Purdue School of Engineering and Technology

Indiana University-Purdue University Indianapolis (IUPUI)

DEPARTMENT OF
MECHANICAL AND ENERGY
ENGINEERING

Graduate Program Handbook

for

MSME
ME Graduate Certificates
On-Site ME PhD
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1. INTRODUCTION

The Department of Mechanical and Energy Engineering (MEE) welcomes you to 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 that 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 Building, Rm. 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) and in meeting the necessary degree requirements for completing the program and graduation. 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:
1. Graduate Certificates
2. Master Degree in Mechanical Engineering (MSME)
3. Doctor of Philosophy Degree (administered IUPUI Campus, Indianapolis)
4. Doctor of Philosophy Degree (administered with the West Lafayette campus) see separate Handbook

The Graduate certificate program includes the offering of four certificates, namely Computer Aided Mechanical Engineering, Energy Management and Assessment, Hybrid and Electric Vehicle, Systems Engineering, and Engineering Design Innovation.

The Master’s degree program offers the following Purdue University Master's degrees: 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 starting on page 25.

Administration of ME graduate program is shared among 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 their roles and procedures. In addition, if you are an international student, you will have contacts 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 Graduate Chair in the MEE Department (SL 260).
1.2 Special Information for New Students

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: One of the first questions to address, as a new student, is how to get properly registered for graduate classes. This process may begin as soon as you have received the official notification of admission from the Purdue Graduate School. To be prepared for registration you should:

1. Have information about the program, its requirements, and the courses. Along with this Graduate Program Handbook, you should also refer to the following:
   - **Schedule of Classes.** Course offerings and schedule of classes are available online at this website: [http://registrar.iupui.edu/schedule.html](http://registrar.iupui.edu/schedule.html).
   - **Faculty Research Expertise.** This website provides a list of faculty members with their respective research interests. [http://engr.iupui.edu/departments/me/people/faculty-and-staff.php](http://engr.iupui.edu/departments/me/people/faculty-and-staff.php).

2. Study these documents and then consult with your advisor or the Chair of MEE Graduate Program. 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, in particular, which courses you should take your first semester. The consultation also serves as a first step to selecting a major professor, the person who will be 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 or a research assistant on a particular research project will be assigned a major professor. If 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. After consulting with the academic advisor, prepare a tentative list of classes for the initial semester according to the web-based “Course Offerings” and “Schedule of Classes” for the particular semester. Online course offerings and schedule of classes can be accessed through the Office of the Registrar website at registrar.iupui.edu. When you have your class schedule prepared and are ready to register, you may you may register directly via the web-based student center, [one.iu.edu](http://one.iu.edu).

**Registration:** Registration and fee information is available on the registrar’s website: [https://studentcentral.iupui.edu/register/index.html](https://studentcentral.iupui.edu/register/index.html) and bursar website [https://studentcentral.iupui.edu/pay-bill/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 late fee by the Bursar.

Questions or problems regarding the registration process should be directed to the Office of the Registrar.

08/20/2019
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 complete the registration procedure as follows:

1. Access the Schedule of Classes. This is available at [http://one.iu.edu](http://one.iu.edu). (See Introduction)
2. Meet with the 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 or RA has been awarded, meet with the MEE Department Assistant to the Chair for completion of paper work.
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 or teaching assistantships should always meet with the MEE Assistant to the Chair in SL 260 before completing the final steps for registration (Section 3). 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 graduate assistantships, including teaching assistantship, research assistantships in the Department of Mechanical and Energy Engineering are required to register for a minimum of six (6) 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.
2. GRADUATE DEGREE PROGRAMS IN MECHANICAL ENGINEERING

2.1 Master’s Degree Program

The Department of Mechanical and Energy Engineering offers the following Master's degree program: Master of Science in Mechanical Engineering. The specific degree awarded depends on the emphasis chosen by the student as well as the undergraduate degree received and academic background of the student. The degree program is described as follows:

- **Master of Science in Mechanical Engineering (MSME)**

  Students who are graduates of recognized programs in Engineering, Science, or Technology, and 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 Programs.** Outstanding undergraduate students in the IUPUI Mechanical Engineering, Physics and other designated programs, may apply for admission to one of the Master’s programs while still in those B.S. 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 Section 6 and Section 7 for the Bachelor of Science-Master of Science and Bachelor of Physics and Master Mechanical Engineering program, respectively. Other dual degree programs may have separate handbooks listing these requirements.

**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.

<table>
<thead>
<tr>
<th>TOEFL Internet-based</th>
<th>TOEFL Paper-delivered</th>
<th>IELTS</th>
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</thead>
<tbody>
<tr>
<td>Reading</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>Writing</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Speaking</td>
<td>18</td>
<td>n/a</td>
</tr>
<tr>
<td>Listening</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>n/a</td>
</tr>
</tbody>
</table>

All applicants are required to take the GRE (Graduate Record Examination) and report the scores along with their applications. Preferred GRE scores are at least 155 on the quantitative section and a 3.0 on the analytical writing section.
Tracks
The graduate program in mechanical engineering consists of the following six areas to choose from:

1. Biomechanics
2. Design Innovation
3. Energy
4. Fluid and Thermal Sciences
5. Materials
6. Mechatronics and Controls
7. Solid Mechanics and Computer-Aided Engineering

The Biomechanics area includes study of the mechanics of biological systems and materials, such as musculoskeletal systems, joint mechanics, dental mechanics, bio-fluid mechanics, bio-solids mechanics, and medical instrumentation. The Energy area deals with the conversion, transfer, distribution, and efficient use of energy. It 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 Fluid and Thermal Sciences area includes study of fluid mechanics, heat transfer, thermodynamics, combustion, energy systems, thermal design, and computational fluid dynamics. The Materials area deals with the design, fabrication, characterization, and simulation of materials. It includes study of the properties and structure of matter and their relationship, strength of materials, composites, nanomaterials and elements of applied physics and chemistry. The Mechatronics and Controls area includes study of mechanical systems, electro-mechanical systems, control theory, micro-controllers, sensors, and actuators. The Solid Mechanics and Computer-Aided Engineering concentration area includes study of strength of materials, dynamics, kinematics, vibration, structural mechanics, mechanical design, CAD/CAM, and computational solid mechanics.

Degree Requirements for MSME Program
The Mechanical Engineering Master’s degree requires a minimum of 30 credit hours of graduate course work. Each student designs his or her own Master’s Plan of Study (POS) with approval from the Advisory Committee. All students appointed as Research Assistants, Teaching Assistants, or who are receiving Fellowships 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. The requirements for thesis and non-thesis options are as follows:

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) Between the 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. One of them must be from the Math Department.
**Note:** “Satisfactory” or “Fail” (S/F) is assigned as a final grade for ME 69800 M.S. Research Thesis course, while S/F grades are not permitted for any other course on the plans 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 59700 Mechanical Engineering Projects I. Refer to Appendix B for the requirements for Mechanical Engineering Projects I.
3) Between the primary and relates area courses, at least 15 credit hours (5 course) must be ME
4) Six (6) credit hours of mathematics or mathematics-related courses. One of them must be from the Math Department.

