UNIVERSITY OF DELAWARE

DEPARTMENT OF MECHANICAL ENGINEERING

GRADUATE BROCHURE

2005-2006

GRADUATE PROGRAM

MECHANICAL ENGINEERING

UNIVERSITY OF DELAWARE

September 2005

GENERAL INFORMATION FOR GRADUATE STUDENTS

This brochure contains some basic information about the Mechanical Engineering graduate program. As a graduate student, you will be expected to be familiar with the requirements of your degree program. You, with the help of your faculty advisor, are responsible for determining a suitable course of study which will ensure that you meet all of the degree requirements.

GRADUATE PROGRAM

Mechanical Engineering

ADMISSION TO PROGRAM

Students are admitted into the graduate program for either a Master's or a doctoral, Ph.D., degree. For students with a bachelor's degree in engineering the following minimum criteria will normally be applied:

1. A baccalaureate degree in mechanical engineering or in a closely allied field of science or mathematics.
2. An undergraduate grade point average in engineering, science and mathematics courses of at least 3.0 on a 4.0 scale.
3. A minimum of at least three letters of strong support from former teachers or supervisors.
4. A minimum combined Quantitative and Verbal score of 1200 in the Graduate Record Examination Aptitude Test.
5. A minimum score of 600 in the Test of English as a Foreign Language for students whose first language is not English. This test is not required of students who have received an undergraduate or post-graduate degree from a College or University in which English is the sole language of instruction.

Admission is granted on a competitive basis; therefore, satisfaction of the above minimum standards does not guarantee admission. All admissions require approval of the Office of Graduate Studies.

For applicants with no prior training in engineering, the same minimum criteria will apply and, in addition, their records will be reviewed in relation to the intended program of study. Provisional status with specific remedial work required may be a basis for acceptance of such applicants.

The acceptance of applicants who have already received a Master's degree in engineering will be based on the above minimum criteria and the results of their graduate work.

ADVISEMENT

An initial academic advisor is assigned to new students when they are admitted to the Department. For students on Research Assistantships, the advisor directs their research and advises on course selection.

Otherwise, the advisor will be someone whose interests match yours insofar as possible, and will assist you in selecting courses to meet your educational objectives. As soon as you become familiar with the department, and clear about your research interests, you will select a permanent advisor.

MASTER of SCIENCE in MECHANICAL ENGINEERING (MSME)

The Master of Science in Mechanical Engineering (MSME) program consists of 24 credit hours of graduate level coursework distributed in four general categories, plus six credits of Master's Thesis. Coursework must be completed with a grade point average of 3.0 or higher. The requirements are designed both to provide a balanced program in Mechanical Engineering and to allow for a degree of specialization. Students should be able to complete all degree requirements, including the thesis, in 18 to 24 months of full-time study.

I. Course Requirements

A. The following five courses are required (15 credits):

- MEEG 610 Intermediate Solid Mechanics
- MEEG 620 Intermediate Dynamics
- MEEG 630 Intermediate Fluid Mechanics
- MEEG 640 Intermediate Heat Transfer
- MEEG 690 Intermediate Engineering Mathematics

Students may petition the Graduate Committee to substitute a more advanced (e.g., 800-level) course on the same topic for one of these required courses.

B. One additional graduate level course (3 credits) in mathematics or numerical methods. The student makes this selection with the documented approval of the Department's Graduate Committee which has the authority to decide on acceptable courses.

C. Two additional elective graduate level courses (6 credits) in engineering or mathematical, physical or biological sciences. The student makes these selections with the documented approval of the department's Graduate Committee which has the authority to decide on acceptable courses.

D.6 credits of MEEG 869 Master's Thesis.

II. Thesis Requirements

A thesis is required which demonstrates the student's ability to conduct scholarly research. Entering graduate students are expected to choose a thesis advisor and research topic during their first semester in the Department so that they can initiate research and choose appropriate elective courses.
At the completion of the thesis research, candidates for the MSME degree must defend their thesis orally to a committee of at least three faculty members. The committee will be chaired by the thesis advisor who, along with at least one other committee member, must be regular full-time faculty in the Department of Mechanical Engineering. The thesis is to be submitted to committee members at least two weeks in advance of the defense and shall meet the academic

and professional standards set forth by the University. Upon acceptance of the thesis, the Committee recommends approval to the Department Chairperson.

MASTER OF ENGINEERING: MECHANICAL (MEM)

The Master of Engineering: Mechanical (MEM) program consists of 30 credit hours of graduate level coursework. Coursework must be completed with a grade point average of 3.0 or higher. The requirements are designed to provide a general program and to allow for some concentration of study within Mechanical Engineering. It will be possible to complete this program taking courses in the late afternoon, early evening, and/or in a distance format for part-time students. Engineering Outreach can help facilitate part-time graduate education.

Course Requirements

A. The following five courses are required (15 credits):

- MEEG 610 Intermediate Solid Mechanics
- MEEG 620 Intermediate Dynamics
- MEEG 630 Intermediate Fluid Mechanics
- MEEG 640 Intermediate Heat Transfer
- MEEG 690 Intermediate Engineering Mathematics

Students may petition the Graduate Committee to substitute a more advanced (e.g., 800-level) course on the same topic for one of these required courses.

B. One additional graduate level course (3 credits) in mathematics or numerical methods. The student makes this selection with the documented approval of the Department's Graduate Committee which has the authority to decide on acceptable courses.

C. One additional graduate level course (3 credits) in Mechanical Engineering. Three credits of MEEG 868 Research can be used toward this requirement. The student makes this selection with the documented approval of the department's Graduate Committee which has the authority to decide on acceptable courses.

