

ENGINEERING MECHANICS, PH.D.

The master of science and doctor of philosophy degrees in engineering mechanics are offered within a graduate program covering contemporary areas in both theoretical and applied mechanics. With the guidance of a major professor, a program can be designed to meet an individual student's needs and interests.

The program is broadly structured into several main areas of instruction and research interests in mechanics of materials and astronautics: continuum mechanics, computational mechanics, dynamics and vibration, fluid mechanics, nanomechanics, solid mechanics, and biomechanics. Related fields in which minor work may be done include civil and environmental engineering, chemical and biological engineering, electrical and computer engineering, materials science, mechanical engineering, nuclear engineering and engineering physics, physics, geological engineering and geology, mathematics, statistics, and computer science.

Current faculty research interests include adhesive-bonded joints; composites; failure criteria; analytical and computational solid mechanics; analytical and computational dynamics; multibody dynamics; analytical and computational active and passive space-structure control systems; dynamic stability; nonlinear fracture mechanics of traditional and advanced materials; continuum mechanics; modal analysis; nanomechanics and nanotribology; fluid-structure interaction; non-Newtonian fluid flow; structural mechanics; viscoelasticity; viscoplasticity; cell mechanics; and biomechanics.

Laboratories are well equipped for experimental testing and research; these include holography, Moire, atomic force microscopy, vibration testing, and other optical methods for experimental mechanics research. The department has access to collegewide facilities. The Wisconsin Laboratory for Structures and Materials Testing has facilities for testing large structures, fatigue and vibration labs, and complements the department's laboratories. The Materials Science Center provides state-of-the-art instrumentation, support facilities, and expert technical assistance for research and education in materials. Its facilities include scanning and transmission electron microscopes, image processing and analysis systems, surface and thin film characterization facilities, and x-ray diffraction facilities.

ADMISSIONS

Please consult the table below for key information about this degree program's admissions requirements. The program may have more detailed admissions requirements, which can be found below the table or on the program's website.

Graduate admissions is a two-step process between academic programs and the Graduate School. **Applicants must meet** the minimum requirements (<https://grad.wisc.edu/apply/requirements/>) **of the Graduate School as well as the program(s)**. Once you have researched the graduate program(s) you are interested in, apply online (<https://grad.wisc.edu/apply/>).

| Requirements | Detail |
|-----------------|-------------|
| Fall Deadline | December 15 |
| Spring Deadline | September 1 |

| | |
|------------------------------------|--|
| Summer Deadline | December 15 |
| GRE (Graduate Record Examinations) | Not Required. |
| English Proficiency Test | Every applicant whose native language is not English or whose undergraduate instruction was not in English must provide an English proficiency test score and meet the Graduate School minimum requirements (https://grad.wisc.edu/apply/requirements/#english-proficiency). |
| Other Test(s) (e.g., GMAT, MCAT) | n/a |
| Letters of Recommendation Required | 3 |

APPLICATION REQUIREMENTS and PROCESS

Degree: For admission to graduate study in Engineering Mechanics, an applicant must have a bachelor's degree in engineering, mathematics, or physical science, and an undergraduate record that indicates an ability to successfully pursue graduate study. International applicants must have a degree comparable to a regionally accredited U.S. bachelor's degree.

It is highly recommended that students take courses that cover the same material as these UW-Madison courses before entering the program:

| <i>Course and Semester Credits</i> | <i>Typical Courses</i> |
|--|------------------------------------|
| Advanced Mathematics, 3 cr MATH 321 | MATH 319, MATH 320, or MATH 321 |
| Linear Algebra and Matrices, 3 cr | MATH 320 or MATH 340 |
| Mechanics of Materials, 3 cr | E M A 303 |
| Dynamics, 3 cr | E M A 202 or PHYSICS 311 |

Descriptions of course content can be accessed through The Guide (<https://guide.wisc.edu/courses/>). Students may enter without having taken these courses. However, in such cases the students must inform their advisors, who will help them plan courses of study that will provide adequate background for our department's graduate curriculum. Provisions for admission on probation, or as an applicant for more than one master's degree (e.g., simultaneous MS degrees in two departments) are given in the Graduate School website (<http://grad.wisc.edu/>).

