Twin Cities Campus

Mechanical Engineering Ph.D.

Mechanical Engineering

College of Science and Engineering

Link to a list of faculty for this program.

Contact Information:
Mechanical Engineering and Industrial Engineering Graduate Programs, University of Minnesota, 1120 Mechanical Engineering, 111 Church Street S.E., Minneapolis, MN 55455 (612-625-2009; fax: 612-624-2010)
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- Program Type: Doctorate
- Requirements for this program are current for Spring 2018
- Length of program in credits: 62
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the General Information section of the catalog website for requirements that apply to all major fields.

Coursework and research for all graduate degrees are offered in bioengineering; biomechanics; combustion; computer-aided design; computer-aided manufacturing; computer graphics; control systems; design; energy conservation; environmental control; environmental engineering; fluid mechanics; heat and mass transfer; history of science and technology; human factors engineering; industrial engineering; innovative methodologies; integration of structural and environmental systems; lubrication; manufacturing engineering; particle technology; plasma chemistry; plasma heat transfer; power, propulsion, and applied thermodynamics; socioeconomic systems; solar energy; solar processing and thermochemistry; statistics; structures; systems dynamics; technology assessment; thermal energy storage; thermal environmental engineering; thermodynamics; transportation; tribology; vibration; and interdisciplinary finite element methodology. Additional instructional and research programs can be formulated.

Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

A four-year B.S. degree in engineering, science, or mathematics.

Special Application Requirements:
Applications are accepted for fall semester only. The application deadline is December 15. Additional information is available at http://www.me.umn.edu/education/graduate/prospective/admissions.shtml

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5

Key to test abbreviations(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements

18 credits are required in the major.
20 credits are required outside the major.
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

The Ph.D. requires a minimum of 38 course credits, consisting of 18 credits in the major and 20 additional graduate level credits. Courses must be taken on an A/F basis, with the exception of seminars and the ethics course. A minimum of 12 course credits at the 8000-level are required (seminars and ethics courses may not be included). Students must complete 2-3 graduate seminar credits, and one research and professional ethics course. 24 thesis credits are also required.

Major Course Credits

Take 18 credits in any 5xxx or 8xxx level mechanical engineering courses. Independent research courses do not count toward the credit requirement. The following courses also meet the requirement for ME graduate course credits.

AEM 5401 - Intermediate Dynamics (3.0 cr)
AEM 5501 - Continuum Mechanics (3.0 cr)
AEM 8201 - Fluid Mechanics I (3.0 cr)
AEM 8202 - Fluid Mechanics II (3.0 cr)
EE 5231 - Linear Systems and Control (3.0 cr)
EE 8215 - Nonlinear Systems (3.0 cr)

Ethics Course

Take one research and professional ethics course. The following may be used or consult with advisor for further options.

ME 8001 - Research Ethics and Professional Practice (0.0 cr)

Seminar

Take 2-3 seminar credits. The following may be used or consult with advisor for further options

ME 8773 - Graduate Seminar (1.0 cr)
ME 8774 - Graduate Seminar (1.0 cr)

Supporting Program

The remaining course credits may be taken in the major or in any supporting field with significant scientific or engineering content, and may include 12 credits in a minor.

Thesis Credits

Take 24 thesis credits after passing the preliminary oral exam

ME 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)

Use of 4xxx-level Courses

No more than six 4xxx-level course credits may be used for graduate-level credit. Only the following courses are acceptable.

AEM 4511 - Mechanics of Composite Materials (3.0 cr)
AEM 4581 - Mechanics of Solids (3.0 cr)
CHEM 4502 - Introduction to Quantum Mechanics and Spectroscopy (3.0 cr)
EE 4541 - Digital Signal Processing (3.0 cr)
MATH 4512 - Differential Equations with Applications (3.0 cr)
PHYS 4051 - Methods of Experimental Physics I (5.0 cr)
PHYS 4101 - Quantum Mechanics (4.0 cr)
PHYS 4201 - Statistical and Thermal Physics (3.0 cr)
PHYS 4211 - Introduction to Solid-State Physics (3.0 cr)