GERC. A maximum of 12 credit hours earned before enrollment in the master's program may be transferred toward the master's degree. Additionally, no more than six (6) transfer credits (2 courses) may be used toward the primary area of specialty. Undergraduate level courses taken at other universities will not be accepted for transfer credit. All courses transferred must meet the following requirements:
  - a. They are acceptable for graduate credit at the school at which they were taken.
  - b. They have not been used to meet the requirements for another degree.
  - c. The grade earned is a "B" or better.

Grades from transfer courses will not be included in calculation of the GPA. Without exception, all transfer and excess undergraduate credits used on graduate POS must be approved by the student's advisory committee and by the GERC. A special request for approval is not necessary; simply include such courses on the POS and attach a copy of the catalog description of the course. Additional documentation to comply with requirements above may be required for approval.

## 2.5 Preparation and Filing of Master's Plan of Study

Contact the MEE Department Academic Advisor in SL 260 for assistance in preparing the master's POS. The advisor must review the draft copy of your POS. Obtain the master's POS from the "Graduate Database" located at [https://www.purdue.edu/gradschool/gsdb/wpu\\_intra\\_php/pu\\_dispauth.php](https://www.purdue.edu/gradschool/gsdb/wpu_intra_php/pu_dispauth.php)

Follow these steps to prepare and submit a POS for approval:

1. Review the preceding portions of this handbook, including the list of 500 and 600-level courses, to determine the requirements for the particular degree and the area of specialty you wish to pursue. Select courses that meet the degree requirements and are appropriate for your area and interest. If possible, check the offering semester of the courses that you need.
2. Prepare a draft of your POS. Label "P" for the primary area courses and "R" for related area courses respectively. Please note, math courses are labeled "R".
3. Select an MEE faculty member to serve as your major professor and to be the chair of your advisory committee. Confer with the major professor for advice on the plan and to receive an informal agreement to the plan.
4. In consultation with your major professor, select two additional faculty members to serve on your graduate advisory committee.
5. Prepare your electronic POS in the Graduate Database. Be sure each course is listed with the exact course title as it appears in your transcripts.
6. Submit your POS as Final. Your POS will be reviewed by the Graduate Advisor to ensure that the plan meets all format and program requirements, and will then be automatically forwarded to any committee members (Thesis & Dissertation) and will finally be sent to the Graduate School for final approval via the Graduate Database.

*Note: Information relevant to completing the POS includes the following:*

1. These are the possible MSME degree options and corresponding degree codes :

Degree Code	Degree Title	Option
ME-MSME	Master of Science in Mechanical Engineering	Non-Thesis
ME-MSME	Master of Science in Mechanical Engineering	Thesis

2. The space for indicating the research area is left blank in most cases.
3. The title of a topic course (ME 59700) must be entered exactly as it appears in your transcripts.
4. Courses transferred from other schools should be listed on the POS with the same title and number as on the transcript from the school at which they were taken. Do not use the equivalent number from a Purdue course. One copy of the catalog description for each course transferred should be supplied to the MEE Department.
5. The column labeled "Regular Regis." is used to indicate whether a course was (or is to be) taken at IUPUI ("X") or transferred from another school ("TR").
6. The column labeled "Non-Degree Regis." is used to indicate courses that were (or are to be) taken while a student was in non-degree status and was not officially admitted to a degree program. A maximum of 12 credit hours taken in non-degree status with grade of "B" or higher may be used on a POS.
7. In order to use a graduate course that is an undergraduate excess on the POS, the course must be declared as an undergraduate excess on the transcript. Otherwise, a letter certifying that the course was not used as a part of any degree is required from the school at which the course

was taken.

8. Thesis research (ME 69800) should not be listed on the POS.

## 2.6 Coursework Requirements for MSME Program

The Mechanical Engineering Master's Degree requires a minimum of **30 credit hours of graduate course work**. Each student designs an individual Master's Plan of Study with approval from the advisory committee. All students receiving financial aid including research assistantship, teaching assistantship, graduate assistantship, tuition assistance, or fellowship awards must enroll in a zero (0) credit graduate seminar course in each semester of appointment.

### Thesis and Non-Thesis Options

Students may choose either the thesis or the non-thesis option for their programs. Below are the requirements for both the thesis and non-thesis options:

Thesis Option - MSME:

- 1) Nine (9) credit hours of research thesis (ME 69800)
- 2) Minimum nine (9) credit hours of primary area courses
- 3) Maximum six (6) credit hours of related area courses
- 4) For primary and related area courses, at least 3 courses (9 credit hours) must be ME courses
- 5) Six (6) credit hours of mathematics or mathematics related courses with one course from the Math Department
- 6) Thesis Students are NOT allowed to use ME 59700/ME 59100 Independent PROJECTS toward their 21 Credit Hours of Coursework Requirements on the Plan of Study, even if the student took the course as NON-THESIS before switching to THESIS.

*Note: "Satisfactory" or "Fail" (S/F) is assigned as a final grade for ME 69800 M.S. Research Thesis course. S/F grades are not permitted for any other course on the Plan of Study.*

Non-Thesis Option - MSME:

- 1) Minimum of 12 credit hours of primary area courses
- 2) Maximum of 12 credit hours of related area courses, including up to six (6) credit hours of ME 59100 Mechanical Engineering Project: Refer to Appendix C for the requirements for ME 591 Mechanical Engineering Projects.
- 3) Within the primary and relates area courses, at least 15 ME credit hours (5 courses)
- 4) Six (6) credit hours of mathematics or mathematics-related courses with at least one of them from the Math Department.
- 5) Students are not allowed to use ME 69800 Research MS Thesis credits toward their 30 Credit Hours of Coursework Requirements on the Plan of Study when they switch from THESIS to NON-THESIS.

**Minimum Grade Requirements:** The minimum grade requirements can be found in section 3.5.3 (Same as the PhD students)

## 2.7 Combined BS-MS Program

This program allows IUPUI BSME students to take four graduate courses (12 credits) as ME electives during their senior (or fourth) year, which will provide credit for both a BS degree (normally 128 credits) and an MS degree (normally 30 credits). The curriculum includes all the core undergraduate courses that are currently required for BSME majors and all the current graduate course requirements of the traditional ME Master's program. Each degree will be awarded separately. Students must apply for their BS graduation the semester before they have completed their BS program and their MS program.

Students must maintain a minimum GPA of 3.2 for the first 85 credit hours of BS course work in the Plan of Study to be conditionally admitted to the program. Formal admission to the graduate program will be made after the student meets the usual minimum 3.00 GPA admission requirement and receives at least a “B” grade in each of the four graduate courses in his/her BS Plan of Study. The ME GERC or undergraduate program advisor may review conditionally admitted students at any stage and advise against formal application if progress is unsatisfactory.

There will be two Plans of Study for students in this program, each including the 12 credit hours of allowed overlap: 1) BS Plan of Study filed no later than one semester before completing the BS degree requirements (normally in the 7<sup>th</sup> semester), and 2) MS Plan of Study filed after submitting the BS Plan of Study (normally in the 9<sup>th</sup> semester), and before the expected semester of graduation.

If a student withdraws from the program, or if the student’s performance is judged to be unsatisfactory for the dual degree program by the ME GERC because of failure to meet the minimum grade requirements, the student can receive the BSME upon completion of all the requirements for that degree.