**Primary Area and Related Area Courses**

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 from time to time, and the Graduate Coordinator 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.

**Primary Area Courses**

**Biomechanics concentration area:**

Primary area courses in Biomechanics include courses in the Solid Mechanics and the Fluid/Thermal Sciences areas, as well as additional courses in the Biomedical Engineering field, such as:

- ME 59700 Orthopedic Biomechanics
- ME 59700 Models of Musculoskeletal Load
- ME 59700 Patient Specific Computational Modeling
- ME 59700 Imaging-Based Computational Analysis of Biomedical Flows
- ME 59700 / BME 59500 Skeletal Biomechanics
- BME 60100 Principles of Biomedical Engineering I
- BME 60200 Principles of Biomedical Engineering II

**Design Innovation area:**

- ME 59700 Design of Complex and Origami Structures
- ME 59700 Optimal Design of Mechatronic Systems: Robots and Interactive Structures
- ME 59700 Environmental Pollution and Emission Control
- ME 60601 Optimal Design of Complex Mechanical Systems
- ME 57201 Analysis and Design of Robotic Manipulators
- ME 50601 Design Optimization Methods
- ME 52601 Integrated Nanosystems Processes and Devices
- ME 54600 CAD/CAM Theory and Application

**Energy specialty area:**

- ME 50000 Thermodynamics
- ME 50101 Energy Assessment of Industrial Processes
- ME 50102 Energy Management Principles
ME 50103 Industrial Energy Assessment: Tools and Applications
ME 50500 Heat and Mass Transfer
ME 50900 Intermediate Fluid Mechanics
ME 54200 Introduction to Renewable Energy
ME 52301 Nanosystems Principles
ME 52500 Combustion
ME 51201 Energy Storage Devices and Systems
ME 59700 Electrochemistry for Engineering
ME 59700 Fuel Cell Science & Engineering
ME 59700 Ceramics Material for Renewable Energy
ME 50105 Hybrid & Electric Transportation

Fluid and Thermal Sciences concentration area:
ME 50000 Thermodynamics
ME 50500 Heat and Mass Transfer
ME 50900 Intermediate Fluid Mechanics
ME 51000 Gas Dynamics
ME 52500 Combustion
ME 55100 Finite Element Analysis
ME 58100 Numerical Methods in Mechanical Engineering
ME 58200 Thermal Stress Analysis
ME 50601 Topics: Design Optimization Methods
ME 59700 Topics: Principles of Turbo-machinery
ME 59700 Topics: Introduction to Tribology
ME 60101 Computational Modeling of Turbulence
ME 61400 Computational Fluid Dynamics

Materials specialty area:
ME 50500 Heat and Mass Transfer
ME 54200 Introduction to Renewable Energy
ME 55000 Advanced Stress Analysis
ME 55100 Finite Element Analysis
ME 55800 Composite Materials
ME 56900 Mechanical Behavior of Materials
ME 59700 Nanosystems Principles
ME 59700 Ceramics Material for Renewable Energy
ME 59700 Introduction to Tribology
ME 59700 Micromechanics of Materials
ME 69700 Computational Fracture Mechanics

Mechatronics and Controls concentration area:
ME 50104 Powertrain Integration
ME 50105 Hybrid and Electric Transportation
ME 50400 Automotive Control
ME 54600 CAD/CAM Theory and Applications
ME 55100 Finite Element Analysis
ME 56300 Mechanical Vibrations
ME 56500 Vehicle Dynamics
ME 57500 Theory and Design of Control Systems
ME 57800 Digital Control
ME 58100 Numerical Methods in Mechanical Engineering
ME 58600 Microprocessors in Electromechanical Systems
ME 59700 Analysis and Design of Robotic Manipulators
ME 59700 Electromechanical Systems and Applied Mechatronics
ECE 53800 Digital Signal Processing
ECE 55400 Electronic Instrumentation and Control Circuits
ECE 58000 Optimization Methods for Systems and Control
ECE 60200 Lumped System Theory
ECE 62900 Introduction to Neural Networks
ECE 68000 Modern Automatic Control
ECE 68500 Introduction to Robust Control CSCI 54900 Intelligent Systems
CSCI 55600 Fault Tolerant Computing

Solid Mechanics & Computer-Aided Engineering concentration area:
ME 54600 CAD/CAM – Theory and Applications
ME 55000 Advanced Stress Analysis
ME 55100 Finite Element Analysis
ME 55700 Design for Manufacturability
ME 55800 Composite Materials
ME 56000 Kinematics
ME 56200 Advanced Dynamics
ME 56300 Mechanical Vibrations
ME 56900 Mechanical Behavior of Materials
ME 57500 Theory and Design of Control Systems
ME 58100 Numerical Methods in Mechanical Engineering
ME 58200 Thermal Stress Analysis
ME 53501 Introduction to Systems Engineering
ME 59700 Topics: Design Optimization Methods
ME 59700 Topics: Topology Optimization
ME 59700 Topics: Design of Mechanical Systems
ME 59700 SysML Model Based Systems Engineering
ME 59700 Dynamics and Simulation of Hybrid-Electric Vehicles
ME 60601 Optimal Design of Complex Mechanical Systems
ME 65100 Advanced Finite Element Method for Solids
ME 69700 Continuum Mechanics
CE 57700: Analysis of Plates and Shells

**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 59700 Mechanical Engineering Projects I (for non-thesis option only)
ME 69700 Mechanical Engineering Projects II (for non-thesis option only)
Additional related area courses are:
MSE 54700 Introduction to Surface Science
MSE 59700E Materials and Devices for Solid-State Energy Conversion
MSE 57600 Corrosion
MSE 51000 Microstructural Characterization Techniques
ECE 59500G Materials and Devices for Solid-State Energy Conversion
MSE 59700E Materials and Devices for Solid-State Energy Conversion
ECE 59500G Materials and Devices for Solid-State Energy Conversion
MSE 54700 Introduction to Surface Science
ECE 53800 Digital Signal Processing I
ECE 62900 Introduction to Neural Networks

Additional related area courses (continued)
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
Mathematics Courses

Six (6) credit hours of mathematics courses are required in the plan of study as a related area for both thesis and non-thesis options. This requirement may be met by taking any of the two acceptable three-credit hour courses from the Mathematics Department (see the list below), or one course from the Mathematics Department and an equivalent course with a strong math content from another department, including MEE. 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.
Graduate Seminar
All students receiving financial aid including research assistantship, teaching assistantship, tuition assistance, or Fellowship awards must, in each semester of appointment, enroll for a zero credit:
ME 59800 Topics: ME Seminar

2.1.1 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 their 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 C).
All non-thesis students will include the MEE Graduate Chair as their 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 7) any changes to the Advisory Committee would require a change to the Plan of Study.

