DEPARTMENT of MECHANICAL ENGINEERING GRADUATE PROGRAMS STUDENT HANDBOOK

2024–2025

V.1

Department of Mechanical Engineering
UNIVERSITY OF WISCONSIN–MADISON

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Introduction and program overview

Welcome! We thank you for selecting this university, and especially our department, to pursue your M.S. and/or Ph.D. degree program. We are delighted to have you as part of our community and hope that you find your studies at UW-Madison to be intellectually stimulating and rewarding.

The purpose of this handbook is to provide you, as a graduate student in the Department of Mechanical Engineering, with information to facilitate your graduate studies.

Program authority to set degree requirements beyond the minimum required by the Graduate School lies with the Mechanical Engineering program faculty. The policies described in this handbook have been approved by the program faculty as a whole. The guide contains a number of items that are not discussed in other University of Wisconsin–Madison publications. Degree and course requirements may change over time. However, students must meet the degree and course requirements in effect when they entered the program. In addition, administrative procedures and processes can change over time. Students are required to follow the procedures and processes listed in the current handbook. Thus, you are urged to read this booklet carefully, both now and as you progress through your degree program. Students may also wish to consult the Graduate School's website:

↗ grad.wisc.edu

Please be aware that it is up to you and your advisor to put together a coherent sequence of courses that satisfies all of the department and the Graduate School requirements.

If you have any questions concerning the information contained in this guide, please stop by the Graduate Student Services Office (3182 Mechanical Engineering Building). Please do not hesitate to contact me if I can be of assistance.

On Wisconsin!

Prof. Darryl Thelen
John Bollinger Chair of Mechanical Engineering

This handbook applies to students matriculating to a program/plan/subplan for Fall 2024 and for subsequent sessions until superseded by a revised guide. Students admitted prior to this time should continue to follow the handbook that was in effect when they entered the program/plan/subplan.

This guide was prepared by the Department of Mechanical Engineering, University of Wisconsin-Madison.

Please send comments or suggestions for improvements to dept@me.engr.wisc.edu.

On the cover: Aerial photograph of the College of Engineering campus showing the Mechanical Engineering Building.

I. Important addresses

Mechanical Engineering Business Office
2107 Mechanical Engineering Building
1513 University Avenue, Madison, WI 53706-1572
(608) 262-3543 | dept@me.engr.wisc.edu

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2107 Mechanical Engineering Building
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Department Associate Chair for Research
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1305 Engineering Research Building
(608) 263-2802
manderson@engr.wisc.edu

Department Associate Chair for Graduate Studies (also known as Chair of Graduate Committee, Director of Graduate Studies)
Professor Frank Pfefferkorn
1031 Mechanical Engineering Building
(608) 263-2668
frank.pfefferkorn@wisc.edu

Department Associate Chair for Engineering Mechanics
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537 Engineering Research Building
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Payroll & Benefits
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2107 Mechanical Engineering Building
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jmeng62@wisc.edu

Graduate Program Coordinator
Sara Hladilek
(608) 262-8617
shladilek@wisc.edu

i. Important websites

Graduate School
↗ grad.wisc.edu

Mechanical Engineering
↗ engineering.wisc.edu/departments/mechanical-engineering/

Mechanical Engineering forms *(NetID required)*
↗ intranet.engineering.wisc.edu/mechanical-engineering/current-me-student-resources/

Mechanical Engineering degree information
↗ engineering.wisc.edu/departments/mechanical-engineering/degrees/

The *Graduate Guide*
↗ guide.wisc.edu/graduate

UW's Response to COVID-19
↗ covid19.wisc.edu

COVID-19 Information for graduate students
↗ https://covidresponse.wisc.edu/students/

ii. For assistance with health problems and emergencies

University Health Services, 333 East Campus Mall, 7th floor; Lakeshore Drop-in Clinic (Dejope Hall)

- 24-Hour Mental Health Crisis Line: 608-265-5600, then press 9
- Schedule an appointment, or speak with an after-hours nurse, by calling 608-265-5600.
- Associate Counselor Michelle Bond focuses on Engineering students

Dean of Students Office, 75 Bascom Hall, (608) 264-5700, 7:30 am–5:00 pm, Monday–Friday

