

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



**DEPARTMENT OF MECHANICAL  
AND ENERGY ENGINEERING**

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**SCHOOL OF ENGINEERING AND TECHNOLOGY**

Indiana University–Purdue University  
Indianapolis

**Graduate Program Handbook**

for

**Cooperative PhD**

## **1 Cooperative PhD Program**

The cooperative PhD program of the Mechanical and Energy Engineering Department at IUPUI is a part of the Purdue University PhD program. The procedures established in this 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 that PhD students have concerning their program of study, Graduate School operations, the graduate program in Mechanical Engineering, and services provided by the Purdue School of Engineering and Technology (ET) Graduate Office. It provides information on registration procedures, setting up a plan of study, acceptable scholastic performance, thesis procedures, and various requirements that must be met to receive the PhD degree.

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.

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.

In particular, PhD students who are initially registered as West Lafayette campus students must comply with requirements of the School of Mechanical Engineering, but must also register in a special student category at IUPUI in order to facilitate supervision by the major professor at IUPUI and to take courses at IUPUI.

### **1.1 Area Examinations Requirement**

PhD students in the cooperative program must take their Area Examinations no later than the third semester of enrollment (excluding summer sessions) of graduate studies at Purdue. The student will be given two chances to pass the Area Examinations and must be enrolled in thesis hours in the semester they take their exams. In the first attempt, the student must take all three exams in the same semester. A student, unable to pass all the required Area Examinations after two attempts, will be dismissed from the PhD program. If desired, by the student and the Major Professor, the student may make a request to the Graduate Committee to change from the PhD to the Master's degree program.

### **1.2 Cooperative PhD Coursework**

PhD coursework requires a minimum of 21 graduate credit hours beyond the Master's degree, 12 of which must be from coursework originating from the Purdue West Lafayette campus. A minimum of 90 graduate course and research credit hours (including at most 30 credit hours from the Master's degree) are required for graduation. At least nine credit hours (usually three courses) of the 90 credit hours must be in applied mathematics. Two of them must be from Math Department. The mathematics requirement may be partially or fully satisfied by courses taken during the MS Program.

### **1.3 Cooperative PhD Program Advisory Committee**

The Advisory Committee consists of at least four members and must be co-chaired by one ME faculty

member from IUPUI and one ME faculty member from the Purdue West Lafayette campus. These Co-chairs serve as the Major Professors who guide the student's thesis research. The Co-chairs should work together in guiding the student's thesis research. At least two members of the Advisory Committee (including a Co-chair) must be ME faculty at the Purdue West Lafayette campus. One committee member must be from a department/school outside of ME. This member can be from Purdue West Lafayette or IUPUI. All persons serving on the Advisory Committee of students must already be regular or special graduate faculty, i.e., certified by the Graduate School to serve on the committees of graduate students. Students also can include non-Purdue academics (faculty at other Universities), scientists at national labs, or researchers in industry on the Advisory Committee. These members require prior approval from the Graduate School in the form of a certification as special graduate faculty. In case a student and the Major Professors contemplate including such a member in the Advisory Committee, the Co-chairs should send a letter to the Graduate Chair requesting this with a clear justification for the specific expertise that the requested member brings to the research to be conducted by the student. An electronic version of the complete vita for the person being considered for Advisory Committee 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 Graduate Chair. This should be done by a regular ME professor.