All applicants must satisfy requirements that are set forth by the Graduate School (<https://grad.wisc.edu/apply/requirements/>).

GPA: The Graduate School requires a minimum undergraduate grade point average of 3.0 on a 4.0 basis on the equivalent of the last 60 semester hours from the most recent bachelor's degree. In special cases, students with grade point averages lower than 3.0 who meet all the general requirements of the Graduate School may be considered for admission on probation.

PhD advisor selection process: PhD applicants are encouraged to identify potential faculty advisors and seek a confirmation. Please review the department Research (<https://engineering.wisc.edu/departments/mechanical-engineering/research/>) and People (<https://directory.engr.wisc.edu/me/faculty/>) websites and contact those whose research interests align with yours. Only faculty members listed with

the titles of Assistant Professor, Associate Professor, or Professor, can serve as graduate advisors. Do not contact Emeritus faculty, Lecturers, Research Scientists, or Faculty Associates. You are also encouraged to inquire about possible funding opportunities. If a faculty member agrees to be your advisor, ask the person to email an acknowledgment to emgradadmission@engr.wisc.edu.

Each application must include the following:

- Graduate School Application (<https://grad.wisc.edu/apply/>)
- Academic transcripts
- Statement of purpose
- Resume/CV
- Three letters of recommendation
- English Proficiency Score (*if required*)
- Application Fee

DEADLINES

To apply to the EM program, complete applications (<https://grad.wisc.edu/apply/>), including supportive materials, must be submitted as described below and received by the following deadline dates:

- Fall Semester—December 15
- Spring Semester—September 1
- Summer Session—December 15

ACADEMIC TRANSCRIPT

Within the online application, upload the undergraduate transcript(s) and, if applicable, the previous graduate transcript. Unofficial copies of transcripts will be accepted for review, but official copies are required for admitted students. Please do not send transcripts or any other application materials to the Graduate School or the Department of Mechanical Engineering unless requested. Please review the requirements

STATEMENT OF PURPOSE

In this document, applicants should explain why they want to pursue further education in Engineering Mechanics and discuss which UW faculty members they would be interested in doing research with during their graduate study (see the Graduate School for more advice on how to structure a personal statement (<https://grad.wisc.edu/apply/prepare/>)).

RESUME

Upload your resume in your application.

THREE LETTERS OF RECOMMENDATION

These letters are required from people who can accurately judge the applicant's academic and/or research performance. It is highly recommended these letters be from faculty familiar with the applicant. Letters of recommendation are submitted electronically to graduate programs through the online application. See the Graduate School for FAQs (<https://grad.wisc.edu/apply/>) regarding letters of recommendation. Letters of recommendation are due by the deadline listed above.

ENGLISH PROFICIENCY SCORE

Every applicant whose native language is not English, or whose undergraduate instruction was not in English, must provide an English proficiency test score. The UW-Madison Graduate School accepts TOEFL or IELTS scores. Your score will not be accepted if it is more than two years

old from the start of your admission term. Country of citizenship does not exempt applicants from this requirement. Language of instruction at the college or university level and how recent the language instruction was taken are the determining factors in meeting this requirement.

For more information regarding minimum score requirements and exemption policy, please see the Graduate School Requirements for Admission (<https://grad.wisc.edu/apply/requirements/>).

APPLICATION FEE

Application submission must be accompanied by the one-time application fee. It is non-refundable and can be paid by credit card (MasterCard or Visa) or debit/ATM. Additional information about the application fee may be found here (<https://grad.wisc.edu/apply/>) (scroll to the 'Frequently asked questions').

Fee grants are available through the conditions outlined here by the Graduate School (<https://grad.wisc.edu/apply/fee-grant/>).

QUESTIONS:

If you have questions, please contact emgradadmission@engr.wisc.edu.

REENTRY ADMISSIONS

If you were previously enrolled as a graduate student in the Engineering Mechanics program, have not earned your degree, but have had a break in enrollment for a minimum of a fall or spring term, you will need to re-apply to resume your studies. Please review the Graduate School requirements for previously enrolled students (<https://policy.wisc.edu/library/UW-1230/>). Your previous faculty advisor (or another EM faculty advisor) must be willing to supply advising support and should e-mail the EM Graduate Student Services Coordinator regarding next steps in the process.