## **2.8 Bachelor of Physics Master of Mechanical Engineering Program (BPMME)**

This program, BPMME, allows IUPUI Physics students to take two junior or higher level ME courses (6 or more credits) during their undergraduate program, which will provide credit for both BS (Physics) degree and make up for any deficiencies in undergraduate ME courses. The curriculum includes all the core undergraduate courses that are currently required for BS (Physics) majors and all current graduate degree requirements of the traditional ME Master’s (MS) program. The BS and MSME degrees will be awarded at the completion of the requirements for each individual degree program.

Formal admission to the graduate program will be made through approval by the ME GERC. The ME GERC may review conditionally admitted students at any stage and advise against formal application if progress is unsatisfactory. An MSME Plan of Study must be filed before the expected semester of graduation.

If a student withdraws from the program, or if the student’s course grade does not meet the minimum grade requirement, the student will be required to leave the BPMME Program. When a student leaves the BPMME Program (for any reason), the student may receive only the BS (Physics) degree upon completion of all the requirements for that degree.

## **2.9 Master’s Degree Milestones**

The following are “milestones” that should be used as a guide to accomplish needed tasks to complete the degree requirement:

### **First Semester Registration:**

- Prior to registration, meet with the graduate advisor to discuss possible courses to take. It is always helpful to talk with course instructors regarding courses you are interested in taking.
- For assistance with registration, contact the MEE Department’s Graduate Advisor.

### **During the First Semester:**

- Satisfy conditions for admission and/or English proficiency requirements, if relevant.
- Get to know professors in the department and learn about their areas of research expertise.

- Choose the major professor or research advisor.

**Second Semester:**

- Decide on an area of specialty.
- Choose the advisory committee.
- Begin to prepare the Master's Plan of Study. Contact the Coordinator for Graduate Programs for assistance in preparing the plan.

**One Semester Prior to the Final Semester of Graduation:**

- Fill out an “*Application for Graduation*” form, available at <https://et.iupui.edu/students/graduation/>
- Have an officially approved Master's Plan of Study on file in the Purdue Graduate Database the semester prior to your intended graduation.

**Final Semester (*Thesis Option*):**

- Register for “*Candidacy 99100*” (0 credit hour) in your final semester before graduation.
- Attend a briefing session on master's thesis preparation. Check with the Coordinator for Graduate Engineering Programs on dates for the briefing session.
- Obtain the major professor's approval of the thesis prior to scheduling the final examination.
- File Graduate School e - Form 8 “*Request for Appointment of Examining Committee*” in the Purdue Graduate School Database a minimum of three (3) weeks prior to the proposed date of final oral examination/thesis defense. Also, schedule the final examination (thesis defense) with major professor and advisory members at least three (3) weeks in advance. You are required to meet the deadlines by which the final thesis examination must be completed. Distribute copies of thesis to members of the Advisory Committee at least two (2) weeks before the oral exam to allow sufficient time for members to review the thesis.
- Immediately following the oral exam, ensure your advisory committee members e-sign Graduate School Form 7 “*Report of Master's Examining Committee*” and submit the e-form in the Graduate Database.
- After the exam and all necessary changes have been made to your thesis/dissertation, submit a final copy of your thesis/dissertation via PDF to the MEE Department's Advisor for Formatting Review.

**Final Semester (Non-Thesis Option):**

- You must register for “*Candidacy 99100*” (0 credit) in your final semester of graduation.

***Note: Please read the candidacy registration requirements in Appendix D.***

## 2.10 MSME Non-Thesis Student Graduation Checklist

✓ **Apply to Graduate Before the Appropriate Graduation Deadline:**

- **May graduation deadline: October 15**
- **August graduation deadline: January 15**
- **December graduation deadline: May 15**

<https://et.iupui.edu/students/graduation/>

✓ **Submit Plan of Study for Approval:**

- Must be **Submitted and Approved *BEFORE* classes start**
  - *Submit Plan of Study electronically via Purdue Graduate Database*
  - **REMINDER\*\***

\*\*Plan of Study is LATE after classes start. A \$200 Late Fee will be assessed.

✓ **Register for CAND 99100:**

- **Monica Henry & Anita Sale (Instructors)**
  - You must be enrolled in **CAND 99100 *BEFORE* classes start.**
  - **REMINDER\*\***  
    **\*\*CAND 99100 enrollment after 1st day of class is LATE: A \$200 Late Fee will be assessed.**
  - You need to register at least 1 credit hour of a fee bearing course. Fee bearing course could be any regular course or project course.
  - If you have completed all the course requirement before the graduating semester, you can register CAND 99200. Check Appendix D for details. If you have questions, please consult with your academic advisor (Jerry Mooney).

✓ **Plan of Study:**

- MUST include **Likun Zhu** as sole **Chair**. Do not include any other instructors.
- Follow the Plan of Study Guidelines:
  - <https://graduate.iupui.edu/doc/forms/plan-of-study-purdue.pdf>
  - Be sure ALL **course titles** are listed **as they appear on your transcripts**.
  - Use **Research Area** for your areas of study **NOT Concentration**.
  - Always **submit Plan of Study as FINAL**.
  - **Note:** *Your plan can be changed at any time after it has been approved!!*

***Please Schedule an appointment with Jerry Mooney for more details on your Plan of Study Submission!!!***

## 2.11 MSME Thesis Student Graduation Checklist

- ✓ **Apply to Graduate Before the Appropriate Graduation Deadline:**
  - **May graduation deadline: October 15**
  - **August graduation deadline: January 15**
  - **December graduation deadline: May 15**
  - <https://et.iupui.edu/students/graduation/>
- ✓ **Submit Plan of Study for Approval:**
  - Must be **Submitted and Approved** *BEFORE* classes start
    - Submit Plan of Study electronically via **Purdue Graduate Database**
    - REMINDER: **Plan of Study** is **LATE** after classes start. A **\$200 Late Fee** will be assessed.
- ✓ **Register for CAND 99100:**
  - **Monica Henry** (Instructor)
    - You must be enrolled in **CAND 99100** *BEFORE* classes start.
    - *CAND 99100 enrollment after 1st day of class is LATE: A \$200 Late Fee will be assessed.*
    - *CAND 99100 is also used for Early Deposit.*
- ✓ **Register for at least 1 credit hour of a Fee Bearing course:**
  - **ME 69800** (Enroll in your Research Faculty's ME 69800 Course)
  - \*\* If you have completed your course requirements, you can still use the above course.

**All Thesis Students are required to attend the Fall or Spring Purdue Thesis Workshop. Be sure to attend the workshop before writing your thesis. Times and Dates for the Purdue Thesis Workshop will be published in MSME CANVAS ANNOUNCEMENTS.**

- ✓ **Plan of Study:**
  - MUST include **ALL** of your **Research Members**
    - Example: 1 Chair and 2 members or 2 Co-Chairs and 1 additional member
  - Follow the Plan of Study Guidelines:
    - <https://graduate.iupui.edu/doc/forms/plan-of-study-purdue.pdf>
    - Be sure **ALL course titles** are listed *as they appear on your transcripts*.
    - Use **Research Area** for your areas of study **NOT Concentration**.
    - Always **submit** Plan of Study as **FINAL**.
    - *Note: Your plan can be changed at any time after it has been approved!!*
    - **Do not** include your 9 credit hours of Research on your Plan of Study.

