

**IUPUI**

INDIANA UNIVERSITY-PURDUE UNIVERSITY INDIANAPOLIS

Purdue School of Engineering and Technology

Mechanical Engineering

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

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**DEPARTMENT OF MECHANICAL ENGINEERING**

Draft

**Doctor of Philosophy Degree Program  
Handbook**

2005 – 2006



## TABLE OF CONTENTS

<u>Contents</u>	<u>Pages</u>
1. Introduction	1
2. Essential Actions for Completion of the Ph.D. Degree	1
3. Registration	2
4. Additional Registration Guidelines for Employed Students	2
5. English Proficiency	3
6. Foreign Language Requirements	3
7. Major Professor and Advisory Committee	4
8. The Plan of Study	4
9. Scholastic and Residence Requirements	6
10. Area Examinations	7
11. Oral Preliminary Examination	8
12. Final Examinations and Committee	8
13. Final Exam Registration, Thesis Approval, and Thesis Deposit	9
14. Publication	11
15. Time Limit for Ph.D. Programs	11



## **1. INTRODUCTION**

The Ph.D program of the Mechanical Engineering Department at IUPUI is a part of the Purdue University Ph.D. 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 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 program of study, acceptable scholastic performance, thesis procedures, and various requirements that must be met to receive the Ph.D. degree.

Each admitted student at IUPUI is given a student identification number. Use that number to establish a OneStart account at <http://onestart.iu.edu>. The features of OneStart will let you access your university academic record, financial information, personal information, campus life and general information. You will need to refer to it often.

Special situations may certainly 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 Office can sometimes save much effort and time for students and faculty alike.

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.

## **2. ESSENTIAL ACTIONS FOR COMPLETION OF THE PH.D.**

### **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 (Section 3). Students with foreign language requirement using Option D should register for a foreign language course (Section 6).
3. Choose a Major Professor and Advisory Committee (Section 7).
4. Register for and successfully complete the Area Examinations **before** the end of one calendar year of residence in the Ph.D. Program (Section 10).
5. Formalize a plan of study in consultation with your Major Professor. The POS should be submitted in the semester in which you successfully complete your area exams.  
Complete the foreign language requirement, if necessary (Section 6).

### **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 Graduate Office no later than the beginning of the final semester of graduate study, if needed (Section 8).
3. Pick up a **Candidate Packet** with a list of deadlines for students from the ET Graduate Office, Room SL 164.
4. Schedule the thesis defense two weeks prior to the date of the defense.
5. Submit the first draft of your thesis to your major professor well before the date of your defense (Section 13).
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.

### **3. REGISTRATION**

Students who are beginning their graduate program in Mechanical Engineering should meet with their major professor or temporary advisor (Chair of GERC) to discuss a tentative plan of study and to choose courses for registration. Students are eligible to register after they receive a formal letter of admission and are advised to register well in advance of the first week of class.

Registration for the Summer and the Fall Semesters begins after the second week in March, and registration for the Spring Semester begins after the second week of October. Students should complete the registration procedure as follows:

1. Access the Schedule of Classes. This is available on OneStart (<http://onestart.iu.edu>). (See Introduction.)
2. Meet with the Major Professor or temporary advisor to select courses.
3. Meet with the Graduate Administrator 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 ME department secretary for completion of paper work.
6. Submit Registration Form, and tuition waiver form if applicable, to the ET Graduate Office
7. Register online or in person with the registrar.

**Registration and fee information is available on the ONESTART 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 **late fee** by the Bursar.

Questions or problems regarding the registration process should be directed to the ET Graduate Office.

### **4. ADDITIONAL REGISTRATION GUIDELINES FOR EMPLOYED STUDENTS**

Students who have research assistantships or teaching assistantships should always meet with the ME administrative secretary 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 salary and, when appropriate, for payment of tuition.