If you were previously enrolled in a UW-Madison graduate degree, completed that degree, have had a break in enrollment since earning the degree and would now like to apply for another UW-Madison program; you are required to submit a new student application through the UW-Madison Graduate School online application. For EM graduate programs, you must follow the entire application process as described above.

CURRENTLY ENROLLED GRADUATE STUDENT ADMISSIONS

Students currently enrolled as a graduate student at UW-Madison, whether in EM or a non-EM graduate program, wishing to apply to this degree program should contact the EM Graduate Admissions Team (emgradadmission@engr.wisc.edu) to inquire about the process and deadlines several months in advance of the anticipated enrollment term. Current students may apply to change or add programs for any term (fall, spring, or summer).

QUESTIONS:

If you have questions, please contact emgradadmission@engr.wisc.edu.

FUNDING

GRADUATE SCHOOL RESOURCES

Resources to help you afford graduate study might include assistantships, fellowships, traineeships, and financial aid. Further funding information

(<https://grad.wisc.edu/funding/>) is available from the Graduate School. Be sure to check with your program for individual policies and restrictions related to funding.

PROGRAM RESOURCES

There are three mechanisms for Graduate Student funding through the university for Engineering Mechanics Ph.D. students:

1. Fellowships
2. Graduate assistantships: project assistantships, teaching assistantships, and research assistantships
3. Traineeships

Funding is awarded based on the qualifications of the student, the number of applicants, the amount of available funding, the number of continuing students receiving support, and the degree program a student is enrolled in. You can apply for funding for research assistantships by contacting individual faculty members directly. Please check our website (<http://directory.engr.wisc.edu/me/faculty/>) to look for faculty (only those listed with titles of assistant professor, associate professor, or professor can serve as graduate student advisors). Search for faculty who have research interests that align closely with your own by viewing faculty directory entries, visiting the faculty's website (linked from the directory page), and reviewing publications by the faculty member. Once you have identified faculty with interests close to your own, you are encouraged to contact them by email to inquire regarding available research assistant positions. The admissions office does not know if a particular professor has research assistant positions available.

Students who apply to the Ph.D. program will be automatically considered for fellowship opportunities within the department. Admitted students will be eligible to apply for Teaching Assistantship positions. More information, including the application, will be available to students after admission is complete.

More information on graduate student funding is available from the UW-Madison Graduate School (<https://grad.wisc.edu/funding/>).

ADDITIONAL RESOURCES

FEDERAL LOANS

Students who are U.S. citizens or permanent residents may be eligible to receive some level of funding through the federal direct loan program. These loans are available to qualified graduate students who are taking at least 4 credits during the fall and spring semesters, and 2 credits during summer. Private loans are also available. Learn more about financial aid at their website (<https://financialaid.wisc.edu/>).

INTERNATIONAL STUDENT SERVICES FUNDING AND SCHOLARSHIPS

For information on International Student Funding and Scholarships visit the ISS website (<https://iss.wisc.edu/students/new-students/funding-scholarships/>).

REQUIREMENTS

MINIMUM GRADUATE SCHOOL REQUIREMENTS

Review the Graduate School minimum academic progress and degree requirements (<http://guide.wisc.edu/graduate/>

#policiesandrequirements.txt), in addition to the program requirements listed below.

MAJOR REQUIREMENTS

MODE OF INSTRUCTION

| Face to Face | Evening/ Weekend | Online | Hybrid | Accelerated |
|--------------|---------------------|--------|--------|-------------|
| Yes | No | No | No | No |

Mode of Instruction Definitions

Accelerated: Accelerated programs are offered at a fast pace that condenses the time to completion. Students typically take enough credits aimed at completing the program in a year or two.

Evening/Weekend: Courses meet on the UW-Madison campus only in evenings and/or on weekends to accommodate typical business schedules. Students have the advantages of face-to-face courses with the flexibility to keep work and other life commitments.

Face-to-Face: Courses typically meet during weekdays on the UW-Madison Campus.

Hybrid: These programs combine face-to-face and online learning formats. Contact the program for more specific information.