2.1.2  MASTER’S PLAN OF STUDY
It is strongly recommended that all Master’s students file a Plan of Study immediately upon completing 12 credit hours of coursework. The Master’s Plan of Study 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 their first semester.

A Master’s Plan of Study is filed by completing Graduate School Form 6 “Request for Master’s Degree Advisory and Plan of Study Approval” (refer to Appendix D and attachment for a sample copy). In all cases, the plan of study must be filed and approved by the Graduate School before the start of the final semester of graduation. If it becomes necessary or desirable to change the Plan of Study at a later date, a plan of study change form may be used for this purpose. An example of a portion of a Master’s Plan of Study is provided in Figure 1.

The following guidelines must be observed in preparing a plan of study. Additional guidelines and information on filling out the Plan of Study are given in Section 2.1.3 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 Plan of Study, 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 6 transfer credits (2 courses) may be used toward the primary area of concentration. 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. have not been used to meet the requirements for another degree; and have grade of “B” or better

Grades from transfer courses will not be included in calculation of the grade point index. Without exception, all transfer and excess undergraduate credits used on graduate plans of study must be approved by the student’s Advisory Committee and by GERC. A special request for approval is not necessary; simply include such courses on the Plan of Study and attach a copy of the catalog description of the course. Additional documentations to comply with requirements above may be required for approval.
2.1.3 **Preparation and Filing of Master’s Plans of Study**
Contact the Assistant to the Chair (advisor) in MEE Department in SL 260 for assistance in preparing the Master’s Plan of Study (POS). The advisor must review the draft copy of your plan of study. You may obtain the Master’s POS from the “Graduate Database” located on the Oncourse site. The form must be typed and can be done so directly on the electronic document. A sample plan of study is shown above in Figure 1.

The following are steps to preparing and submitting a plan of study 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 time the courses you need will be offered.

2. Prepare a draft of your plan of study. 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 as your major professor and to be the chair of your advisory committee. Confer with him/her for advice on the plan and ultimately his/her 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 a computer-generated or typed version of your plan of study, sign it, and carry it to the members of your advisory committee for their signatures.

6. Submit the original copy with all necessary signatures to the School’s Graduate Engineering Programs Office. Your plan of study will be reviewed by the Graduate Coordinator to ensure that the plan meets all format and program requirements, after which it will be submitted to the Purdue Graduate School for final approval.

*Note: Information relevant to completing the Plan of Study includes the following:*

1. There are the MSME possible degree options. Their degree codes are:

<table>
<thead>
<tr>
<th>Degree Code</th>
<th>Degree Title</th>
<th>Option</th>
</tr>
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<tbody>
<tr>
<td>ME-MSME</td>
<td>Master of Science in Mechanical Engineering</td>
<td>Non-Thesis</td>
</tr>
<tr>
<td>ME-MSME</td>
<td>Master of Science in Mechanical Engineering</td>
<td>Thesis</td>
</tr>
</tbody>
</table>
2. The space for indicating the research area is left blank in most cases.
3. The title of a topic course (ME 59700) must start with TPCS, followed by the title.
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/s 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 plan of study.

2.1.4 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 B.S. degree (normally 128 credits) and M.S. 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 allowed overlap: 1) BS plan of study filed no later than one semester before completing the BS degree requirements (normally in the 7th semester), and 2) MS plan of study filed after submitting the BS plan of study (normally in the 9th 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 not meeting the minimum grade requirements, the student can receive the BSME upon completion of all the requirements for that degree.
2.1.5 MBA/MSE Dual Degree Program

The MBA/MSE Dual Degree Program offered at IUPUI allows for the concurrent study of graduate engineering and graduate business course work and lead to both the MBA and MSE degrees. The program is designed for individuals who want to practice engineering involving business clients, work in a corporate engineering department, or work in a government agency regulating business, among other engineering/business interrelated opportunities.

Candidates must meet the admissions and prerequisite criteria of each school and be separately admitted by each. Candidates may be admitted to the Kelley School of Business in either August or January and to the School of Engineering and Technology in August.

The MBA/MSE dual degree program requires three-four years of full-time study instead of the five years that would be required if the two degrees were to be earned separately. The program requires 66 total credit hours, 24 credit hours at the school of Engineering and Technology in Indianapolis and 42 credit hours at the Kelley School of Business at Indianapolis for graduation. Non-dual degree study requires 81 total credit hours, 30 credit hours at the School of Engineering and Technology and 51 credit hours at the Kelley School of Business. Summer school during the first two summers of the dual degree program is encouraged to help the MBA/MSE student attain increased credit hours and ease potential scheduling conflicts that may arise when scheduling course work in two different professional schools. Some MBA courses are required to be taken during the summer term.

The MBA/MSE dual degree program is designed so that students take courses in both programs simultaneously. The degrees are conferred simultaneously when all requirements for graduation for the dual degree student have been met in each professional program.

1. Admission

The person seeking admission to the MBA/MSE dual degree program in Indianapolis must:

1. Meet the prerequisite requirements for application to both the Kelley School of Business in Indianapolis and the School of Engineering and Technology in Indianapolis.
2. Complete and application and required application documentation for each school individually, including completion of the GRE (for Engineering), and the GMAT (for Business) examinations.
3. Be admitted to each school individually.
4. The Kelley School of Business Indianapolis deadlines for applications are April 15 for the fall admission and November 1 for spring admission, with applications considered as they arrive. Similar deadlines apply for MSE admission applications for the School of Engineering and Technology.

As part of the application procedure for the MBA/MSE dual degree program, the interested candidate should contact the School of Engineering and Technology and the Kelley School of Business to obtain applications and pre-admission advising for each program respectively. Included in the information for each program will be information on prerequisites, the applicant pool, and the characteristics of the successful applicants, deadlines, and application checklists. Since the prerequisite requirements and competitive standards are not waived for applicants to the dual degree program, it is to the benefit of the potential applicant to fully understand the application, admission procedures, criteria and applicant pools for both schools.

In order to be eligible for consideration for admission to the MBA/MSE program, applicants must apply, be admitted, and begin taking course work in the School of Engineering and Technology before they have completed more than 12 hours of MBA course work and begin taking course work in the Kelley School of Business before they have completed more than 12 credit hours in the School of Engineering and Technology.