Although the Graduate School only requires a minimum of three credits of course work or research for graduate students who have an appointment at any level FTE, the research and course work credit total for the Fall and Spring Semesters should usually be 15 credits. Students seldom register for more than 9 credits of course work. Registering for the appropriate level of research each semester will ensure adequate credit to satisfy the residency requirement.

Students who have teaching assistantships in the Dept. of Mechanical Engineering are required to register for a minimum of 6 credits for the Fall and the Spring Semesters. Requests for exceptions to the requirement may be submitted to the GERC Chairman and are reviewed on a case-by-case basis.

## **5. ENGLISH PROFICIENCY**

At the time of matriculation, the records of all incoming graduate students are reviewed to determine whether or not they have met the minimum English proficiency requirement, as established by the Dept. of Mechanical Engineering. The minimum requirements are as follows:

- Domestic Students – A GRE verbal score of at least 570 and a grade of “B” or better in all undergraduate composition courses.
- International Students – A GRE verbal score of at least 570 and a minimum score of 600 on the Test of English as a Foreign Language (TOEFL).

Records for students matriculating in the Summer and the Fall Semesters are reviewed at the beginning of the Fall Semester, and records of students matriculating in the Spring Semester are reviewed in January.

Students, who have not met the English Proficiency requirement, will be informed by letter that they are required to take the IUPUI English Placement Test.

## **6. 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.

## 7. MAJOR PROFESSOR AND ADVISORY COMMITTEE

All students are assigned a temporary advisor, Chair of GERC, when they are admitted to the ME graduate program. Each thesis graduate student is expected to choose a Major Professor before the end of his/her first semester. Those who are employed to work on a particular research project will be under the supervision of a faculty member associated with the project. **Students are not automatically assigned a Major Professor.** It is a mutual agreement between the student and the professor, and students who accept an assistantship offer automatically accept the professor offering the assistantship as the Major Professor. Students should notify the ET Graduate Office of their decision before the end of their first semester.

After the student has chosen a Major Professor, the Advisory Committee should be established. Normally the Advisory Committee for the Ph.D. students consists of four members. This committee shall be co-chaired by one ME faculty member from IUPUI and one ME faculty member from WL. These co-chairs serve as the major professors in guiding the student's thesis research. At least two members of the Doctoral Advisory Committee (including the co-chair) must be ME faculty members at the WL campus. One member of the committee must be from a department/school outside ME. This member can be from WL or IUPUI. The Advisory Committee is also formally established when the Plan of Study (Section 8) is submitted by the student and approved by the Graduate School.

## 8. PLAN OF STUDY

**Each Ph.D. student must file a Plan of Study before the end of the semester in which the Area Examinations are successfully completed (Section 10).** 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. The draft must be submitted as a final copy to be approved.

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 Ph.D. students) must have originated at WL. These may include courses offered on the IUPUI schedule of classes, through the Purdue CEE program.

Although there is no specific credit hour requirement for the Ph.D., 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 Ph.D. Plan of Study. **All Plans of Study must contain two semesters of ME 597 ME Graduate Seminar and a minimum of nine hours of applied mathematics.** At least six of these hours must be taken from the Mathematics Department. (This requirement may be partially or fully satisfied by courses taken as part of the M.S. 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.

## 9. SCHOLASTIC AND RESIDENCE REQUIREMENTS

Requirements for completing the Ph.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 10, 11).
- 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 Ph.D. students. An occasional "C" in a 600 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/no pass 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 Ph.D. 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 Ph.D. students is based on courses taken at Purdue which apply toward the Ph.D. 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 Graduate Committee 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 Graduate Committee. 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.  
Master's Degree.

## **10. AREA EXAMINATIONS**

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 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 Ph.D. Area Examinations rests with the Mechanical Engineering faculty. 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 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 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 Ph.D. 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 will prepare, administer and grade the Area Examinations, then report the results to both the Major Professor and the Graduate Committee. 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 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 action to terminate the student may be made via written petition to the GERC 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 Advisory Committee may appeal to the Mechanical Engineering faculty.