Online: These programs are offered 100% online. Some programs may require an on-campus orientation or residency experience, but the courses will be facilitated in an online format.

CURRICULAR REQUIREMENTS

Requirement Detail

Minimum
Credit
Requirement

Minimum
Residence
Credit
Requirement

Minimum
Graduate
Coursework
Requirement

30 credits must be graduate-level coursework. Details can be found in the Graduate School's Minimum Graduate Coursework (50%) policy (<https://policy.wisc.edu/library/UW-1244>) (<https://policy.wisc.edu/library/UW-1244/>). In addition, at least 18 of the non-research credits must be in classes having the graduate-level designation.

Overall
Graduate
GPA
Requirement

3.00 GPA required.
This program follows the Graduate School's policy: <https://policy.wisc.edu/library/UW-1203> (<https://policy.wisc.edu/library/UW-1203/>).

Other Grade
Requirements

Courses in which grades of BC, C, or below are received cannot be counted toward the degree except as follows: 1) Credits of C will be allowed provided they are balanced by twice as many credits of A or by four times as many credits of AB, 2) Credits of BC will be allowed provided they are balanced by twice as many credits of AB or by an equal number of credits of A.

| | |
|-------------------------------------|--|
| Assessments and Examinations | Ph.D. qualifying examination is required of all students. After acceptance of the student's doctoral plan of study, the student must take an oral preliminary examination. Final oral examination is required at the end of the thesis work. |
| Language Requirements | No language requirements. |
| Graduate School Breadth Requirement | All doctoral students are required to complete a doctoral minor or graduate/professional certificate as approved by their advisor. Students should select one of the following options: • Option A (External Minor): Fulfillment of this minor requires approval of the doctoral minor program. This minor must be outside of the student's doctoral major program. • Option B (Distributed Minor): Fulfillment of this minor requires 9 course credits. The coursework should form a coherent group of courses for which graduate credit is allowed. The approval of the faculty advisor and ME Graduate Committee is required. • Option C (Graduate/Professional Certificate): Fulfillment of this option requires successful completion of a Graduate/Professional certificate in a program outside of the student's doctoral major program. |

REQUIRED COURSES

At least 36 of the required 60 credits must be in classes satisfying the following general requirements and mathematics, breadth and depth requirements.

| Code | Title | Credits |
|---|--|----------|
| General | | |
| All courses must be numbered 500 or above. At least 21 credits must be numbered 600 and above OR from the following list: | | 21 |
| E M A/CIV ENGR/ M E 508 | Composite Materials | |
| E M A 519 | Fracture Mechanics | |
| E M A 522 | Aerodynamics Lab | |
| E M A 523 | Flight Dynamics and Control | |
| E M A/M E 540 | Experimental Vibration and Dynamic System Analysis | |
| E M A/ M S & E 541 | Heterogeneous and Multiphase Materials | |
| E M A/E P 547 | Engineering Analysis I | |
| E M A/E P 548 | Engineering Analysis II | |
| E M A/M E 570 | Experimental Mechanics | |
| Mathematics Requirements | | 6 |
| At least 6 credits (2 courses) must be in applied mathematics from the following list: | | |
| E M A/E P 547 | Engineering Analysis I | |
| E M A/E P 548 | Engineering Analysis II | |
| MATH 519 | Ordinary Differential Equations | |
| MATH 521 | Analysis I | |
| MATH 522 | Analysis II | |
| MATH 540 | Linear Algebra II | |

| | |
|--------------------|--|
| MATH 619 | Analysis of Partial Differential Equations |
| MATH 623 | Complex Analysis |
| MATH 703 | Methods of Applied Mathematics I |
| MATH 704 | Methods of Applied Mathematics-2 |
| MATH/ COMP SCI 714 | Methods of Computational Mathematics I |
| MATH/ COMP SCI 715 | Methods of Computational Mathematics II |

Breadth Requirement

As part of their M.S. or Ph.D., students must have taken courses from at least 2 of the 3 areas defined below. For each of the 2 areas, the student must have taken at least 2 courses. The courses must be at a similar level to those listed below.