Under no circumstances will an applicant who has completed more than 18 hours of course work in the School of Engineering and Technology before matriculating in the MBA program be admitted to the Dual Degree Program.
2.1.6 Bachelor of Physics Masters 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 B.S. (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. Both the BS and MSME degrees will be awarded simultaneously at the completion of all 142 credits of the combined programs.

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. Semester-by-semester sample distribution of courses is given in Appendix F.

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.

2.1.7 Master 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 to discuss with the graduate advisor about possible courses to take. It is always helpful to talk with course instructors regarding courses you are interested in taking.
- For assistance with registration, go to the Graduate Programs Office in ET 215.

**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 specialization.
- 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 in the Graduate Programs Office, ET 215 or online.
- Have an officially approved Master’s plan of study on file with the Purdue University Graduate School and the ET Office of Graduate Programs.
**Final Semester (Thesis Option):**
- Register for “Candidacy 99100” (0 credit hour) in your final semester of 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 major professor’s approval of the thesis prior to scheduling the final examination.
- File Graduate School Form 8 “Request for Appointment of Examining Committee” with the Department and the School’s Graduate Office a minimum of 3 weeks prior to the proposed date of final oral examination/thesis defense. (Refer to Appendix D for a list of Graduate School forms and see sample copy of Form 8 attached.) Also, schedule the final examination (thesis defense) with major professor and advisory members at least 3 weeks in advance. You are required to meet the deadlines by which the final thesis examination must be completed. (Read Appendix G for more information on preparing final oral/thesis exam). Distribute copies of thesis to members of the Advisory Committee at least 2-3 weeks before the oral exam to allow sufficient time for members to review the thesis.
- Immediately following the oral exam insure that your advisory committee members sign Graduate School Form 7 “Report of Master’s Examining Committee” and submit the form at the Graduate Programs Office (ET 215).
- After the exam and all necessary changes have been made to your thesis, submit one copy to the ET Graduate Office, where it will be filed electronically.

**Final Semester (Non-Thesis Option):**
- You must register for “Candidacy 99100” (0 credit) in your final semester of graduation.

See the Non-Thesis & Thesis Checklists on the next two pages....
**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 and a $200 Late Fee is accessed

**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 is accessed

**Register for at least 1 credit hour of a Fee Bearing course:**
- ME 69800 (Instructor: Sohel Anwar 1 credit hour)
  
  **If you have completed your course requirements, you can use the above course:
  **No report required for only 1 credit of this course for Non-Thesis Students

**NON-THESIS Students**
- Plan of Study:
  - MUST include Sohel Anwar 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 anytime after it has been approved!!

*Please Schedule an appointment with Jerry Mooney for more details on Your Plan of study Submission!!*
**MSME THESIS STUDENTS GRADUATION CHECKLIST**

**Apply to Graduate Before Deadlines:** (see Deadlines)
- May graduation deadline: October 15
- August graduation deadline: January 15
- December graduation deadline: May 15
  
  [https://et.iupui.edu/students/graduation/](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 and a $200 Late Fee is accessed

**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 is accessed
- 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**
continued..

**MSME THESIS STUDENTS GRADUATION CHECKLIST**

**THESIS Students**

◊ **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](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 anytime 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 your Committee Members PRIOR to scheduling your defense:
    • Must Submit 2 week prior to Defense Date (for both Form 8 & Draft Copies to members)
    • See MEE Front Desk Staff for assistance securing a room for your defense
      • Contact Susan James for assistance in securing a room

*Before securing a room check to ensure 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
School of Engineering and Technology

IUPUI SITE APPROVED ME PhD Program

Indiana University-Purdue University Indianapolis (IUPUI)

DEPARTMENT OF MECHANICAL AND ENERGY ENGINEERING

Ph.D. Program Handbook
1. INTRODUCTION

Overview
The Department of Mechanical and Energy Engineering (MEE) welcomes you to IUPUI and the ME graduate program. We expect your time here to be an experience of enriched learning, exploration and discovery, and professional & personal growth. We hope that this will be an invigorating experience which fosters a lifetime of learning.

This manual is intended to answer common questions Ph.D. 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, Plan of Study (POS) preparation procedures, acceptable scholastic performance, dissertation preparation, and various requirements that must be met to receive a Ph.D. degree.

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, Ph.D. students must comply with requirements of the Department of MEE set forth in this handbook.

This handbook describes the requirements and regulations for the Ph.D. 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 completing the program and graduation. 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).

Handbook
This handbook is aimed at the Ph.D. program at IUPUI. Specific requirements for the Ph.D. program are described in section 2. Administration of the Ph.D. 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 have contacts 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.
2. NEW STUDENT INFORMATION

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

**Communication:** E-mail and Canvas are the primary modes of communication used between the Graduate Programs office and all graduate engineering students. Be sure that the Graduate Programs Office always has your current and active email address on file.

**Course Selection:** One of the first questions to address, as a new student, is how to be properly registered for graduate classes. This process may begin as soon as you have received the official notification of admission from the Purdue Graduate School. To be prepared for registration you should:

Have information about the program, its requirements, and the courses, along with this Graduate Program Handbook, you should also refer to the following:

**Schedule of Classes:** Course offerings and a schedule of classes are available online at this website: [http://registrar.iupui.edu/schedule.html](http://registrar.iupui.edu/schedule.html).

**Faculty Research Expertise:** This website provides a list of faculty members with their respective research interests: [http://et.engr.iupui.edu/departments/me/people/index.php](http://et.engr.iupui.edu/departments/me/people/index.php). Copies of these materials can also be obtained from either the MEE department in SL260 or the School of Engineering and Technology Graduate Programs Office in ET 215.

All Ph.D. 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 students. The purpose of the consultation is to begin planning your doctoral program and to decide which courses you should take your first semester. The Major Professor will serve as the chair of the student’s advisory committee (see Section 2).

After consulting with the Major Professor, prepare a tentative list of classes for the initial semester according to the web-based “Course Offerings” and “Schedule of Classes” for that particular semester. Online course offerings and the schedule of classes can be accessed through the Office of the Registrar website at registrar.iupui.edu. When you have your class schedule prepared and are ready to register, register directly via the web-based student information system, one.iu.edu.

**Registration:** Registration and fee information is available on the one.iu.edu web site. The Bursar’s computer system will schedule and print the registration statement and the fee statement for mailing to the student.

**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 MEE Graduate Office.
**Registration for subsequent semesters:**

Students are required to meet with their Major Professor to discuss a tentative plan of study before the end of the first semester to choose courses for registration.

Registration for summer and fall semesters begins approximately the second week in March. Registration for the spring semester begins approximately the second week of October. Students should complete the registration procedure as follows:

Access the Schedule of Classes at [http://one.iu.edu](http://one.iu.edu). (See Introduction)  □ Meet with the Major Professor to select courses.