***Please Schedule an appointment with Jerry Mooney for more details on your Plan of Study Submission!!!***

✓ **Oral Defense:**

- Submit **Exam Form 8** (electronically via Purdue Graduate Database)
- Submit a **Draft** of your **Thesis** to ALL Committee Members **PRIOR** to scheduling your defense:
  - **Must submit 2 week prior to Defense Date (for both Form 8 & Draft Copies to members)**
  - Contact **Susan James** for assistance in securing a room.

*Before securing a room, check to ensure that all members of your committee can make your defense time & date.*

✓ **After Passing Oral Defense:**

- Submit your **ETAF Exam Form 9 Thesis Acceptance** (*electronically via Purdue Graduate Database*).
- **Thesis Format Review:** Send your **accepted/approved thesis** to Jerry Mooney for review.
- **Send your thesis via PDF directly to Jerry Mooney or via University BOX.**

### 3 IUPUI Site-Approved ME PhD Program

#### 3.1 Introduction

This section is aimed at the PhD program at IUPUI and intended to answer common questions that PhD students have concerning their Program of Study, Graduate School operations, the Mechanical Engineering Graduate Program, and services provided by the Purdue School of Engineering and Technology (ET) Graduate Office. This section describes the requirements and regulations for the PhD degree programs in the Department of Mechanical and Energy Engineering (SL Building, Rm. 260). The guidelines and procedures set forth in this handbook will help you in preparing your POS (see Section 2) and in meeting the necessary degree requirements for both completing the program and graduating. We invite you to visit the Chair of the Graduate Education and Research Committee (GERC) and academic advisor in the Department of Mechanical and Energy Engineering (SL 260) with questions related to graduate studies or any other academic matters. In addition, you are required to subscribe to the MEE Canvas “GRAD\_Site” to stay informed on program matters, to participate in the discussions of graduate study related topics and issues, and to receive information on job opportunities. Important announcements are also posted on the bulletin board outside the MEE Office (SL 260).

Administration of the PhD program is handled by the MEE Department (SL 260; <https://et.iupui.edu/departments/mee/>); Purdue University Graduate School (West Lafayette campus; <https://engineering.purdue.edu/ME/Academics/Graduate/index.html>), and the IUPUI Graduate Office (University Library, Room 1170; <http://www.iupui.edu/~gradoff/>). You should become familiar with their roles and procedures. In addition, if you are an international student, you will also have contact with the Office of International Affairs (OIA) at IUPUI (Education and Social Work Building, ES Rm. 2126) regarding visas and immigration regulations. The MEE Graduate Advisors (SL 260) can direct you to the appropriate office for specific issues.

Special situations certainly may arise which are not addressed here. We welcome the opportunity to discuss these issues with you. Timing is often an important factor, and an early visit to the Graduate Academic Advisor can save much effort and time for students and faculty alike. In particular, PhD students must comply with the requirements of the Department of MEE that are set forth in this handbook.

#### 3.2 Admission Requirements

The department’s PhD program consists of two types of PhD applicants, Direct PhD (DPhD) students who have received a baccalaureate degree in Mechanical Engineering or related engineering programs and PhD students who already have earned master’s degrees. All students must have earned at least a baccalaureate degree from a U.S.-accredited institution or an equivalent degree from a foreign institution. The requirements for the two types of students are different. Students should adhere to the requirements that apply to them.

##### 3.2.1 Qualifications of PhD Degree Program

Students with an MS in Mechanical Engineering or related engineering at the time of admission may be admitted to the PhD program at IUPUI. The student must have a minimum cumulative GPA of 3.2 (4.0) for the master’s degree from a reputable university. Preferred GRE scores are at least 155 on the quantitative section and a 3.0 on the analytical writing section. The GERC approves PhD applications.

##### 3.2.2 Qualifications of Direct PhD (DPhD) Degree Program

Students with strong performance in coursework and some research experience at the undergraduate level may be admitted into the DPhD program at the time of admission to graduate studies at IUPUI. The student

must have a minimum cumulative GPA of 3.50 in the baccalaureate degree from a highly ranked university. The student also must have taken the GRE with minimum scores of 150 in verbal, 161 in quantitative and 3.5 in analytical. The GERC approves PhD applications.

A graduate student who enters the master's program but later wants to pursue the DPhD program may submit a request to the MEE Graduate Chair for approval by the GERC. The student must have a minimum cumulative GPA of 3.2 in the baccalaureate degree, must have completed at least 12 credit hours of graduate coursework with a minimum GPA of 3.75, and must have minimum GRE scores of 150 in verbal, 161 in quantitative and 3.5 in analytical. The request also must include a written endorsement by the major professor. The request must be submitted to the MEE Graduate Chair after the student has completed at least twelve credit hours of graduate coursework.

### 3.3 PhD Program Advisory Committee

Each PhD student needs to have a major professor and an advisory committee. The advisory committee consists of at least four members and must be chaired by one MEE faculty member from IUPUI. The chair serves as the major professor who guides the student's dissertation research. At least two members of the advisory committee (including the chair) must be MEE faculty members. One committee member must be from a department/school outside of MEE.

An outside member can be someone with a PhD who is in industry. All professors serving on an advisory committee must already be regular or special graduate faculty (i.e., certified by the Graduate School to serve on the committees of graduate students). Faculty members from other universities, scientists at national labs, or researchers in industry are also eligible to serve on an advisory committee. These members require prior approval from the Graduate School in the form of a certification as special graduate faculty. In case a student and the major professor contemplate including such a member in the advisory committee, the chair should send to the GERC Chair a letter requesting this person's inclusion along with clear justification of the specific expertise that the requested member will bring to the student's research. An electronic version of the complete vita of the Advisory committee nominee must be provided with this memo. This request must be submitted in one transaction by the major professor. The outside person **should not** submit information directly to the GERC Chair.

Members of the advisory committee are to assist the student in the preparation of the Plan of Study and to offer advice on graduate work, including research and thesis preparation. Selection of the advisory committee members is done in consultation with the major professor, but the student should seek the consent of all of the faculty members who are requested to serve on the advisory committee. The advisory committee is formally established when the Plan of Study has been submitted by the student and has been approved by the Purdue Graduate School.

### 3.4 PhD Plan of Study (POS)

Each PhD student must file a POS by the end of the second semester after the student has a major professor and has established an advisory committee. Students failing to meet this requirement will not be permitted to complete their registration for the next semester. All courses included on the POS for an ME degree must be "technical and quantitative in content."

[https://www.purdue.edu/gradschool/gsdb/GradSch/gsdb\\_info.htm](https://www.purdue.edu/gradschool/gsdb/GradSch/gsdb_info.htm)

The POS must be created in the *Purdue Graduate Database* by selecting *Graduate Student Database* under *Academic*. The instructions are on *MyPurdue.Purdue.edu*. Students may create and save a draft POS and return later to complete it. The POS address cannot be bookmarked.

Important: The draft POS must be submitted as a "final" to be approved. Keep in mind that the POS must be approved before the end of the second semester of the degree program.

The POS may be modified after it is filed. The draft POS must be submitted to the major professor. After receiving the major professor's approval, the Graduate Coordinator will assist the student in preparing the final copy and submitting it for final approval.