| <i>Solid Mechanics</i> | | |
|-------------------------|---|---|
| E M A 506 | Advanced Mechanics of Materials I | 3 |
| E M A/CIV ENGR/ M E 508 | Composite Materials | 3 |
| M E/B M E 516 | Finite Elements for Biological and Other Soft Materials | 3 |
| E M A 519 | Fracture Mechanics | 3 |
| E M A/M S & E 541 | Heterogeneous and Multiphase Materials | 3 |
| E M A/M E 570 | Experimental Mechanics | 3 |
| E M A 605 | Introduction to Finite Elements | 3 |
| E M A 611 | Advanced Mechanical Testing of Materials | 3 |
| E M A/E P 615 | Micro- and Nanoscale Mechanics | 3 |
| E M A 622 | Mechanics of Continua | 3 |
| E M A 630 | Viscoelastic Solids | 3 |
| E M A 700 | Theory of Elasticity | 3 |
| E M A/M E 703 | Plasticity Theory and Physics | 3 |
| E M A 705 | Advanced Topics in Finite Elements | 3 |
| E M A/M E 706 | Plates, Shells and Pressure Vessels | 3 |
| E M A/M E 708 | Advanced Composite Materials | 3 |
| E M A/M E 722 | Introduction to Polymer Rheology | 3 |
| M E 753 | Friction, Lubrication and Wear | 3 |
| <i>Fluid Mechanics</i> | | |
| E M A 521 | Aerodynamics | 3 |
| E M A 622 | Mechanics of Continua | 3 |
| M E 563 | Intermediate Fluid Dynamics | 3 |
| M E 572 | Intermediate Gas Dynamics | 3 |
| M E 573 | Computational Fluid Dynamics | 3 |
| M E 769 | Combustion Processes | 3 |
| M E 770 | Advanced Experimental Instrumentation | 3 |
| M E 774 | Chem Kinetics of Combust Systems | 3 |
| M E/CIV ENGR/ E M A 775 | Turbulent Heat and Momentum Transfer | 3 |
| MATH 705 | Mathematical Fluid Dynamics | 3 |
| <i>Dynamics</i> | | |
| E M A 523 | Flight Dynamics and Control | 3 |

| | | |
|--------------------------|---|-----------|
| E M A/M E 540 | Experimental Vibration and Dynamic System Analysis | 3 |
| E M A 542 | Advanced Dynamics | 3 |
| E M A 545 | Mechanical Vibrations | 3 |
| E M A/ASTRON 550 | Astrodynamics | 3 |
| E M A 610 | Structural Finite Element Model Validation | 3 |
| E M A 642 | Satellite Dynamics | 3 |
| E M A 742 | Theory and Applications in Advanced Dynamics | 3 |
| E M A 745 | Advanced Methods in Structural Dynamics | 3 |
| E M A 747 | Nonlinear and Random Mechanical Vibrations | 3 |
| M E/E C E 577 | Automatic Controls Laboratory | 4 |
| M E 740 | Advanced Vibrations | 3 |
| M E 747 | Advanced Computer Control of Machines and Processes | 3 |
| M E 748 | Optimum Design of Mechanical Elements and Systems | 3 |
| Depth Requirement | | 12 |

At least 4 courses (12 credits) must be numbered 700 or above in mechanics, applied mathematics, or computer science. At least 2 of the courses (6 credits) must be from List 1 (below), and the remaining 2 courses (6 credits) may be from List 1 or List 2.

List 1 6-12

| | | |
|--|---|--|
| Any E M A course except E M A 790, E M A 890, or E M A 990. | | |
| E M A 601 Special Topics courses may only be counted as numbered 700+ if designated as such by the instructor. | | |
| CBE 720 | Microhydrodynamics, Brownian Motion, and Complex Fluids | |
| CIV ENGR/ G L E 730 | Engineering Properties of Soils | |
| CIV ENGR/ G L E 735 | Soil Dynamics | |
| MATH 705 | Mathematical Fluid Dynamics | |
| M E 740 | Advanced Vibrations | |
| M E 746 | Dynamics of Controlled Systems | |
| M E 747 | Advanced Computer Control of Machines and Processes | |
| M E 748 | Optimum Design of Mechanical Elements and Systems | |
| M E 751 | Advanced Computational Dynamics | |
| M E 753 | Friction, Lubrication and Wear | |
| M E 769 | Combustion Processes | |
| M E 770 | Advanced Experimental Instrumentation | |
| M E 774 | Chem Kinetics of Combust Systems | |
| M E/CIV ENGR/ E M A 775 | Turbulent Heat and Momentum Transfer | |

