MECHANICAL ENGINEERING, PH.D.

The department offers a master of science (M.S.) and doctor of philosophy (Ph.D.) in mechanical engineering. The graduate programs are designed to train outstanding students for advanced work in industry and research and development through a combination of coursework and hands on research. Online programs in the department include an M.S. with named option in controls and a master of engineering (M.Eng.) with named option in polymer science.

The Department of Mechanical Engineering has a long history of excellence in graduate education. The department is consistently ranked in the top 20 in the United States for graduate programs in mechanical engineering. The department offers research opportunities in a large number of established and emerging research specializations. Broad research themes within the department include: biomechanics, computational engineering, energy, manufacturing, and mechanics and controls. Excellent research facilities are available for specialized research within these broad areas for studies in: biomechanics, combustion, computational design, controls, cryogenics, dynamics and vibrations, fluid dynamics, fluid power, geometric modeling and prototyping, heat and mass transfer, internal combustion engines, laser diagnostics, manufacturing processes, mechanics, mechatronics, polymer and composites processing, powertrain control, robotics, solar energy, and more.

A list of mechanical engineering faculty and their respective areas of specialization is available on the department’s website (http://directory.engr.wisc.edu/me/faculty).


ONLINE PROGRAMS

The mechanical engineering M.Eng. named option: polymer science is a fully online degree that includes an interdisciplinary curriculum of courses incorporating the latest research and practices in plastics and polymer manufacturing. It is designed to prepare engineers for professional practice in the polymer industry. Please visit the Department of Engineering Professional Development’s website (https://epd.wisc.edu/online-degree/master-of-engineering-polymer-science) for complete information about the online polymer science program.

The mechanical engineering M.S. named option: controls is a primarily online degree that includes a full curriculum of courses incorporating the latest research and practices in drive, converter control, and sensor integration. This program consists of 27 online credits and 3 credits taken on campus through a summer laboratory course. The program includes courses in both mechanical engineering and electrical engineering and is designed for practicing engineers. Please visit the Department of Engineering Professional Development’s website (http://epd.wisc.edu/online-degree/mechanical-engineering-controls) for complete information about the online controls program.

FUNDING

Prospective students should see the program website for funding information.

REQUIREMENTS

MINIMUM DEGREE REQUIREMENTS AND SATISFACTORY PROGRESS

To make progress toward a graduate degree, students must meet the Graduate School Minimum Degree Requirements and Satisfactory Progress (http://guide.wisc.edu/graduate/#policiesandrequirementstext) in addition to the requirements of the program.

DOCTORAL DEGREES

Ph.D.

MINIMUM GRADUATE CREDIT REQUIREMENT:

60 credits

MINIMUM GRADUATE RESIDENCE CREDIT REQUIREMENT

32 credits

MINIMUM GRADUATE COURSEWORK (50%) REQUIREMENT

Half of degree coursework (31 credits out of 62 total credits) must be in graduate-level coursework; courses with the Graduate Level Coursework attribute are identified and searchable in the university’s Course Guide (http://my.wisc.edu/CourseGuideRedirect/BrowseByTitle).

PRIOR COURSEWORK REQUIREMENTS: GRADUATE WORK FROM OTHER INSTITUTIONS

With program approval, students are allowed to count graduate coursework from other institutions toward the minimum graduate degree credit requirement and the minimum graduate course work (50%) requirement. No credits from other institutions can be counted toward the minimum graduate residence credit requirement. Coursework earned ten years or more prior to admission to a doctoral degree is not allowed to satisfy requirements.

PRIOR COURSEWORK REQUIREMENTS: UW–MADISON UNDERGRADUATE

Up to 7 credits numbered 300 or above can be counted toward the minimum graduate degree credit requirement. These credits may be counted toward the minimum graduate coursework (50%) requirement if they are in courses numbered 700 or above. No credits can be counted toward the minimum graduate residence credit requirement. Coursework earned ten years or more prior to admission to a doctoral degree is not allowed to satisfy requirements.

PRIOR COURSEWORK REQUIREMENTS: UW–MADISON UNIVERSITY SPECIAL

With program approval, students are allowed to count up to 15 credits of coursework numbered 300 or above taken as a UW–Madison Special student toward the minimum graduate residence credit requirement and the minimum graduate degree credit requirement. These credits may be
counted toward the minimum graduate coursework (50%) requirement if they are in courses numbered 700 or above. Coursework earned ten years or more prior to admission to a doctoral degree is not allowed to satisfy requirements.