A POS consists of a group of courses in the student's "Primary Area" and other courses in "Related Areas." Courses on the POS must have quantitative and technical content. Courses in the primary area should show a reasonably close relation to the core subject. For example, if the primary area is heat transfer, the POS might include courses in heat transfer, mass transfer, fluid mechanics, and thermodynamics. Courses in the primary area can also come from schools or departments other than Mechanical and Energy Engineering. Courses in related areas are outside the primary area but still contribute to the program. These courses may come from MEE or from other schools or departments. When completing the POS, students should choose from the following list for the Area of Specialty:

- Thermal and Fluid Sciences
- Solid Mechanics, Biomechanics, and Design
- Mechatronics and Controls
- Energy and Materials

After Graduate School approval, the courses listed on the POS must be completed before certification for graduation can be granted.

Changes to the approved POS require approval of the advisory committee. This process may be used to change Advisory Committee members, to delete or add courses, or to change the area of specialty. Courses may not be removed from the POS after a grade has been received.

### **3.5 Coursework Requirements for PhD Program**

#### **3.5.1 PhD Coursework**

A PhD Plan of Study includes a minimum of 21 credit hours of coursework beyond the master's degree. A minimum of 90 graduate coursework and research credit hours (including at most 30 credit hours from an MS degree) is required for graduation.

Only graduate level courses (50000 or 60000 numbers) may be listed on the Plan of Study. At least one of the courses must be at the 60000 level.

A minimum of nine (9) hours of applied mathematics must be included in the Plan of Study, at least six (6) of which must be taken from the Mathematics Department. The mathematics requirement may be partially or fully satisfied by courses taken as a part of the MS program.

PhD students are required to take ME 59800 MEE Graduate Seminar every semester when they receive financial aid from MEE Department.

You and your Major Professor may decide that additional courses not included on the POS should be taken to strengthen your background in a particular area.

PhD Students are NOT allowed to use ME 69700/ME 59100 Independent PROJECTS toward their 21

### Credit Hours of Coursework Requirements on the POS.

Courses taken to satisfy a condition of a PhD Area Exam cannot be used toward the minimum POS coursework requirement for the degree. However, the courses may be included on the POS provided there is a supplemental note explaining that the courses have been used to meet a condition of a PhD Area Exam.

#### **3.5.2 DPhD Coursework**

A DPhD Plan of Study includes a minimum of 36 credit hours of coursework in addition to thesis research credit hours. A minimum of 90 graduate coursework and research credit hours is required for graduation.

Only graduate level courses (50000 or 60000 numbers) may be listed on a DPhD Plan of Study. At least one of the courses must be at the 60000 level. Independent project courses (ME 59100 or ME 69700) are limited to a maximum of three credit hours.

A DPhD Plan of Study must contain a minimum of nine credit hours of applied mathematics, at least six of which must be taken from the Department of Mathematics.

Successful completion of ME 59800: MEE Graduate Seminar course is required. This course is not listed on the Plan of Study.

#### **3.5.3 Minimum Grade Requirements**

The Department of Mechanical and Energy Engineering maintains the following minimum standards to be in “good academic standing” in the PhD’s degree program.

To be in good academic standing, a PhD student must maintain a cumulative grade point index of at least 3.00 out of 4.00 in the courses on his/her Plan of Study. A graduate student who is not in good standing at the end of the semester is automatically placed on “*academic warning*” and is provided with an “*academic warning*” form via e-mail. Registration is restricted when students are placed on “*academic warning*”. Students on academic warning are required to meet with their faculty & academic advisors and complete the “*Academic Warning Form*” in order for the Advising Hold to be temporarily released for registration that semester. Should the student’s cumulative grade point index remain below 3.00 at the end of the succeeding semester or summer session, he/she will be placed on Academic Probation. A student on Academic Probation may not be permitted to register for further graduate courses, pending academic review and approval by the MEE Graduate Committee.

The cumulative grade point index is calculated using the courses that are on the Plan of Study. If a course is taken more than once while the student is enrolled as a graduate student, only the most recent grade received in the course will be used in computing the grade point index. Transfer courses are not included in the computation of the cumulative grade point average. No grade lower than “C-” is allowed for a course that is on the approved Plan of Study. *All PhD students must achieve a final cumulative grade point index of 3.00 or higher for courses that are on the Plan of Study.* Any course on the Plan of Study that carries a grade lower than “C-” must be repeated. In the event of a cumulative grade point deficiency, a course may be repeated but only the most recent grade received will be used in computing the index.

### **3.6 Area Examination**

#### **3.6.1 Rules and Areas**

Before a student becomes an official candidate for the PhD degree, the Area Examinations and Preliminary Examinations must be passed. PhD students pursuing their studies at IUPUI must take the Area Examinations subject to the same conditions stated in this handbook. The area exams will be held at IUPUI.

**Responsibility and Authority:** The responsibility and authority for the implementation of the PhD Area Examinations rests with the Mechanical and Energy Engineering faculty at IUPUI. Certain portions of this responsibility and associated authority are delegated to the GERC, IUPUI, and/or the student's advisory committee.

**Purpose:** The PhD Area Examinations exist to provide assurance that all PhD candidates have sufficient knowledge of fundamental principles in selected areas of Mechanical Engineering. Accordingly, these procedures apply to all PhD students, including those who do not have BS and/or MS degrees in engineering.

**Area Examinations:** The student is expected to demonstrate a firm command of fundamental principles up to and including the master's level in applied mathematics plus at least two of the following approved areas of Mechanical Engineering: (1) control, (2) design, (3) dynamics, (4) fluid mechanics (see waiver section), (5) heat and mass transfer (see waiver section), (6) solid mechanics (see waiver section), (7) thermodynamics (see waiver section), and (8) materials.

Written examinations in these nine areas will be offered each spring and fall semester. If an area does not have any student registration in a semester, that area exam will not be held until the next semester. The first Area Examinations must be taken within three semesters after starting the PhD program, excluding the summer semester. For example: If you begin in the Fall 2021 semester, you would be required to take the first attempt at the Area Examinations before the end of the Fall 2022 semester. The student must take three Area Examinations when taking the exams in the first attempt. A request by the student for exception to these constraints must be submitted in writing to the advisory committee and should clearly indicate the unusual and/or special circumstances justifying the request. If the student's advisory committee approves, the request must be transmitted to the GERC Chair in time for appropriate action. Such a request will require approval by the GERC in addition to the student's advisory committee.

The Area Examination Committee at IUPUI will prepare, administer and grade the Area Examinations and then report the results to both the major professor and the GERC at IUPUI. The Area Examination Committee will give grades of pass, fail, or conditional pass. The grade of "pass" will require no remedial action on the part of the student. The grade of "conditional pass" will be associated with a recommendation for remedial work but not reexamination. Since these written examinations are meant to guide the student's advisory committee, any areas of weakness indicating a need for remedial work should receive immediate action. The remedial work specified by the student's advisory committee --either coursework or individual study or both -- should be reported in writing to the Chair of the GERC with signatures from all members of the advisory committee.

PhD students will be given two chances to pass the Area Examinations. A student who is unable to pass all required Area Examinations after two attempts will be dismissed from the PhD program. If desired by the student and the major professor, the student may make a request to the Graduate Committee to change from the PhD to the master's program.