List 2 0-6

| | | |
|-----------------------|--|--|
| COMP SCI/ MATH 714 | Methods of Computational Mathematics I | |
|-----------------------|--|--|

| | |
|-----------------------------|---|
| COMP SCI/ MATH 715 | Methods of Computational Mathematics II |
| COMP SCI/ E C E 760 | Machine Learning |
| E C E 717 | Linear Systems |
| E C E 719 | Optimal Systems |
| E C E/ COMP SCI 761 | Mathematical Foundations of Machine Learning |
| E C E/CBE/ MATH 777 | Nonlinear Dynamics, Bifurcations and Chaos |
| E C E/COMP SCI/ STAT 861 | Theoretical Foundations of Machine Learning |
| MATH 703 | Methods of Applied Mathematics 1 |
| MATH 704 | Methods of Applied Mathematics-2 |
| M E 718 | Modeling and Simulation in Polymer Processing |
| M E/E C E 739 | Kinematics, Dynamics, and Control of Robotic Manipulators |
| M E 758 | Solid Modeling |
| M E 761 | Topics in Thermodynamics |
| M E 764 | Advanced Heat Transfer I- Conduction |
| M S & E 748 | Structural Analysis of Materials |
| M S & E 750 | Imperfections and Mechanical Properties |
| M S & E 760 | Molecular Modeling of Materials |
| PHYSICS 711 | Theoretical Physics-Dynamics |
| PHYSICS 715 | Statistical Mechanics |
| PHYSICS 721 | Theoretical Physics- Electrostatics |
| PHYSICS 731 | Quantum Mechanics |
| PHYSICS 732 | Quantum Mechanics |
| PHYSICS 751 | Advanced Solid State Physics |
| PHYSICS 801 | Special Topics in Theoretical Physics (when taught as Nanostructures in Science and Technology) |

It is acceptable for students who earned an M.S. degree in Engineering Mechanics at UW-Madison to use coursework completed while in the M.S. degree program to meet the requirements above.

POLICIES

GRADUATE SCHOOL POLICIES

The Graduate School's Academic Policies and Procedures (<https://grad.wisc.edu/acadpolicy/>) provide essential information regarding general university policies. Program authority to set degree policies beyond the minimum required by the Graduate School lies with the degree program faculty. Policies set by the academic degree program can be found below.

MAJOR-SPECIFIC POLICIES

PRIOR COURSEWORK

Graduate Work from Other Institutions

With advisor and EM Graduate Studies Committee approval, students may use up to 15 credits of prior graduate coursework that led to a relevant MS degree. Alternatively, with advisor and EM Graduate Studies Committee approval, students may use up to 6 credits of relevant coursework from a prior graduate program. Please review the Graduate Program Handbook (see contact box) for information about use and restrictions to this policy.

UW–Madison Undergraduate

With faculty approval, students who have received their undergraduate degree from UW–Madison may apply up to 7 credits numbered 400 or above toward the minimum graduate degree credit requirement. This work would not be allowed to count toward the 50% graduate coursework minimum unless taken 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 PhD program is not allowed to satisfy requirements.

With faculty approval, students who have received an ABET–accredited undergraduate degree (not including UW–Madison) may be eligible to apply up to 7 credits of their undergraduate coursework toward the Minimum Graduate Degree Credit Requirement. No credits can be counted toward the Minimum Graduate Residence Credit Requirement, nor the Minimum Graduate Coursework (50%) Requirement. Coursework earned five or more years prior to admission to a master's degree is not allowed to satisfy requirements.

UW–Madison University Special

With program approval, students are allowed to count up to 15 credits of coursework numbered 400 or above taken as a UW–Madison Special student toward the minimum graduate residence credit requirement, and the minimum graduate degree credit requirement. UW–Madison coursework taken as a University Special student would not be allowed to count toward the 50% graduate coursework minimum unless taken 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.