- Meet with the graduate advisor to begin completion of the registration form
  - Obtain the signature of the Major Professor for approval.
- If a TA or an RA has been awarded, meet with the MEE department secretary for completion of paperwork.
- Submit the registration form and tuition waiver form, if applicable, to the MEE Graduate Office.
- Register online or in person with the registrar.

**Additional Registration Guidelines for Employed Students**

Students who have research assistantships or teaching assistantships should always meet with the MEE administrative assistant in SL260 before completing the final step for registration (Section 3). Completion of this step each semester will ensure that proper documentation exists for the prompt payment of the stipend and, when appropriate, for payment of tuition.

Students seldom register for more than nine credits of coursework in a single semester. Students who have graduate assistantships, including teaching assistantships, research assistantships, and university fellowships, in the Department of Mechanical and Energy Engineering are required to register for a minimum of six credits during the fall and the spring semesters. Requests for exceptions to the requirement must be submitted to the GERC Chair and are reviewed on a case-by-case basis.

**3. PHD DEGREE PROGRAMS IN MECHANICAL ENGINEERING**

The department’s Ph.D. program consists of two types of Ph.D. applicants, Direct Ph.D. (DPh.D.) students who have received a baccalaureate degree in mechanical engineering or related engineering programs and Ph.D. students who already have 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 know the requirements that apply to them.
**Admission**

Ph.D. Degree Program

**Qualifications**

Students with an M.S. in Mechanical Engineering or related engineering at the time of admission may be admitted to the Ph.D. program at IUPUI. The student must have a cumulative GPA $\geq 3.20$ for the Master's degree from a reputable university. The student also must have taken the GRE and received good scores. The Graduate Committee approves Ph.D. applications.

Direct Ph.D. (DPh.D.) Degree Program

**Qualifications**

Students with strong performance in coursework and some research experience at the undergraduate level may be admitted into the DPh.D. program at the time of admission to graduate studies at Purdue. The student must have a GPA $\geq 3.50$ 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 Graduate Committee approves Ph.D. applications.

A graduate student who enters the Master's program but later wants to pursue the DPh.D. may submit a request to the Graduate Chair for approval by the Graduate Committee. The student must have an undergraduate GPA $\geq 3.2$, 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 Graduate Chair before the first semester after the student has completed at least twelve credit hours of graduate coursework.

**Primary Area of Specialty and Related Area Courses**

There are primary areas of specialty and related areas in each Ph.D. student’s POS. The four primary areas in our Ph.D. program are:

1. Solid Mechanics, Biomechanics, and Design
2. Energy and Materials
3. Fluid and Thermal Sciences
4. Mechatronics and Controls

Courses are classified under either primary area or related area. Those courses directly related to the area of specialty are classified as primary and those courses outside of the specialty area are classified as related course. This list may periodically change: the Graduate Committee will have updated information.
Curriculum

Primary Area Courses

**Primary Area: Solid Mechanics, Biomechanics, and Design**

ME 50601 Design Optimization Methods
ME 54600 CAD/CAM – Theory and Applications
ME 55000 Advanced Stress Analysis
ME 55100 Finite Element Analysis
ME 55700 Design for Manufacturability
ME 55800 Composite Materials
ME 56000 Kinematics
ME 56200 Advanced Dynamics
ME 56300 Mechanical Vibrations
ME 56900 Mechanical Behavior of Materials
ME 58100 Numerical Methods in Mechanical Engineering
ME 58200 Thermal Stress Analysis
ME 59700 Topics: Orthopedic Biomechanics
ME 59700 Topics: Topology Optimization
ME 60601 Optimal Design of Complex Mechanical Systems
ME 59700 / BME 59500 Skeletal Biomechanics
BME 60100 Principles of Biomedical Engineering I
BME 60200 Principles of Biomedical Engineering II
ME 65100 Advanced Applications of Finite Element Method

**Primary area: Energy and Materials:**

ME 50000 Thermodynamics
ME 50101 Energy Assessment of Industrial Processes
ME 50103 Industrial Energy Assessment: Tools and Applications
ME 50500 Heat and Mass Transfer
ME 50900 Intermediate Fluid Mechanics
ME 51200 Energy Storage Devices and Systems
ME 52301 Nanosystems Principles
ME 52500 Combustion
ME 54200 Introduction to Renewable Energy
ME 54800 Fuel Cell Science & Engineering
ME 55000 Advanced Stress Analysis
ME 55100 Finite Element Analysis
ME 55800 Composite Materials
ME 56802 Ceramics Material for Renewable Energy
ME 56900 Mechanical Behavior of Materials
ME 59700 Electrochemistry for Engineering
ME 59700 Introduction to Tribology
ME 59700 Micromechanics of Materials
ME 69700 Computational Fracture Mechanics

*Primary area: Fluid and Thermal Sciences*

ME 50000 Thermodynamics
ME 50500 Heat and Mass Transfer
ME 50601 Design Optimization Methods
ME 50900 Intermediate Fluid Mechanics
ME 51000 Gas Dynamics
ME 52500 Combustion
ME 55100 Finite Element Analysis
ME 58100 Numerical Methods in Mechanical Engineering
ME 58200 Thermal Stress Analysis
ME 59700 Topics: Principles of Turbo-machinery
ME 59700 Topics: Introduction to Tribology
ME 61400 Computational Fluid Dynamics

**Primary area: Mechatronics and Controls**

ME 50104 Powertrain Integration
ME 50105 Hybrid and Electric Transportation
ME 50400 Automotive Control
ME 52601 Integrated Nanosystems Processes and Devices
ME 54600 CAD/CAM Theory and Applications
ME 55100 Finite Element Analysis
ME 56300 Mechanical Vibrations
ME 56500 Vehicle Dynamics
ME 57500 Theory and Design of Control Systems
ME 57800 Digital Control
ME 58100 Numerical Methods in Mechanical Engineering
ME 57201 Analysis and Design of Robotic Manipulators
ME 59700 Optimal Design of Mechatronic Systems: Robots and Interactive Structures
ME 59700 Environmental Pollution and Emission Control
ECE 53800 Digital Signal Processing
ECE 55400 Electronic Instrumentation and Control Circuits
ECE 58000 Optimization Methods for Systems and Control
ECE 60200 Lumped System Theory
ECE 62900 Introduction to Neural Networks
ECE 68000 Modern Automatic Control
ECE 68500 Introduction to Robust Control

08/20/2019
CSCI 55600 Fault Tolerant Computing

**Mathematics Courses**

Nine (9) credit hours of mathematics courses are required in the plan of study (including M.S. coursework). This requirement may be met by taking any of the two acceptable three-credit hour courses from the mathematics department (see the list below) and an equivalent course with a strong math content from another department, including ME.