#### **1.4 Essential Actions for Completion of the PhD**

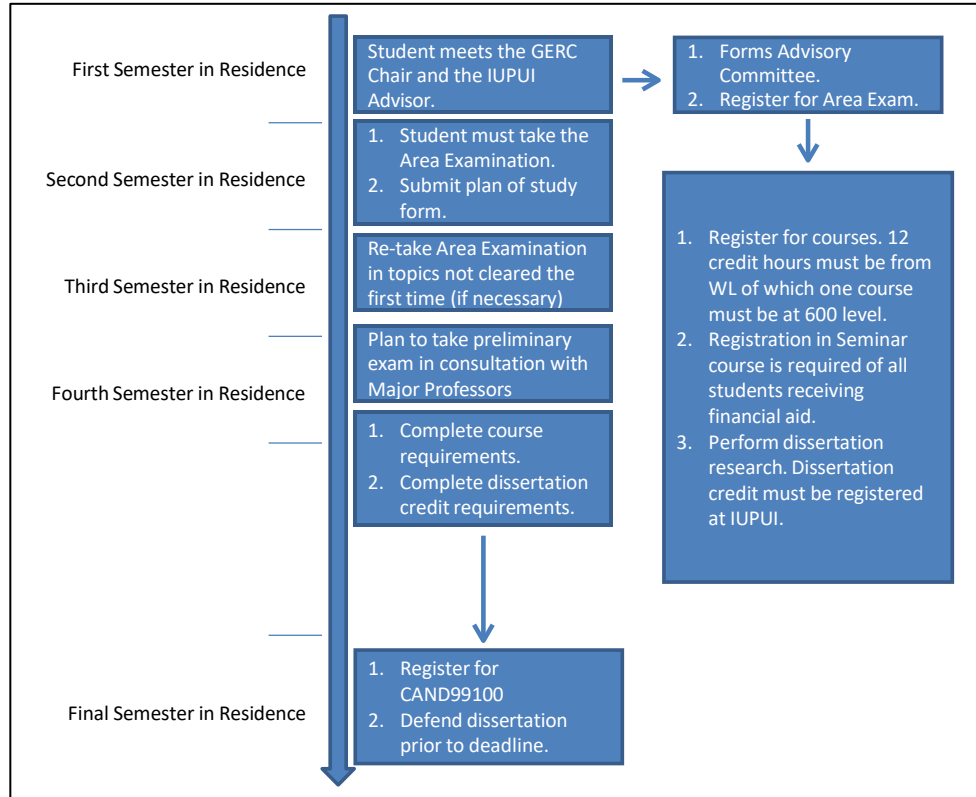
##### ***First Year***

1. Meet with your Major Professor or temporary advisor, Chair of ME Graduate Education and Research Committee (GERC), to discuss course selection before registering.
2. Complete the registration process in the ET Graduate Office. Students with foreign language requirement using Option D should register for a foreign language course.
3. Thoroughly review the PhD section of the Purdue University School of Mechanical Engineering Graduate Procedures Manual (latest update). You can locate this manual at this link: <https://engineering.purdue.edu/ME/Academics/Graduate/currgrad.html>.
4. Choose your Advisory Committee.
5. Register for and successfully complete the Area Examinations before the end of one calendar year of residence in the PhD Program.
6. Formalize a plan of study in consultation with your Major Professors. The plan of study should be submitted in the semester in which you successfully complete your area exams.
7. Complete the foreign language requirement, if necessary.
8. Take Preliminary Exams (enrolled in PhD thesis hour).

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

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

## PhD Process by Semester



### **1.5 Foreign Language Requirements**

At the option of the Major Professor and Advisory Committee, proficiency in a foreign language may be required. Your Major Professor will designate the language most appropriate for your program. The language chosen is usually German, Russian, Japanese, or French. The required foreign language is to be indicated on the Plan of Study. The method by which the language requirement is to be met shall also be stipulated on the Plan of Study.

Each student's Advisory Committee will specify in which of the following ways the student may satisfy the minimum language requirement by:

- A. Transfer or satisfaction of the foreign language at some other graduate school.
- B. Passing the fourth semester of the undergraduate course sequence in an acceptable language with at least a grade of "C" in the last course or the equivalent of this requirement by transfer from another institution.
- C. Examination. The student's Advisory Committee will determine an appropriate examination in consultation with foreign language departments, consistent with Purdue policy. This examination may be repeated no more than twice
- D. Course work. The student's Advisory Committee will determine appropriate course work to be taken from foreign language departments, consistent with Purdue policy. These courses may not be audited. Grades in these courses will not be counted in the student's grade index.
- E. Taking the E.T.S. Graduate School Foreign Language Test and scoring 500 or better.

### **1.6 Plan of Study**

Each PhD student must file a Plan of Study before the end of the semester in which the Area Examinations are successfully completed. Students failing to meet this requirement will not be permitted to complete their registration for the next semester.