PROBATION

This program follows the Graduate School's Probation policy. (<https://policy.wisc.edu/library/UW-1217/>)

ADVISOR / COMMITTEE

Each student is required to meet with their advisor prior to registration every semester.

CREDITS PER TERM ALLOWED

15 credits

TIME LIMITS

Qualifying Exam: The written portion of the qualifying exam is offered twice a year, once in August/September and once in January, generally the week before classes start. The associated literature review presentation must be completed within the timing limits stated above. 1. If you enter the PhD program directly without an MS or equivalent degree, you will first earn 30 graduate credits. Take your qualifying exam either the first or second time that it is offered after the semester in which you earn those 30 credits. 2. If you earn a UW–Madison Engineering Mechanics MS

and immediately enter the PhD program in the following semester, take your qualifying exam either the first or second time it is offered after the semester in which you earned your MS. 3. If you enter the PhD program with an MS degree either from another department or institution, or are returning to UW–Madison with an MS degree after an absence, take the exam at the start of your third PhD semester

Preliminary Exam: Ph.D. students must complete their preliminary exam within five years of passing their qualifying exam.

Dissertation Defense (oral thesis presentation): There must be at least nine (9) months between the preliminary exam and dissertation defense.

A candidate for a doctoral degree who fails to successfully complete the dissertation defense 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.

GRIEVANCES AND APPEALS

These resources may be helpful in addressing your concerns:

- Bias or Hate Reporting (<https://doso.students.wisc.edu/bias-or-hate-reporting/>)
- Graduate Assistantship Policies and Procedures (<https://hr.wisc.edu/policies/gapp/#grievance-procedure>)
- Hostile and Intimidating Behavior Policies and Procedures (<https://hr.wisc.edu/hib/>)
 - Office of the Provost for Faculty and Staff Affairs (<https://facstaff.provost.wisc.edu/>)
- Dean of Students Office (<https://doso.students.wisc.edu/>) (for all students to seek grievance assistance and support)
- Employee Assistance (<http://www.eao.wisc.edu/>) (for personal counseling and workplace consultation around communication and conflict involving graduate assistants and other employees, post-doctoral students, faculty and staff)
- Employee Disability Resource Office (<https://employee disabilities.wisc.edu/>) (for qualified employees or applicants with disabilities to have equal employment opportunities)
- Graduate School (<https://grad.wisc.edu/>) (for informal advice at any level of review and for official appeals of program/departmental or school/college grievance decisions)
- Office of Compliance (<https://compliance.wisc.edu/>) (for class harassment and discrimination, including sexual harassment and sexual violence)
- Office of Student Conduct and Community Standards (<https://conduct.students.wisc.edu/>) (for conflicts involving students)
- Ombuds Office for Faculty and Staff (<http://www.ombuds.wisc.edu/>) (for employed graduate students and post-docs, as well as faculty and staff)
- Title IX (<https://compliance.wisc.edu/titleix/>) (for concerns about discrimination)

Department of Mechanical Engineering Grievance Procedures

If a student feels unfairly treated or aggrieved by faculty, staff, or another student, the University offers several avenues to resolve the grievance. Students' concerns about unfair treatment are best handled directly with the person responsible for the objectionable action. If the student is uncomfortable making direct contact with the individual(s) involved, they should contact the advisor or the person in charge of the unit where

the action occurred (program or department chair, section chair, lab manager, etc.). Many departments and schools/colleges have established specific procedures for handling such situations; check their web pages and published handbooks for information. If such procedures exist at the local level, these should be investigated first. For more information see the Graduate School Academic Policies & Procedures: <https://grad.wisc.edu/acadpolicy/?policy=grievancesandappeals>. The Assistant Dean for Graduate Affairs (enr-dean-graduateaffairs@enr.wisc.edu) provides overall leadership for graduate education in the College of Engineering (CoE), and is a point of contact for graduate students who have concerns about education, mentoring, research, or other difficulties.