*The following are acceptable mathematics courses offered by the Math Department:*

- 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

*The following courses are acceptable equivalent courses offered by the MEE Department*

- ME 55100 Finite Element Analysis
- ME 58100 Numerical Methods in Mechanical Engineering
- ME 61400 Computational Fluid Dynamics

**Graduate Seminar**

All Ph.D. students must enroll in a zero credit hour seminar course for two semesters during their residency.

ME 59800 Topics: ME Seminar

**Area Examination Rules and Areas**

Before a student becomes an official candidate for the Ph.D. degree, the Area Examinations and Preliminary Examinations must be passed. Ph.D. students pursuing their studies at IUPUI must take the Area Examinations subject to the same conditions stated in this handbook. Depending on the registration of an area exam, that exam will be held at IUPUI. If an area has no student registration, no exam will be held in that area.

**Responsibility and Authority:** The responsibility and authority for the implementation of the Ph.D. Area Examinations rests with the Mechanical 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 Ph.D. Area Examinations exist to provide assurance that all Ph.D. candidates have sufficient knowledge of fundamental principles in selected areas of Mechanical Engineering. Accordingly, these procedures apply to all Ph.D. students, including those who do not have B.S. and/or M.S. 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, (5) heat and mass transfer, (6) solid mechanics, (7) thermodynamics, and (8) materials.

Written examinations in these nine areas will be offered each semester, excluding the summer session. The student must take all three Area Examinations when taking the exams in the first attempt and no later than the second semester of residency past receipt of the Master's degree. 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 approved request must be transmitted to the Chair of the GERC 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.

Ph.D. students will be given two chances to pass the Area Examinations and must be enrolled in thesis hours in the semester they take their exams. A student who is unable to pass all the required Area Examinations after two attempts will be dismissed from the Ph.D. program. If desired by the student and the Major Professor, the student may make a request to the Graduate Committee to change from the Ph.D. to the Master’s degree 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.

**Ph.D. Program Advisory Committee**

Each Ph.D. 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. One committee member must be from a department/school outside of MEE.
An outside member can be someone with a Ph.D. 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). Also eligible to serve on an Advisory Committee are faculty members from other universities, scientists at national labs, or researchers in industry. 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 Chair of GERC a letter requesting this person’s inclusion along with clear justification of the specific expertise that the requested member will bring to the research to be conducted by the student. 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. Do not ask the outside person to submit information directly to the GERC Chair. This should be done by the Major Professor.

**Plan of Study (POS)** Each Ph.D. student must file a POS by the end of the 1st 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 second semester of their degree program.

The POS may be modified after it is filed. The draft POS must be submitted to the Major Professor, and, after approval, the Graduate Coordinator will assist the student in preparing the final copy and submitting it for 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 your primary area is heat transfer, it 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 your primary area but still contribute to your 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 Specialization:

1. Thermal and Fluid Sciences
2. Solid Mechanics, Biomechanics, and Design
3. Mechatronics and Controls
4. 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 specialization. Courses may not be removed from the POS after a grade has been received.

4. SPECIFIC REQUIREMENTS FOR Ph.D. STUDENTS WITH M.S. DEGREE

Essential Actions for Completion of the Ph.D.

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.
- Register for and successfully complete the Area Examinations before the end of the second semester of residence in the Ph.D. Program. A request by the student for an exception to these requirements may be submitted in writing 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 Graduate Chair in time for appropriate action. The request requires approval by the Graduate Committee in addition to the student's Advisory Committee.
- Formalize a POS in consultation with your Major Professor(s). The POS should be submitted at the end of the first semester.
- Complete the foreign language requirement, if necessary.

First year after passing the area exams

- Take Preliminary Exams (enrolled in Ph.D. 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 to the MEE GERC 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.

**Ph.D. Coursework**

Ph.D. coursework requires a minimum of 21 graduate credit hours beyond the Master’s degree. A minimum of 90 graduate course and research credit hours (including at most 30 credit hours from an M.S. degree) is required for graduation. All Plans of Study must contain at least two semesters of ME 59800 MEE Graduate Seminar (IUPUI Ph.D. students are required to take ME59800 every semester when they receive financial aid.) and a minimum of nine hours of applied mathematics. At least six of these hours must be taken from the Mathematics Department. A minimum of one course (3 credit hours) must be at 6XXXX level. (These requirements may be partially or fully satisfied by courses taken as a part of the M.S. program.)

**5. SPECIFIC REQUIREMENTS FOR DPh.D STUDENTS**

**Essential Actions for Completion of the DPh.D**

**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.

- Register for and successfully complete the Area Examinations before the end of the fourth semester of residence in the DPh.D. Program. A request by the student for an exception to these requirements may be submitted in writing 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 Graduate Chair in time for appropriate action. The request requires approval by the Graduate Committee in addition to the student's Advisory Committee.
A student who changes to the DPh.D. 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 Ph.D. status.

Formalize a POS in consultation with your Major Professor(s). The POS should be submitted at the end of the first semester.

Complete the foreign language requirement, if necessary.

First year after passing the area exams

- Take Preliminary Exams (enrolled in Ph.D. 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 to the MEE GERC 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.

DPh.D. Coursework

- A Ph.D. POS includes a minimum of 36 credit hours of coursework in addition to thesis research credit hours.
- Only graduate level courses (50000 or 60000 numbers) may be listed on a DPh.D. POS. At least one of the courses must be at the 60000 level. Independent project courses (ME 59700 or ME 69700) are limited to a maximum of three credit hours.
- At least six of these hours must be taken from the Mathematics Department. A minimum of one course (3 credit hours) must be at 6XXXX level.
- All DPh.D. POS must contain a minimum of nine credit hours of applied mathematics, at least six of which must be taken from the Department of Mathematics.
- Two semesters of successful completion of ME 59800: MEE Graduate Seminar are required. This course is not listed on the POS.
• Courses taken to satisfy a condition of a Ph.D. 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 Ph.D. Area Exam.

Optional Master’s Degree Along the Way

• Students enrolled in the DPh.D. program have the option of seeking a Master’s degree “along the way” to the Ph.D.. This option is available when the student meets the Master’s degree requirements for ME and the Graduate School. The student must submit a written request endorsed by the Major Professor to the Graduate Chair. Upon approval, the student will file a Master’s POS and will register for Master’s candidacy that semester. The Master’s plan can be for a non-thesis option and must satisfy ME’s requirements for a non-thesis Master’s degree.

Scholastic Requirements

• Requirements for completing the Ph.D. or DPh.D. degree are:

• Successfully complete all courses on your approved Plan of Study.