Each semester, the GERC will report to the Mechanical Engineering faculty on student performance and actions taken by the various advisory committees concerning the Area Examinations.

### 3.6.2 Area Exam Waivers

To qualify for the Area Exam Waivers, the class completion must be prior to the first attempt at the Area Exams and within the prior ten (10) years. The courses, which can qualify for waivers, may be included in the student's Plan of Study and must be taken at the IUPUI campus. Students can qualify for more than one waiver.

Fluid Mechanics Area Exam Waiver—A student who has completed ME 50900 (Intermediate Fluid Mechanics) or ME 51000 (Gas Dynamics) with a minimum grade of B+ prior to the Fluid Mechanics Area Exam will be considered to have successfully completed the requirements of the exam.

Solid Mechanics Area Exam Waiver—A student who has completed ME 55000 (Advanced Stress Analysis) with a minimum grade of B+ prior to the Solid Mechanics Area Exam will be considered to have successfully completed the requirements of the exam.

Thermodynamics Area Exam Waiver—A student who has completed ME 50000 (Advanced Thermodynamics) with a minimum grade of B+ prior to the Thermodynamics Area Exam will be considered to have successfully completed the requirements of the exam.

Heat Transfer Area Exam Waiver—A student who has completed ME 50500 (Intermediate Heat Transfer) with a minimum grade of B+ prior to the Heat Transfer Area Exam will be considered to have successfully completed the requirements of the exam.

### **3.6.3 Registration for Area Exams**

Students obtain the registration form from the MEE Office and return it by the deadline date. It must include a list of at least three tentative advisory committee members and the signature of the major professor. Area Examinations usually are held during the third and fourth weeks of the semester. Each registered student will be given a schedule of the exams and is expected to appear in the room listed for that exam on the day and time scheduled. Each student must take the Math Area Exam during the first sitting for the Area Examinations along with two other exams.

### **3.6.4 Exam Grading and Score Reporting**

Area Exam Committee Input: The respective Area Exam Committee will evaluate the student's performance in each Area Examination. Each Area Exam Committee Chair will report results for each student to both the Major Professor and GERC on a pass/fail/conditional-pass basis. Satisfying the requirements means that the student passes the exam. A "conditional pass" determined by the Area Exam Committee stipulates requirements for remedial action. Failing to satisfy the requirements means that the student fails the exam.

Advisory Committee Input: The major professor of the student, in consultation with the advisory committee, will provide to the GERC a written evaluation of the student's performance to date. The evaluation includes coursework, various components associated with research potential and progress of the student (interactions with group members, scientific contributions, development of experimental skills, theoretical developments, etc.), and the major professor's intention to retain and financially support (given resource availability) the student for further PhD studies in ME. The advisory committee has the option to include additional information deemed relevant to Graduate Committee deliberations.

The GERC will evaluate the student's overall performance in regard to all three Area Examinations in addition to the evaluation of the advisory committee. The results of this evaluation will be one of the following:

**Pass:** The student who clearly passes the three Area Examinations and has satisfactory input from the advisory committee typically is allowed to continue in the PhD program and prepare the PhD proposal for the Preliminary Examination.

**Fail:** A student not passing one (or more) of the Area Examinations on the first attempt may be allowed a retake at the next offering of the failed examination(s). When retaking the exam(s), the student may choose to take an exam in a different area (if not applied math); however, only one attempt will be

allowed in this different area. Alternatively, the Graduate Committee may advise the student after the first failed attempt to transfer to the master's program. A student who fails a retake of an exam will be dismissed from the graduate program.

**Conditional Pass:** A student with lower than acceptable performance in an Area Examination may be required to remedy the deficiencies by taking an appropriate course. The course may be at the graduate level or at the undergraduate level. The minimum performance expectations will be specified.

The student and major professor will be notified via a letter from the GERC Chairman regarding the final assessment of each section of the Area Examination (pass/fail/conditional pass) as well as an overall exam designation. Students who do not pass an exam are encouraged to discuss their performance with the major professor as well as the appropriate Area Exam chairs.

### **3.6.5 Unsatisfactory Area Exam Results**

A student has only two attempts to pass an Area Exam subject to the process described above. The student who fails an Area Exam and is granted a second attempt must retake that examination the following semester. A student will be dismissed by the Graduate Committee from the graduate program if any Area Examination is failed twice.

A student may appeal a dismissal. The student must submit a written petition to the GERC along with a supporting letter from the student's major professor and advisory committee. The petition must enumerate reasons the student should be allowed to continue in the PhD degree program. If the petition is denied, the student, the major professor and the advisory committee may then appeal to the MEE faculty.

A student in the DPhD or PhD program who fails to pass all area exams may petition the GERC Chair to change from the PhD or DPhD to the master's program. After completing the master's degree, the student can apply again to the PhD program. If accepted, the student will have to start over with Area Examinations. Each semester, the Graduate Committee will review all performance and actions taken by the various advisory committees and the Graduate Committee concerning the Area Examinations.

## **3.7 Preliminary and Final Examinations**

### **3.7.1 Oral Preliminary Examinations**

The Oral Preliminary Examination should be completed within one year after successful completion of the Area Examinations. The responsibility and authority for the PhD Oral Preliminary Examination rests entirely with the student's advisory committee. The Oral Preliminary Examination exists to provide assurance that all PhD candidates have in-depth knowledge of subject matter closely related to the student's research topic. In the Oral Preliminary Examination, the student must:

- Demonstrate fundamental competency in areas that required remedial action per the Area Examinations.
- Demonstrate in-depth knowledge of subject matter related to the thesis topic.
- Present a reasonable research plan for the dissertation. The Purdue Graduate School must receive the formal request for an appointment of the Preliminary Examination Committee at least two weeks prior to the date of the Preliminary Exam.

### **3.7.2 Final Examination**

At least two semesters (including Fall, Spring and Summer semesters) must elapse and be devoted to

research between the Preliminary and Final Examinations. The Final Examining Committee consists of a minimum of four members and is appointed at the request of the student's major professor. The same guidelines (Section 3.3) for choosing the advisory committee apply. The Examining Committee is normally the same as the student's advisory committee and is responsible for reading the student's dissertation and conducting the Final Examination. A copy of the dissertation should be submitted to the Examining Committee at least two weeks before the examination. Final Oral Exam Presentations are open to all interested parties. Therefore, the Graduate School requires that the date, time and room for the examination be registered at least two weeks in advance via Form 8. Room location needs to accommodate at least 20 people. At the time the exam is scheduled, the student will send an electronic copy of the abstract to the MEE GERC Chair for distribution to the MEE faculty and graduate students.

### **3.7.3 Final Exam Registration, Dissertation Approval and Dissertation Deposit**

A Manual for the Preparation of Graduate Dissertation is available on the ET Graduate School webpage. IMPORTANT NOTE: Type "Department of Mechanical and Energy Engineering, Indianapolis" at the beginning of the abstract, after the name(s) of the major professor(s). Express appreciation for any financial support in the "Acknowledgments" section.

AT LEAST TWO WEEKS BEFORE THE PhD FINAL EXAMINATION DATE, submit e-Form 8 to the MEE Graduate Office – Request for Appointment of Examining Committee, which registers the date, time and location of the defense. All Forms are located in the Purdue Graduate Database.