D. Three additional graduate level courses (9 credits) in engineering, mathematical, physical or biological sciences or business and economics. The student makes these selections with the documented approval of the department's Graduate Committee which has the authority to decide on acceptable courses.

PH.D. in MECHANICAL ENGINEERING

The Ph.D. program in Mechanical Engineering consists of 27 credit hours (for a post M.S. student) or 33 credits (for a post B.S. student) of graduate level course work plus nine credits of Doctoral Dissertation. The program is designed to allow considerable flexibility in course selection and specialization of study. Course work must be completed with a cumulative grade point average of 3.0 or higher (see page 213 of the Graduate Catalog for relevant details). In addition, the student must pass a Qualifying Examination and a Candidacy Examination prior to completing the dissertation requirements. The Ph.D. should be obtainable in four years of full-time study after beginning graduate studies at the University. There is no foreign language or teaching requirement for the Ph.D.

I. Course Requirements

A. At least four courses (12 credits) at the 600 or higher level in Mechanical Engineering.
B. At least three courses (9 credits) at the 800 level.
C. At least one course (3 credits) in mathematics (other than MEEG690.
D. 9 credits of MEEG 969 Doctoral Dissertation.

An individual course can be used to meet more than one of the requirements A, B or C provided the total number of credits is at least 27 (post M.S.) or 33 (post B.S.). MEEG868, and any course counted toward a Master's degree (for a post M.S. student) cannot be used toward these requirements. The Ph.D. qualifying exam is based on the materials in the courses MEEG 610, 620, 630, 640, and 690. As stated in Section III, students will write tests in three of the five subject areas corresponding to these five courses. The three corresponding MEEG6x0 courses cannot be counted towards the course requirements.

Students will submit a proposed course plan to the Dissertation Committee at the time of their candidacy exam. Upon approval, it will enter into the candidate's file. Deviations from the proposed plan must be approved by the Dissertation Committee. A copy of the course plan must be sent to the University Office of Graduate Studies.

II. Dissertation Requirements

A dissertation is required which demonstrates the student's ability to conduct independent research. A Dissertation Committee is selected by the advisor and approved by the Department Chairperson. This committee will also serve as the student's Candidacy Examination Committee. At least three Mechanical Engineering Department faculty members and at least one faculty member from another department will serve on the Dissertation Committee. The Committee will be chaired by the research advisor, who must be a regular full-time member of the Department of Mechanical Engineering faculty. During the course of the research, the student will periodically review progress with the Committee.

The student must orally present the dissertation before the Dissertation Committee at an open defense. The student shall supply final draft copies of the dissertation to members of

the Committee at least two weeks before the oral defense. The dissertation must meet the academic and professional standards set forth by the University.

III. Qualifying Examination

The purpose of the Ph.D. qualifying exam is to assess the aptitude of a doctoral student in the early stages of the program. Accordingly, upon the completion of one year of study toward the doctoral degree, doctoral students must pass the next available Qualifying Examination. The exam will be offered in early June and the student has one opportunity to take and pass this exam. A student who fails the Qualifying Examination is not eligible to continue in the Ph.D. program, but may apply to change his/her matriculation to the Master's program. This examination consists of separate written tests in three areas (each of three hours duration): Mathematics is a mandatory area; students may pick any two out of the remaining four areas of dynamics, fluid mechanics, heat transfer and solid mechanics. The qualifying examinations will be based on the corresponding course material in MEEG 610, 620, 630, 640, and 690 and is intended to test the student for a broad base of knowledge in the fundamental areas of Mechanical Engineering. Therefore, a student with a Master's degree in Mechanical Engineering should not need to take MEEG 610, 620, 630, 640, and 690 to prepare for the exam.

IV. Candidacy Examination

The Ph.D. Candidacy Examination must be taken within one and a half years of successful completion of the Qualifying Examination and at least one year prior to the dissertation defense. The student will prepare a comprehensive, written research proposal and defend it orally before the Candidacy Examination Committee (the composition of which is specified in II). The Candidacy Examination is intended to test the student's ability to synthesize knowledge in the formulation of an independent research proposal. Performance is judged by the Candidacy Examination Committee, and any additional requirements they wish to impose must be satisfied before the student is admitted to candidacy. Additional requirements could include, but are not limited to: taking additional course work, modifying the written research proposal, and defending the revised proposal before the Candidacy Examination Committee. Satisfactory completion of any additional requirements must be approved by the student's Candidacy Examination Committee.

NOTE: Students already enrolled in the Ph.D. program can choose to switch to the new guidelines, or continue under the current guidelines.

Mechanical Engineering
Ph.D. Qualifying Examination for 2006

Examination Schedule

Part	Exam	Time	Date
#1	Mathematics	9:00 -12:00	Monday, June 12, 2006
#2	Solid Mechanics	9:00 -12:00	Tuesday, June 13, 2006
#3	Fluid Mechanics	9:00 -12:00	Wednesday, June 14, 2006
#4	Dynamics	9:00 -12:00	Thursday, June 15, 2006
#5	Heat Transfer	9:00 -12:00	Friday, June 16, 2006

These sections of the exam are closed-book and are based on material in MEEG 610, 620, 630, 640, and 690.

To take the exam, students must complete the form below and return it to Donna Fritz by April 15, 2006.

Ph.D. Qualifying Examination Application

I wish to take the Ph.D. Qualifying Examination in June 12 - June 16, 2006.

Choose two subject areas:

Name _____ Solid Mechanics _____

Signature _____ Fluid Mechanics _____

Advisor (print name)* _____ Dynamics _____

Advisor Signature* _____ Heat Transfer _____

*In the event no advisor has been chosen, the form must be signed by the Chairman of the Graduate Program (Dr. Andras Z. Szeri).