• Pass the Area Examinations and Oral Preliminary Examination as specified by your Advisory Committee (Section 3).

• Complete the dissertation to the satisfaction of your Final Examining Committee.

• Accumulate ninety (90) credits in coursework and research (See below).

• Earn grades of A or B as expected from Ph.D. or DPh.D. students. An occasional "C" in a 60000 level course or in a related area course 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 POS. Semester Grade Reviews are conducted by the GERC each semester. Warning letters are sent to those Ph.D. or DPh.D. students either not maintaining a minimum 3.0 or failing to make successful progress in their research. The Plan of Study index for Ph.D. or DPh.D. students is based on courses taken at IUPUI that apply toward the Ph.D. or DPh.D. 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 POS 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.

6. AREA EXAMINATIONS: REGISTRATION AND ADMINISTRATION

Registration

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 fourth and fifth 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 Exam during the first sitting for the Area Examinations along with two other exams.

Grading and Reporting Exam Scores

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 will provide 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 Ph.D. 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 all three Area Examinations and 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 Ph.D. program and prepare the Ph.D. 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 Chairman of the GRC 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.

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 dismissal appeal may be made as a written petition to the GERC by the student with a supporting letter from the student's Major Professor and Advisory Committee. The petition must explain the reasons the student should be allowed to continue in the Ph.D. 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 DPh.D. or Ph.D. program who fails to pass all area exams may petition the GERC Chair to change from the Ph.D. or DPh.D. to the Master’s program. After completing the Master’s degree, the student can apply to the Ph.D. program. If accepted, the student will have to start over with Area Examinations.

Each semester, the Graduate Committee will review all students’ performance and actions taken by the various Advisory Committees and the Graduate Committee concerning the Area Examinations.

7. PRELIMINARY AND FINAL EXAMINATIONS

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 Ph.D. Oral Preliminary Examination rests entirely with the student's Advisory Committee. The Oral Preliminary Examination exists to provide assurance that all Ph.D. candidates have in-depth knowledge of subject matter closely related to the student's research topic. In the Oral Preliminary Examination, the student should:

- 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 written research proposal containing 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.

Final Examination

At least two terms 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 7) 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 and the Graduate Chairman at least two weeks before the examination (see Section 13-E, F). Final Oral Exam Presentations are open to all interested parties. Therefore, the WL 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.

Final Exam Registration, Dissertation Approval and Dissertation Deposit

A Manual for the Preparation of Graduate Dissertation is available in the ET Graduate Office and on the Graduate School web page. 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 PH.D. FINAL EXAMINATION DATE, submit 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

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

Graduate School Form 9 – Dissertation Acceptance (Signature) Page. Obtain Form 9 from the MEE Graduate Office with a copy of the examination registration approval from the Graduate School. Bind the original Form 9/Signature page into the Library Thesis Office Deposit Copy and bind copies of the form in the dissertation copies (see H 1-3 below).

On Form 9: Type the names of individual examining committee members under the appropriate signature lines on the dissertation signature page. Type “School of Mechanical Engineering” under the line for the Department Head signature on the thesis signature page.

If a thesis is to be classified as “confidential,” obtain Form 15 – Request for Confidentiality of Thesis from the ET Graduate Office. Complete this form and submit it to the Graduate Chairman 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 MEE GERC for final approval to the Graduate Chair. The Graduate 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 Ph.D. dissertation research will lead to journal publication(s). It is recommended that the Ph.D. candidate prepare at least two (2) manuscripts for scholarly journal papers before the final examination.

**Dismissals:**

The GERC action regarding dismissals from the Mechanical Engineering graduate program that have resulted 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.

** Appeal Process:**

If a student’s Advisory Committee feels that special circumstances are involved, it may appeal a 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.
8. TIME LIMIT FOR Ph.D. OR DPh.D. PROGRAMS

Graduate study, particularly at the Ph.D. 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 his work becomes suspect. Accordingly, the Department of Mechanical and Energy Engineering has adopted the following policy used by the School of Mechanical Engineering, WL.

The total elapsed time for completion of a Ph.D. in the School of Mechanical Engineering shall be no more than eight calendar years from date of entry into the Ph.D. program to final approval of the Ph.D. 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; however, such an extension will require re-approval of the Plan of Study and the retaking of Area and Preliminary Examinations.

Transfer Courses

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

All post-baccalaureate and transfer courses used on the POS must have a grade of B- or better.

Courses taken during the semester when a student is admitted to degree-seeking status can be used as a part of the requirement above.

For the regular Ph.D. program, a maximum of nine 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 Advisory Committee of the student and the Graduate Chair.

For the DPh.D. 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 Advisory Committee of the student and the Graduate Chair.

The credit hours of the transfer course are not recorded on the transcript until the course is listed on the approved POS and the official transcript from the institution has been accepted at Purdue.

Ph.D. Degree Title

Students who complete the requirements for the Ph.D. or DPh.D. will receive a degree with the title “Doctor of Philosophy,” with the field of study noted as “Mechanical Engineering.” Note that the degree awarded is not “Doctor of Philosophy in Mechanical Engineering.”
9. ENGLISH LANGUAGE PROFICIENCY REQUIREMENTS FOR INTERNATIONAL STUDENTS

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 take an English for Academic Purposes (EAP) placement exam during new international student orientation 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 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 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 allows students who willingly comply 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 moved/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.
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.

10. RESIDENCY AND LOAD

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 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.

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 POS taken at IUPUI while enrolled in a graduate degree program and passed with grades of “C” or better; and thesis/ dissertation research 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.

11. REGISTRATION

Registration. The registration period begins on approximately October 21st for the spring semester and March 21 for summer & fall semesters. All current MEE graduate students are encouraged to register online through the one.iu.edu student information system during the open registration period (October-November and March-April). Note that late registration incurs a penalty fee. You are highly encouraged to select your courses and register early, as the department’s decisions to cancel courses that have low enrollment may affect your course options.

Dropping/Adding Courses. Be aware of procedures, late fee charges, and refund deadlines for the dropping and adding of courses. Students may drop/add courses online during the open registration period. However, once the open registration period ends, students must use a Drop/Add form to change a course. Information on procedures and deadlines are available on the Registrar’s website at http://registrar.iupui.edu/

12. MINIMUM GRADE REQUIREMENTS

Good Academic Standing. The Department of Mechanical and Energy Engineering maintains the following minimum standards to be in “good academic standing” in the Master’s degree program.
To be in good academic standing, a Ph.D. 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 of “D” or “F” is allowed for a course that is on the approved Plan of Study. All Ph.D. 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 of “D” or “F” must be repeated. In the event of a deficiency in the cumulative grade point index, a course may be repeated but only the most recent grade received will be used in computing the index.