When the exam registration (e-Form 8) is approved by the Graduate School, it will be forwarded to the MEE Graduate Office with an additional e-form:

Graduate School e-Form 9 – Dissertation Acceptance (Signature) Page. Obtain e-Form 9 from the Graduate Database with a copy of the examination registration approval from the Graduate School.

On e-Form 9: Type the names of individual examining committee members under the appropriate signature lines on the dissertation signature page. Type "Department of Mechanical and Energy Engineering" under the line for the Department Chair signature on the thesis signature page.

If a thesis is to be classified as "confidential," be sure to indicate that on e-Form 9. Complete this e-form and submit it to the Graduate Chair(s) at the same time as the dissertation for final approval. Consult your major professor if the confidentiality of the dissertation is uncertain.

NO LATER THAN TWO WEEKS BEFORE THE FINAL EXAMINATION, submit an electronic copy of the dissertation to the MEE Office for format approval. This submission should be as far ahead of the deadline as possible but cannot be made any later than two weeks prior to the final examination.

NO LATER THAN TWO WEEKS BEFORE THE FINAL EXAMINATION, submit a copy of the dissertation to the Examining Committee.

After the Final Examination, revise the dissertation according to the requirements of the Examining Committee and the format review.

Submit the revised dissertation to the Graduate Advisory Committee Chair for final approval. The Graduate Advisory Committee Chair will require three days minimum to read the dissertation and may require additional changes before final approval. After final approval has been granted, an electronic copy will be filed and stored at IUPUI and WL. Bound copies are no longer required.

If no additional corrections are required and final approval is given, deposit the dissertation copies as follows:

The MEE Graduate Office will retain the MEE Departmental Copy for electronic deposit. (If the thesis has been classified as "confidential," submit an abstract to the MEE Graduate Office.)

An electronic copy of theses classified as "confidential" is retained by the Thesis and Dissertation Deposit and Approval Office.

Publication: It is expected that PhD dissertation research will lead to journal publication(s). It is recommended that the PhD candidate prepare at least two (2) manuscripts for scholarly journal papers before the final examination.

### 3.8 Scholastic Requirements

PhD or DPhD Completion Requirements:

- Complete all courses on your approved Plan of Study.
- Pass the Area Examinations and Oral Preliminary Examination as specified by the advisory committee.
- Complete the dissertation to the satisfaction of the Final Examining Committee.
- Accumulate ninety (90) credits in coursework and research.
- Earn grades of A or B in coursework. An occasional "C" will be acceptable, but the large majority of your courses must show A or B grades. Pass/Fail grades are not acceptable in fulfilling degree requirements.
- Accrue a minimum of thirty credits earned by continuous residence at IUPUI. In fulfilling the course requirements, a maximum of fifteen credit hours will be allowed from any one semester and a maximum of eight credits from a summer session.
- Maintain a 3.0/4.0 grade point average index on the Plan of Study. Semester Grade Reviews are conducted by the GERC each semester. Warning letters are sent to those PhD or DPhD students either not maintaining a minimum 3.0 or failing to make successful progress in their research. The Plan of Study index for PhD or DPhD students is based on courses taken at IUPUI that apply toward the PhD or DPhD and have not been previously applied towards the master's degree. The warning letter may set forth specific conditions to be met within a specified period.
- Complete satisfactory coursework and research. Unsatisfactory coursework and/or research, if continued, may lead to dismissal from the Mechanical Engineering Graduate Program. **A student whose Plan of Study index is below 2.85 after twelve semester hours of coursework will be dropped automatically from the program.**
- Should the student's advisory committee advise the GERC of unsatisfactory performance on research, the student may be considered for dismissal at the end of any semester.

### 3.9 Essential Actions for Completion of the PhD Degree

### 3.9.1 For PhD Students with MS Degree

#### ***First Year***

- Meet with your major professor to discuss course selection before registering.
- Complete the registration process in the ET Graduate Office. Students with foreign language requirement using Option D should register for a foreign language course.
- Choose your advisory committee.
- Formalize a Plan of Study in consultation with your major professor(s). The Plan of Study should be submitted at the end of the second semester.
- Complete the foreign language requirement, if necessary.

#### ***Second Year***

- Register for and successfully complete the Area Examinations before the end of the third semester of residence in the PhD Program. A written Requirement Exception Request may be submitted by the student to the student's advisory committee and should clearly indicate the unusual and/or special circumstances justifying the request. If the student's advisory committee approves, the request must then be transmitted to the MEE Graduate Chair in time for appropriate action. The request requires the approval of the Graduate Committee in addition to the student's advisory committee.

#### ***First Year after Passing the Area Exams***

- Take Preliminary Exams (enrolled in PhD thesis hour).

#### ***Final Semester***

- Indicate your intention to graduate on your registration form to declare candidacy.
- Submit a Change to the Plan of Study form in the *Purdue Graduate Database* no later than the beginning of the final semester of graduate study, if needed.
- Obtain a Candidate Packet with a list of deadlines for students from the ET Graduate Office.
- Schedule the dissertation defense two weeks prior to the deadline for the defense.
- Submit the first draft of your dissertation to your major professor well before the date of your defense.
- Submit the MEE Departmental Check-out Signature Form to the Graduate Office before leaving campus. Include a forwarding address when the form is submitted.

### 3.9.2 For DPhD Students without MS Degree

#### ***First Year***

- Meet with your major professor to discuss course selection before registering.
- Complete the registration process in the ET Graduate Office. Students with foreign language requirement using Option D should register for a foreign language course.

- Choose your advisory committee.
- A student who changes to the DPhD program after initial admission to master's degree will be notified in the change approval letter as to when the Area Examinations must be attempted. Generally this will be the second semester the student has PhD status.
- Formalize a Plan of Study in consultation with your major professor(s). The Plan of Study should be submitted at the end of the second semester.
- Complete the foreign language requirement, if necessary.

### ***Second Year***

- Register for and successfully complete the Area Examinations before the end of the third semester of residence in the DPhD Program. A written Requirement Exception Request may be submitted by the student to the student's advisory committee and should clearly indicate the unusual and/or special circumstances justifying the request. If the student's advisory committee approves, the request must then be transmitted to the MEE Graduate Chair in time for appropriate action. The request requires the approval of the Graduate Committee in addition to the student's advisory committee.

### ***First Year after Passing the Area Exams***

- Take Preliminary Exams (enrolled in PhD thesis hour).

### ***Final Semester***

- Indicate your intention to graduate on your registration form to declare candidacy.
- Submit a Change to the Plan of Study form in the *Purdue Graduate Database* no later than the beginning of the final semester of graduate study, if needed.
- Obtain a Candidate Packet with a list of deadlines from the ET Graduate Office.
- Schedule the dissertation defense two weeks prior to the deadline for the defense.
- Submit the first draft of your dissertation to your major professor well before the date of your defense.
- Submit the MEE Departmental Check-out Signature Form to the Graduate Office before leaving campus. Include a forwarding address when the form is submitted.