1. The student is encouraged to speak first with the person toward whom the grievance is directed to see if a situation can be resolved at this level.
2. Should a satisfactory resolution not be achieved, the student should contact the Associate Chair for Graduate Studies or the John Bollinger Chair of Mechanical Engineering (<https://engineering.wisc.edu/departments/mechanical-engineering/people/>) to discuss the grievance. The Associate Chair for Graduate Studies or Department Chair will facilitate problem resolution through informal channels and facilitate any complaints or issues of students. The first attempt is to help students informally address the grievance prior to any formal complaint. Students are also encouraged to talk with their faculty advisors regarding concerns or difficulties if necessary. University resources for sexual harassment, discrimination, disability accommodations, and other related concerns can be found on the UW Office of Compliance website (<https://compliance.wisc.edu/>). Other campus resources can be found above.
3. If the issue is not resolved to the student's satisfaction the student can submit the grievance to the Associate Chair for Graduate Studies in writing, within 60 calendar days of the alleged unfair treatment.
4. On receipt of a written complaint, a faculty committee will be convened by the Associate Chair for Graduate Studies to manage the grievance. The faculty committee will obtain a written response from the person toward whom the complaint is directed. This response will be shared with the person filing the grievance.
5. The faculty committee will determine a decision regarding the grievance. The Associate Chair for Graduate Studies will report on the action taken by the committee in writing to both the student and the party toward whom the complaint was directed within 15 working days from the date the complaint was received.
6. At this point, if either party (the student or the person toward whom the grievance is directed) is unsatisfied with the decision of the faculty committee, the party may file a written appeal. Either party has 10 working days to file a written appeal to the School/College.
7. Documentation of the grievance will be stored for at least 7 years. Significant grievances that set a precedent will be stored indefinitely.

The Graduate School has procedures for students wishing to appeal a grievance decision made at the school/college level. These policies are described in the Graduate School's Academic Policies & Procedures: <https://grad.wisc.edu/acadpolicy/?policy=grievancesandappeals>.

OTHER

n/a

PROFESSIONAL DEVELOPMENT

GRADUATE SCHOOL RESOURCES

Take advantage of the Graduate School's professional development resources (<https://grad.wisc.edu/pd/>) to build skills, thrive academically, and launch your career.

LEARNING OUTCOMES

1. Demonstrate an extraordinary, deep understanding of mathematical, scientific, and engineering principles in the field.
2. Demonstrate an ability to formulate, analyze, and independently solve advanced engineering problems.
3. Apply the relevant scientific and technological advancements, techniques, and engineering tools to address these problems.
4. Recognize and apply principles of ethical and professional conduct.
5. Demonstrate an ability to synthesize knowledge from a subset of the biological, physical, and/or social sciences to help frame problems critical to the future of their discipline.
6. Demonstrate an ability to conduct original research and communicate it to their peers.

PEOPLE

PROFESSORS

Darryl Thelen (Chair)
 Peter Adamczyk
 Mark Anderson
 Riccardo Bonazza
 Curt Bronkhorst
 Wendy Crone
 Christian Franck
 Jaal Ghandhi
 Sage Kokjohn
 Dan Negrut
 Gregory F. Nellis
 Tim Osswald
 Frank Pfefferkorn
 Xiaoping Qian
 Douglas Reindl
 David Rothamer
 Scott T. Sanders
 Krishnan Suresh
 Mario F. Trujillo
 Lih-sheng Turng
 Fabian Waleffe

ASSOCIATE PROFESSORS

Lianyi Chen
 Melih Eriten
 Katherine Fu
 Tom N. Krupenkin
 Ying Li
 Franklin Miller
 Sangkee Min
 Wenxiao Pan
 James Pikul
 Pavana Prabhakar
 Alejandro Roldan-Alzate
 Michael Zinn

ASSISTANT PROFESSORS

Joseph Andrews
Jennifer Franck
Corinne Henak
Eric Kazyak
Allison Mahvi
Luca Mastropasqua
Jacob Notbohm
Josh Roth
Shiva Rudraraju
Stephan Rudykh
Eric Tervo
Ramathasan Thevamaran
Dakotah Thompson
Michael Wagner
Wei Wang
Michael Wehner
Jinlong Wu
Xiaobin Xiong
Xiangru Xu
Lei Zhou

See also Mechanical Engineering Faculty Directory
(<https://directory.engr.wisc.edu/me/faculty/>).