The Plan of Study may be modified after it is filed. The draft Plan of Study must be submitted to the Major Professor, and after approval, the Graduate Coordinator will assist the student to prepare the final copy and to submit it for approval.

A Plan of Study consists of a group of courses in the student's "Primary Area" and other courses in "Related Areas." Courses on the Plan of Study must have a 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 Engineering. Courses in related areas are outside your primary area but still contribute to your program. These courses may come from ME or from other schools or departments. As a special requirement, a minimum of four courses from each student's plan of study (or eight courses for direct PhD students) must have originated at West Lafayette. These may include courses offered through the Purdue EPE program.

Although there is no specific lecture credit hour requirement for the PhD, typical Plans of Study will include from 21 to 30 credit hours beyond the Master's degree; a minimum of ninety course and research credits (including the Master's degree credits) is required for graduation. Your Major Professor may also feel that additional courses not included on the Plan of Study should be taken to broaden your background in a particular area. Only graduate level courses (500 or 600 numbers) may be listed on a PhD Plan of Study. All Plans of Study must contain at least two semesters of ME 597 ME Graduate Seminar and a minimum of

nine hours of applied mathematics. (IUPUI PhD students are required to take the seminar course every semester when they receive financial aid.) At least six of these hours must be taken from the Mathematics Department and a minimum of one ME course (3 credit hours) must be at 6XXXX level. (This requirement may be partially or fully satisfied by courses taken as part of the MS program.) When completing the Plan of Study, students should choose from the following list for the Area of Specialization:

ACOUSTICS	FLUID MECHANICS
APPLIED OPTICS	HEAT TRANSFER
AUTOMATIC CONTROLS	MANUFACTURING AND MATERIALS PROCESSING
AUTOMATION	NOISE CONTROL AND VIBRATIONS
BIOENGINEERING	PROPULSION
COMBUSTION	THEORETICAL AND APPLIED MECHANICS
DESIGN (CAD, ROBOTICS)	TRANSPORTATION
ENVIRONMENTAL CONTROL (HVAC&R)	

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.

### **1.7 Scholastic Requirements**

Requirements for completing the PhD 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.
- Complete the dissertation to the satisfaction of your Final Examining Committee.
- Accumulate ninety (90) credits in course work and research (See below).

In general, grades of A or B are expected from PhD 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.

A minimum of ninety credits is required for graduation. This includes both course and research credits, plus thirty credits allowed for a master's degree, if completed in an appropriate discipline. A minimum of four courses must originate at the West Lafayette campus, and a minimum of thirty credits must be earned by continuous residence at the Indianapolis or West Lafayette campuses. In fulfilling these requirements, a maximum of fifteen credit hours will be allowed from any one semester and a maximum of eight credits from a summer session.

Semester Grade Review: The GERC reviews graduate student performance each semester and sends warning letters to those PhD students not maintaining a 3.0/4.0 grade point average index on their Plan of Study and/or failing to make successful progress in their research. The Plan of Study index for PhD students is based on courses taken at Purdue which apply toward the PhD and were not previously applied towards the Master's degree. The warning letter may set forth specific conditions to be met within a specified time period.

Unsatisfactory course work and/or research, if continued, may lead to dismissal from the Mechanical

Engineering graduate program. **A student, who's Plan of Study index is below 2.75 after twelve semester hours of course work, will be automatically dropped 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.

Dismissals: The GERC action on dismissals from the Mechanical Engineering graduate program resulting from failure to meet the index requirements will take place as soon as practical after the 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 to 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 Dept. of Mechanical 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 successfully complete the program.

### **1.8 Area Examinations**

Before a student becomes an official candidate for the PhD degree, the Area Examinations and Preliminary Examinations must be passed. PhD students pursuing their studies at IUPUI must take the Area Examinations at WL, subject to the same conditions and rules as WL students. An exam may be held simultaneously at IUPUI if a sufficient number of students appearing in a particular Area Examination are registered at IUPUI.

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

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

Area Examinations: The student is expected to demonstrate a firm command of fundamental principles up to and including the Master's level in applied mathematics plus at least two of the following approved areas of Mechanical Engineering: (1) acoustics, (2) applied optics, (3) control, (4) design, (5) dynamics, (6) fluid mechanics, (7) heat and mass transfer, (8) solid mechanics, (9) thermodynamics.