***Note: Please read the candidacy registration requirements in Appendix D.***

### **3.9.3 Optional Master's Degree along the Way**

Students enrolled in the DPhD program have the option of seeking a Master's degree "along the way" to the PhD. This option is available when the student meets the master's degree requirements for MEE and the Graduate School. The student must submit a written request endorsed by the major professor to the MEE Graduate Chair. Upon approval, the student will file a Master's Plan of Study and will register for Master's Candidacy that semester. This request can be for a non-thesis option and must satisfy ME's requirements for a non-thesis master's degree.

## **3.10 Dismissals and Appeal Process**

GERC action regarding dismissals from the Mechanical Engineering Graduate Program resulting from failure to meet the index requirements will take place as soon as practical after grade reports are received following the end of an academic term. The GERC determines the effective date of dismissal. Normally the official date of dismissal will be approximately three weeks after the decision, but in some cases, it may be extended until the end of the term. Course registration will not be allowed after dismissal takes effect, and registration for the current term will be canceled if classes have already begun. It is understood that dismissal from the graduate program implies termination of any assistantship held by the student in the Department of Mechanical and Energy Engineering.

If a student's advisory committee feels that special circumstances are involved, the committee may appeal the dismissal by making a written petition to the GERC. A student whose advisory committee does not support an appeal may petition the GERC directly. An appeal will be successful only if evidence is presented to show that unusual circumstances were responsible for the student's poor performance and a reasonable chance exists for the student to complete the program successfully.

### **3.11 Time Limit for PhD or DPhD Programs**

Graduate study, particularly at the PhD level, is less structured than undergraduate study, and the time needed for a particular student to complete a program depends on many factors. Nevertheless, a student who is actively pursuing a degree should be able to complete the coursework and dissertation in a reasonable length of time beyond which the relevance and originality of the work becomes suspect.

The total elapsed time for completion of a PhD in the MEE Department shall be no more than eight calendar years from date of entry into the PhD program to final approval of the PhD thesis by the Examining Committee. In the case of students in residence continuing beyond the master's degree, the date of entry is defined as the start of the semester following receipt of the master's degree. This policy applies to all students including those who register for research in absentia.

The GERC may grant an extension of the eight-year time limit upon recommendation of a student's advisory committee.

### **3.12 PhD Degree Title**

Students who complete the requirements for the PhD or DPhD will receive a degree with the title "Doctor of Philosophy" with the field of study noted as "Mechanical Engineering." The degree awarded is not "Doctor of Philosophy in Mechanical Engineering."

## **4 Graduate Certification Program**

**ME Graduate Certificate Program:** The graduate certificate programs in the Department of Mechanical and Energy Engineering are designed for working professionals who want to enhance their skills in certain technical areas but are unable to commit to a full master's degree program. The MEE department has developed five graduate certificate programs based on industry needs in central Indiana and beyond. Currently the following five graduate certificate programs are available:

- **Computer-Aided Mechanical Engineering**
- **Energy Management and Assessment**
- **Hybrid Electric Vehicle Technology**
- **Systems Engineering**
- **Engineering Design Innovation**

*Please visit our site for detailed information on these Certifications:  
<https://et.iupui.edu/departments/mee/programs/me/grad/certificates/>*

## APPENDIX A

### **Undergraduate Course Requirements for Non-Engineering Majors**

Graduates from recognized non-engineering programs in science and technology may apply for admission to the Graduate Program in Mechanical Engineering leading to a Master of Science in Mechanical Engineering (MSME) upon completion of the requirements specified below for the different majors. Course requirements may vary depending on the specialty area chosen. For admission to the program, the student must maintain a grade point average of 3.00/4.00 or higher in all of the required courses.

#### **Physics Majors (except BPMME Program) – Three Courses**

***Solid Mechanics, Biomechanics and Design:*** Two junior or higher level ME courses (each with three or more credit hours) approved by the Graduate Committee in addition to ME46200 – Capstone Design.

***Fluid and Thermal Sciences:*** Two junior or higher level ME courses (each with three or more credit hours), and one of the following: ME46200 – Engineering Design, ME31000 – Fluid Mechanics or a three or more credit hour thermal science elective with design content.

***Mechatronics and Controls:*** ME 33000 – Modeling and Analysis of Dynamic Systems, ME 34000 – Instrumentation and Measurement Systems, and ME 48200 – Control System Analysis and Design.

***Energy and Materials:*** Two junior or higher level ME courses (each with three or more credit hours) approved by the Graduate Committee, and one of the following: ME 34400 – Engineering Materials, ME31000 – Fluid Mechanics, or ME 31400 – Heat and Mass Transfer

#### **Mathematics Majors – Four Courses**

***Solid Mechanics and Computer-Aided Engineering:*** ME 20000 – Thermodynamics I, ME 27000 – Basic Mechanics I, ME 27200 – Mechanics of Materials, and ME 46200 – Engineering Design.

***Fluid and Thermal Sciences:*** ME 20000 – Thermodynamics I, ME 27000 – Basic Mechanics I, ME 31000 – Fluid Mechanics, and one of the following: ME46200 – Engineering Design, ME 31400 Heat and Mass Transfer or a three or more credit hour thermal science elective with design content.

***Mechatronics and Controls:*** ME 20000 – Thermodynamics I, ME 33000 – Modeling and Analysis of Dynamic Systems, ME 34000 – Instrumentation and Measurement Systems,

and ME 48200 – Control System Analysis and Design.

**Energy and Materials:** ME 20000 – Thermodynamics I, ME 27000 – Basic Mechanics I, and two of the following: ME 27200 – Mechanics of Materials, ME 34400 – Engineering Materials, ME 31000 – Fluid Mechanics, and ME 31400 – Heat and Mass Transfer.

**Other Science and Technology Majors – Seven Courses**

**Solid Mechanics, Biomechanics and Design:** Math 26100 – Multivariate Calculus, Math 26600 – Linear Algebra and Differential Equations, ME 20000 – Thermodynamics I, ME 27000 – Basic Mechanics I, ME 27200 – Mechanics of Materials, ME 27400 Basic Mechanics II, and ME 46200 – Capstone Design.

**Fluid and Thermal Sciences:** Math 26100 – Multivariate Calculus, Math 26600 – Linear Algebra and Differential Equations, ME 20000 – Thermodynamics I, ME 27000 – Basic Mechanics I, ME 31000 Fluid Mechanics, ME 31400 Heat and Mass Transfer, and one of the following: ME46200 – Capstone Design, ME 41400 – Thermal-Fluid Systems Design, or a three or more credit hour thermal science elective with design content.

**Mechatronics and Controls:** Math 26100 – Multivariate Calculus, Math 26600 – Linear Algebra and Differential Equations, ME 27000 – Basic Mechanics I, ME 27400 Basic Mechanics II, ME 33000 – Modeling and Analysis of Dynamic Systems, ME 34000 – Instrumentation and Measurement Systems, and ME 48200 – Control System Analysis and Design.

**Energy and Materials:** Math 26100 – Multivariate Calculus, Math 26600 – Linear Algebra and Differential Equations, ME 20000 – Thermodynamics I, ME 27000 – Basic Mechanics I, ME 27200 – Mechanics of Materials, ME 31000 – Fluid Mechanics, ME 31400 – Heat and Mass Transfer, ME 34400 – Engineering Materials, and ME 46200 – Capstone Design..