13. CHANGES IN ACADEMIC PROGRAM

As a student’s academic program progresses, conditions may arise that 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 POS:

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.

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 for a change of Major Professor and/or other advisory committee members, or for a change of the Ph.D. 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
14. 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 other 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 to be invalid registrations and will not count toward graduate credit.

15. PETITIONS TO THE GRADUATE COMMITTEE

All graduate students have the right to petition the Mechanical 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.

GRADUATE CERTIFICATION PROGRAM

**ME Graduate Certificate Program:** The graduate certificate programs in the Department of Mechanical & 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 four graduate certificate programs based on the industry needs in the central Indiana area and beyond. Currently the following four graduate certificate programs are available:

1. **Computer Aided Mechanical Engineering**
2. **Energy Management and Assessment**
3. **Hybrid Electric Vehicle Technology**
4. **Systems Engineering**

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

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.

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

<table>
<thead>
<tr>
<th>All Thesis and Non-Thesis Graduate Students who are:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrolled in at least 1 credit of fee-bearing coursework, i.e. regular course(s), directed project, or thesis credit(s)</td>
</tr>
<tr>
<td><em>Best value with least effort</em></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Thesis Graduate Students who have:</th>
<th>Non-Thesis Graduate Students who have:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed all degree requirements</td>
<td>Completed all degree requirements</td>
</tr>
<tr>
<td>Passed the final oral examination</td>
<td>HAVE NOT YET completed the Directed Project</td>
</tr>
<tr>
<td>HAVE NOT YET completed a thesis deposit</td>
<td><strong>OR</strong> (not both)</td>
</tr>
<tr>
<td>FAILURE to successfully deposit the thesis with the Graduate School within the first 7 weeks of the term will require:</td>
<td>HAVE NOT YET resolved one or more</td>
</tr>
<tr>
<td>1. Withdrawal from CAND 99200</td>
<td>FAILURE to successfully resolve all Incomplete (I) grades by the end of the term will require:</td>
</tr>
<tr>
<td>2. Late registration into CAND 99100</td>
<td>1. A grade of “F” to be assigned for CAND 99200</td>
</tr>
<tr>
<td>3. Late registration into at least 1 thesis research credit</td>
<td>2. Enrollment in CAND 99100 the subsequent term</td>
</tr>
<tr>
<td>4. Payment of all late registration fees and credit hour costs</td>
<td>3. Enrollment in a <em>fee-bearing</em> course the subsequent term</td>
</tr>
<tr>
<td></td>
<td>4. Resolution of all remaining grades of Incomplete (I)</td>
</tr>
</tbody>
</table>

*Ok value and minimum effort “Degree Only Registration.”*
**APPENDIX A (continued)**

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

<table>
<thead>
<tr>
<th>Thesis Graduate Students who have:</th>
<th>Non-Thesis Graduate Students who have:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed all degree requirements but HAVE NOT YET passed the final oral examination or HAVE NOT YET completed a thesis deposit</td>
<td>Completed all degree requirements but HAVE NOT YET completed the Directed Project AND HAVE NOT YET resolved one or more</td>
</tr>
<tr>
<td><strong>FAILURE to successfully deposit the thesis with the Graduate School within the first 7 weeks of the term will require:</strong></td>
<td><strong>FAILURE to successfully resolve all Incomplete (I) grades by the end of the term will require:</strong></td>
</tr>
<tr>
<td>1. Withdrawal from CAND 99300</td>
<td>1. A grade of “F” be assigned for CAND 99300</td>
</tr>
<tr>
<td>2. Late registration into CAND 99100</td>
<td>2. Enrollment in CAND 99100 the subsequent term</td>
</tr>
<tr>
<td>3. Late registration into at least 1 thesis research credit</td>
<td>3. Enrollment in a fee-bearing course the subsequent term</td>
</tr>
<tr>
<td>4. Payment of all late registration fees and credit hour costs</td>
<td>4. Resolution of all remaining grades of Incomplete (I)</td>
</tr>
</tbody>
</table>

*Least value and most effort. Exam only registration.*
APPENDIX B
ME 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:

<table>
<thead>
<tr>
<th>Name</th>
<th>Identifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADAMS, ERIC</td>
<td>X0898</td>
</tr>
<tr>
<td>AGARWAL, MANGILAL</td>
<td>X0615</td>
</tr>
<tr>
<td>ANASORI, BABAK</td>
<td>X0906</td>
</tr>
<tr>
<td>ANWAR, SOHEL</td>
<td>X0460</td>
</tr>
<tr>
<td>CHEN, JIE</td>
<td>X0229</td>
</tr>
<tr>
<td>DALIR, HAMID</td>
<td>X0844</td>
</tr>
<tr>
<td>DU, XIAOPING</td>
<td>X0903</td>
</tr>
<tr>
<td>EL-MOUNAYRI, HAZIM A.</td>
<td>X0362</td>
</tr>
<tr>
<td>HOLGUIN, NILSSON</td>
<td>X0870</td>
</tr>
<tr>
<td>JONES, ALAN S.</td>
<td>X0481</td>
</tr>
<tr>
<td>KATONA, THOMAS R.</td>
<td>X0337</td>
</tr>
<tr>
<td>LARRIBA-ANDALUZ, CARLOS</td>
<td>X0779</td>
</tr>
<tr>
<td>NALIM, M. RAZI</td>
<td>X0361</td>
</tr>
<tr>
<td>NEMATOLLAHI, KHOSROW</td>
<td>X0505</td>
</tr>
<tr>
<td>RAZBAN, ALI</td>
<td>X0689</td>
</tr>
<tr>
<td>RYU, JONG EUN</td>
<td>X0739</td>
</tr>
<tr>
<td>SHIN, HOSOP</td>
<td>X0891</td>
</tr>
<tr>
<td>SMITH, CRAWFORD FRED</td>
<td>X0571</td>
</tr>
<tr>
<td>TOVAR, ANDRES</td>
<td>X0670</td>
</tr>
<tr>
<td>WAGNER, DIANE</td>
<td>X0778</td>
</tr>
<tr>
<td>WEI, XIAOLIANG</td>
<td>X0873</td>
</tr>
<tr>
<td>XIE, JIAN</td>
<td>X0554</td>
</tr>
<tr>
<td>YANG, SHENGFENG</td>
<td>X0865</td>
</tr>
<tr>
<td>YU, HUIDAN (WHITNEY)</td>
<td>X0671</td>
</tr>
<tr>
<td>ZHANG, JING</td>
<td>X0672</td>
</tr>
<tr>
<td>ZHU, LIKUN</td>
<td>X0627</td>
</tr>
</tbody>
</table>
APPENDIX C

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 Ph.D. 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 Ph.D. 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 Ph.D. degree.

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