CREDITS PER TERM ALLOWED
Ph.D.: 15 credits

Ph.D. dissertator status: 3 credits of M E 990 Dissertator Research and Thesis

PROGRAM-SPECIFIC COURSES REQUIRED
Two semesters of M E 903 Graduate Seminar are required. These should be taken the first two semester the student is in residence. If an M.S. degree is received at UW-Madison, additional M E 903 credits are not required.

At least 18 credits of thesis (M E 790 Master’s Research and Thesis, M E 890 PhD Research and Thesis, M E 990 Dissertator Research and Thesis) are required with an overall grade of S.

DOCTORAL MINOR/BREADTH REQUIREMENTS
Minor required.

Minor Option A: Requirements for external minor are defined by the department of that minor. Selection of this option requires the approval of the minor department.

Minor Option B (distributed) requires a minimum of 12 formal course credits of graduate-level courses. The coursework should form a coherent group of courses for which the graduate credit is allowed. The approval of the advisor and the graduate committee are required.

OVERALL GRADUATE GPA REQUIREMENT
3.25 GPA required.

OTHER GRADE REQUIREMENTS
Students must earn a C or above in all formal coursework. PhD candidates may not have any more than two Incompletes on their record at any one time.

PROBATION POLICY
The status of a student can be one of three options:

1. Good standing (progressing according to standards; any funding guarantee remains in place).
2. Probation (not progressing according to standards but permitted to enroll; loss of funding guarantee; specific plan with dates and deadlines in place in regard to removal of probationary status).
3. Unsatisfactory progress (not progressing according to standards; not permitted to enroll, dismissal from program, leave of absence or change of advisor or program).

A semester GPA below 3.0 will result in the student being placed on academic probation. If a semester GPA of 3.0 is not attained during the subsequent semester of full time enrollment (or 12 credits of enrollment if enrolled part-time), this will be deemed unsatisfactory progress and the student may be dismissed from the program or allowed to continue for one additional semester based on advisor appeal to the Graduate School.

ADVISOR / COMMITTEE
All students must have a mechanical engineering faculty advisor who assists them in planning a course sequence that meets degree requirements and who will discuss career objectives with the student. A preliminary committee must include student’s mechanical engineering faculty advisor and at least three other faculty members. A final oral defense committee must include student’s mechanical engineering faculty advisor and at least four other faculty members, one of whom must be from outside of the mechanical engineering department.

ASSESSMENTS AND EXAMINATIONS
All Ph.D. applicants must take the Ph.D. qualifying exam no later than the second semester after completing their master degree. The Ph.D. candidate will need to pass a qualifying exam, preliminary exam, and a final defense in order to obtain a degree.

TIME CONSTRAINTS
Ph.D. students must complete their preliminary exam within five years of passing their qualifying exam.

The preliminary must be passed at least 9 months prior to the thesis defense.

A candidate for a doctoral degree who fails to take the final oral examination and deposit the dissertation within five years after passing the preliminary examination may be required to take another preliminary examination to be admitted to candidacy a second time.

LANGUAGE REQUIREMENTS
No language requirements.

ADMISSIONS
Students with a strong background in mechanical engineering or a related field with interest in furthering their education in mechanical engineering are encouraged to apply for admission to the department. Applicants accepted into the program generally have an undergraduate grade point average well above the graduate school minimum of 3.0 on a 4.0 scale. All applicants are required to take the Graduate Record Exam (GRE). Applications are evaluated on the basis of previous academic record, GRE scores, letters of recommendation, and a personal statement. For more information on admission requirements see the department website (https://www.engr.wisc.edu/department/mechanical-engineering/academics/phd-in-mechanical-engineering).

LEARNING OUTCOMES

KNOWLEDGE AND SKILLS
- demonstrate an ability to synthesize knowledge from a subset of the biological, physical, and social sciences to help frame problems critical to the future of their discipline.
- conduct original research.
- demonstrate an ability to create new knowledge and communicate it to their peers.

PROFESSIONAL CONDUCT
- fosters ethical and professional conduct.
Faculty: Professors Engelstad, Ghandhi (chair), Lorenz, Moskwa, Nellis, Osswald, Pfrome, Rowland, Rutland, Sanders, Shapiro, Thelen, Turng; Associate Professors Krupenkin, Negrut, Pfefferkorn, Ploeg, Qian, Rothamer, Shedd, Suresh, Trujillo, Zinn; Assistant Professors Adamczyk, Eriten, Henak, Kokjohn, Miller, Min, Roldan-Alzo, Rudolph; Faculty affiliates Allen, Bonazza, Clemons, Corradini, Holloway, Kammer, Luzzio, Reindl, Scarlat, Schauer, Smith