**Other Majors –***Courses to be determined by the MEE Graduate Education Committee on a case-by-case basis.*

## APPENDIX B

### MEE Graduate Faculty Identifiers

Graduate Faculty Identifiers must be listed on the Plan of Study following each committee member's signature. The following is a list of Graduate Faculty Identifiers:

ADAMS, ERIC	X0898
AGARWAL, MANGILAL	X0615
ANASORI, BABA K	X0906
ANWAR, SOHEL	X0460
CHEN, JIE	X0229
DALIR, HAMID	X0844
DU, XIAOPING	X0903
EL-MOUNAYRI, HAZIM A.	X0362
HOLGUIN, NILSSON	X0870
JONES, ALAN S.	X0481
KATONA, THOMAS R.	X0337
LARRIBA-ANDALUZ, CARLOS	X0779
NALIM, M. RAZI	X0361
NEMATOLLAHI, KHOSROW	X0505
RAZBAN, ALI	X0689
RYU, JONG EUN	X0739
SHIN, HOSOP	X0891
SMITH, CRAWFORD FRED	X0571

TOVAR, ANDRES	X0670
WAGNER, DIANE	X0778
WEI, XIAOLIANG	X0873
XIE, JIAN	X0554
YANG, SHENGFENG	X0865
YU, HUIDAN (WHITNEY)	X0671
ZHANG, JING	X0672
ZHU, LIKUN	X0627

## APPENDIX C

### Requirements for ME 59100 Mechanical Engineering Project

**Approval.** To be eligible to register for a 3 -credit independent project course (ME 59100 Mechanical Engineering Project), a graduate student must first receive the approval of a graduate faculty member who will be the advisor for the project and instructor of record for the course.

**Proposal.** It is normally recommended that the student submit a written proposal to the faculty member for the project to be undertaken. The proposal should include the following sections: Abstract (no more than one page), Problem Description and Significance, Review of Existing Work, Methodology to be Followed, Deliverables, Timeline, and References.

**Timely Progress.** It is recommended that the student should meet with the faculty advisor at least biweekly, and should write monthly progress reports on the project. If the project is not complete at the end of the semester, the student will receive an Incomplete (I) grade which will automatically convert to a Failure (F) if not completed and graded in one year.

**Completion.** The requirements for successful completion of the course include a formal final report and a successful oral presentation of the work to a faculty jury. The report should follow a format similar to a master's thesis. For successful completion of this course, the student should be able to:

1. Clearly identify the problem investigated
2. Demonstrate creativity
3. Demonstrate the use of a sound methodology
4. Use sound engineering principles
5. Demonstrate completeness of the project
6. Demonstrate effectiveness in writing
7. Demonstrate effectiveness in oral presentation

**Multiple Projects.** A student may not register for more than three (3) credits of ME 59100 Mechanical Engineering Project in one semester unless it is with different faculty advisors and on different topics. In this case, a clear differentiation should be made between the two projects, and separate reports and presentations are required. A student may register for up to 3 credits of ME 591 Mechanical Engineering Project in each of two successive semesters (total up to 6 credits), to complete a relatively large, in-depth project, and will submit one report with a presentation at the end of the second semester. Equivalence to these requirements for unusual cases -- such as rare transfers from thesis research -- will be determined on an individual case basis.

## APPENDIX D

### Candidacy Registration Requirements

Candidacy registration is required of all graduate students in the final semester of their plan of study. The Graduate School has three options to choose from in order to certify awarding of the degree (graduation) at the end of a fall, spring or summer term.

**1. CAND 99100 is zero credit (0) and zero cost (\$0)**

**All Thesis and Non-Thesis Graduate Students who are:**

Enrolled in at least 1 credit of fee-bearing coursework, i.e. regular course(s), directed project, or thesis credit(s)

*\*Best value with least effort*

**2. CAND 99200 is zero credit (0) with a fee of \$125**

Thesis Graduate Students who have:	Non-Thesis Graduate Students who have:
Completed all degree requirements Passed the final oral examination HAVE NOT YET completed a thesis deposit	Completed all degree requirements but HAVE NOT YET completed the Directed Project <b><u>OR</u></b> (not both) HAVE NOT YET resolved one or more
FAILURE to successfully deposit the thesis with the Graduate School within the first 7 weeks of the term will require:	FAILURE to successfully resolve all Incomplete (I) grades by the end of the term will require:
<ol style="list-style-type: none"> <li>1. Withdrawal from CAND 99200</li> <li>2. Late registration into CAND 99100</li> <li>3. Late registration into at least 1 thesis research credit</li> <li>4. Payment of all late registration fees and credit hour costs</li> </ol>	<ol style="list-style-type: none"> <li>1. A grade of "F" to be assigned for CAND 99200</li> <li>2. Enrollment in CAND 99100 the subsequent term</li> <li>3. Enrollment in a <i>fee-bearing</i> course the subsequent term</li> <li>4. Resolution of all remaining grades of Incomplete (I)</li> </ol> <p><b><i>*Ok value and minimum effort "Degree Only Registration."</i></b></p>

**3. CAND 99300 is zero credit (0) with a fee of \$125**

<b>Thesis Graduate Students who have:</b>	<b>Non-Thesis Graduate Students who have:</b>
Completed all degree requirements but HAVE NOT YET passed the final oral examination or HAVE NOT YET completed a thesis deposit	Completed all degree requirements but HAVE NOT YET completed the Directed Project <b><u>AND</u></b> HAVE NOT YET resolved one or more
FAILURE to successfully deposit the thesis with the Graduate School within the first 7 weeks of the term will require:  <ol style="list-style-type: none"><li>1. Withdrawal from CAND 99300</li><li>2. Late registration into CAND 99100</li><li>3. Late registration into at least 1 thesis research credit</li><li>4. Payment of all late registration fees and credit hour costs</li></ol>	FAILURE to successfully resolve all Incomplete (I) grades by the end of the term will require:  <ol style="list-style-type: none"><li>1. A grade of "F" be assigned for CAND 99300</li><li>2. Enrollment in CAND 99100 the subsequent term</li><li>3. Enrollment in a <i>fee-bearing</i> course the subsequent term</li><li>4. Resolution of all remaining grades of Incomplete (I)</li></ol>

*\*Least value and most effort. Exam only registration.*

## APPENDIX E

### Cooperative PhD Program with Purdue West Lafayette (PWL)

The **Cooperative Ph.D (PWL)** program of the Mechanical Engineering Department at IUPUI is a part of the Purdue University PhD program. The procedures established in the handbook are based on the rules and guidelines defined in a cooperative agreement between The Purdue School of Engineering and Technology, IUPUI and The School of Mechanical Engineering, Purdue University, West Lafayette on April 5, 2004.

This manual is intended to answer common questions PhD students have concerning their program of study, Graduate School operations, the graduate program in Mechanical Engineering, and services provided by the Purdue School of Engineering and Technology (ET) Graduate Office. It provides information on registration procedures, setting up a plan of study, acceptable scholastic performance, thesis procedures, and various requirements that must be met to receive the PhD degree.

**Cooperative PhD HANDBOOK HAS BEEN ARCHIVED and is available at the link provided below:**

[https://et.iupui.edu/departments/mee/programs/me/grad/\\_documents/cooperative-phd-program-archived-handbook.pdf](https://et.iupui.edu/departments/mee/programs/me/grad/_documents/cooperative-phd-program-archived-handbook.pdf)