Written examinations in these ten areas will be offered each semester, excluding the summer session. The student must take three Area Examinations during one semester, no earlier than the first semester of enrollment in the PhD program 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 in writing to his 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 Chairman 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 WL will prepare, administer and grade the Area Examinations, then report the results to both the Major Professor and the Graduate Committee at WL. 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 re-examination. 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 course work or individual study or both, should be reported in writing to the Chairman of the Graduate Committee, WL with signatures from all members of the Advisory Committee.

A student who fails any of the three examinations must retake that examination the following semester. Furthermore, a student will be terminated by the GERC if any examination is failed twice. An appeal of this termination may be made via written petition to the Graduate Committee at WL by the student's Advisory Committee. The petition must explain the reasons the student should be allowed to continue. If the petition is denied, the student termination from the program becomes permanent.

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.

### **1.9 Oral Preliminary Examinations**

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

- Demonstrate competency with fundamentals in areas that required remedial action as a result of 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 thesis. The formal request for an appointment of the Preliminary Examination Committee must be received by the Graduate School at least two weeks prior to the date of the Preliminary Exam. Form 8 is available on the Graduate School web page and in the ME Office for this request.



### **1.10 Final Examination and Committee**

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 1.3) for choosing the Advisory Committee apply. The Examining Committee is normally the same as the student's Advisory Committee and is responsible for reading the student's dissertation and conducting the Final Examination. A copy of the dissertation should be submitted to the Examining Committee and the Graduate Chairman at least two weeks before the examination. 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 by way of 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 ME Graduate Committee at WL and the GERC for distribution to the ME faculty and graduate students.

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

- A. 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 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.
- B. **NO LATER THAN TWO WEEKS BEFORE THE PH.D. FINAL EXAMINATION DATE**, submit Form 8 to the ME Graduate Office – Request for Appointment of Examining Committee, which registers the date, time and location of the defense. The Form 8 is available on the Graduate School website under Publications, Forms, and Reports.
- When the exam registration (Form 8) is approved by the Graduate School at WL, it will be returned to the ME Graduate Office with the following additional form:
- The Graduate School Form 9 – Dissertation Acceptance (Signature) Page. Pick up Form 9 from the ME 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 the 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.
- C. If a thesis is to be classified as "confidential," obtain Form 15 – Request for Confidentiality of Thesis from the ET Graduate Office. Complete and submit 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.
- D. **NO LATER THAN TWO WEEKS BEFORE THE FINAL EXAMINATION**, submit an unbound copy of the dissertation to the ET Graduate Office for format approval. This submission should be as far ahead of the deadline as possible.
- E. **NO LATER THAN TWO WEEKS BEFORE THE FINAL EXAMINATION**, submit a copy of the dissertation to the Examining Committee.
- F. After the Final Examination, revise the dissertation according to the requirements of the Examining Committee and the format review.
- G. Submit the revised dissertation to the ME 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 an electronic copy will be filed and stored at IUPUI and WL. Bound copies are no longer required.

- H. Upon notification, pick up the dissertation copies from the ET Graduate Office. If no additional corrections are required and final approval is given, deposit the dissertation copies as follows:
1. The ME Graduate Office will retain the ME Departmental Copy for electronic deposit. (If the thesis has been classified as “confidential,” submit an abstract to the ME Graduate Office.)
  2. An electronic copy of theses classified as “confidential” are retained by the Thesis and Dissertation Deposit and Approval Office.
- I. Publication: It is expected that Ph.D. thesis should lead to journal publication. The Major Professor will insist that the student prepare a paper in suitable form for publication from the results of his/her research. The student should check with the Major Professor early to be sure of the requirements. A student will not be certified for the degree until the publication requirements are met.

### **1.12 Time Limit for Ph.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 course work and dissertation in a reasonable length of time beyond which the relevance and originality of his work becomes suspect. Accordingly, the Dept. of Mechanical Engineering has adopted the following policy that is 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 the student's Advisory Committee. However, such an extension will require re-approval of the Plan of Study and retaking of the Area and Preliminary Examinations.