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

Reminder: The student, in concert with his Major Professor, must select an Advisory Committee and submit a Ph.D. Plan of Study before the end of the semester in which the Area Examinations are first taken. (Section 8)

## **11. 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 Preliminary Examining 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 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 Graduate Office for this request.

## **12. 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 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 thesis and conducting the Final Examination. A copy of the thesis 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 Graduate School requires that the date, time and room for the examination be registered at least two weeks in advance. (Room location needs to accommodate at least 20 people.) The Graduate School requires that a Form 8, which registers the date, time, location, and committee for the examination, be submitted no later than 2 weeks before the examination. At the time the exam is scheduled, the student will send an electronic copy of the abstract to the ME Graduate Office for distribution to the ME faculty and graduate students.

### 13. FINAL EXAM REGISTRATION, THESIS APPROVAL AND THESIS DEPOSIT

- A. A **Manual for the Preparation of Graduate Thesis** is available in the ET Graduate Office (SL 164) 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 to the ME Graduate Office **Form 8 – 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, it will be returned to the ME Graduate Office with the following additional form:

The Graduate School **Form 9 – Thesis 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 thesis 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 thesis 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 in Room SL 164D. Complete and submit to the Graduate Chairman at the same time as the thesis for final approval. Consult your major professor if the confidentiality of the thesis is uncertain.
- D. NO LATER THAN TWO WEEKS BEFORE THE FINAL EXAMINATION, submit an unbound copy of the thesis 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 thesis to the Examining Committee.
- F. After the Final Examination, revise the thesis according to the requirements of the Examining Committee and the format review.
- G. Submit the revised thesis to the ME GERC for final approval to the Graduate Chairman. The Graduate Chairman will **require three days minimum to read** the thesis and may require additional changes before final approval. The following are to be submitted to the Graduate Chairman for the final review:

1. A Thesis Office Deposit Copy (printed on 100% cotton, 20 lb. paper) bound in a black 3-hole screw binder with the original Thesis Acceptance Page, Form 9 (see C-2 above) bound as the first page. Binding materials are available in the University Bookstore.
2. A Potter Library (ME Departmental) Copy bound in a black 3-hole screw binder with a copy of the Thesis Acceptance Page, Form 9, bound as the first page.
3. An unbound Thesis Office Copy (for microfilming) with a copy of the Thesis Acceptance Page, Form 9.

After the final review, the Graduate Chairman will forward the thesis copies to the ET Graduate Office. Make sure to inform the ET Graduate Office of a phone number and e-mail address to be used by the Office to notify you when the thesis copies are ready for pick-up.

H. Upon notification, pick up the thesis copies from the ET Graduate Office. If no additional corrections are required and final approval is given, deposit the thesis copies as follows:

1. The ME Graduate Office will retain the ME Departmental Copy for deposit in Potter Library. (If the thesis has been classified as "confidential," submit an abstract to the ME Graduate Office.)
2. Make an appointment to deliver the Thesis Office Deposit Copy to:  
Thesis and Dissertation Deposit and Approval Office  
Young Grad House 170  
Telephone (765) 496-3157  
Office Hours: 8 a.m. – 5 p.m. (Mon.-Fri.)
3. All copies of theses classified as "confidential" are retained by the Thesis and Dissertation Deposit and Approval Office.
4. Submit the unbound copy to the Thesis Office in Young Grad House with the original thesis. The unbound copy will be sent to University Microfilms International for microfilming. The microfilming fee must be paid by money order by the posted deadline for degree candidates. Check ahead with the thesis office for fee amount.

J. Take the Thesis Receipt from the Thesis Office to the Graduate School in Young Graduate House, Room 170, by the posted deadline for degree candidates.

#### **14. PUBLICATION**

It is expected that Ph.D. thesis should lead to journal publication. The Major Professor will normally 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.

## **15. 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.