Dane County Mental Health Center's Emergency Lines, 24 hours daily, (608) 280-2600

Madison Police and Medical Emergency: 911, Non-Emergency number: (608) 264-4275

University Police Emergency: 911, Non-Emergency number: (608) 264-COPS (2677)

II. New graduate student checklist: What do I do now?

Adapted from

↗ grad.wisc.edu/new-students

i. Visit the Graduate Student Services Office

Visit the Graduate Student Services Office (3182 Mechanical Engineering Building) and meet your graduate program coordinator. Although the Graduate Student Services Office is there to assist you, it is your responsibility to be aware of graduate policies and deadlines.

ii. Activate your UW–Madison NetID

Your NetID is your unique credential for accessing your online services at UW–Madison. You will need your 10-digit campus ID number. Follow these instructions to activate your NetID:

↗ kb.wisc.edu/iam/page.php?id=1140

You can change your password, and set recovery questions in case you forget your password.

↗ mynetid.wisc.edu/modify

iii. Enroll in classes

Students enroll at my.wisc.edu. You will need your NetID and password to access the MyUW portal. (See Activate your UW–Madison NetID for more information). You can enroll at any time after your Enrollment Appointment Time until each session's class-add deadline. You can find your enrollment time in your Student Center at my.wisc.edu. To enroll after the add period for a course, you will need department and/or dean's permission. You will not be able to obtain your student ID card (Wiscard) until you enroll.

iv. Pay your tuition and fees

Check your student account invoice for amount due and payment deadlines. Pay your fees and tuition, if applicable, at the Bursar's Office. If you do not receive an invoice, contact the Bursar's Office. Failure to receive an invoice will not be accepted as a reason for failure to comply with payment deadlines.
333 East Campus Mall #10501, (608) 262-3611

↗ bursar.wisc.edu

v. Get your student ID card (Wiscard)

Get your student ID card at the Wiscard Office. You must be enrolled and have valid identification (such as a valid driver's license, passport, or state ID) to get your Wiscard. *Prerequisite: You must be enrolled.*
Union South, 1308 W Dayton Street, room 149, (608) 262-3258, M-F 8:30 am – 5:00 pm

↗ wiscard.wisc.edu

vi. Locate your WiscMail account and "wisc.edu" address

When you have activated your NetID, log on to my.wisc.edu and open the "Email" tile. WiscMail is UW–Madison's centrally supported email service, providing a reliable service with built-in spam filtering and other features. **All campus units, including Mechanical Engineering, the Graduate School, the Office of the Registrar (your student records), and the Bursar's Office (tuition and fees) will only send mail to your official wisc.edu address. Read your email often.**

WiscMail is based on a version of Microsoft Office365/Outlook. You can set up an Outlook app on your computer, and configure other email clients—including mobile devices—to read and send from your wisc.edu account. Start with these instructions:

↗ kb.wisc.edu/28350

vii. Activate your CAE account

CAE accounts are automatically established for all engineering students from their current registration information, and they allow for a variety of services at no charge to the student. Your CAE account will give you access to the many computing resources in the College of Engineering including the CAE Windows and Linux workstations, and access to software. Your CAE account is available as long as you are enrolled in an engineering course, until your graduation. On the CAE site, clicking the "Activate your CAE account" link or emailing the CAE Helpdesk at helpdesk@cae.wisc.edu.
Prerequisite: You must have had your Wiscard for about a week.

↗ cae.wisc.edu

viii. Update your mailing address and phone number

Your student record can include both a Home address (your current address while a student) and a Mailing address (often a student's more permanent address, or that of a parent/family member). Before you graduate, you can also add a Diploma address for receiving that mailed document. Update these addresses and your current phone number through Student Center. To update your address before you enroll for your first semester, contact the Graduate Admissions Office at (608) 262-2433.

↗ kb.wisc.edu/4126

ix. Order your free Madison Metro bus pass

As a UW student, you order a bus pass at no charge online through Transportation Services at the beginning of the fall and spring semesters. Visit the Transportation Services webpage for more information and the online order form. *Prerequisite: You must be enrolled for classes and have paid the student transportation segregated fee for the current or upcoming semester at UW-Madison.*

↗ https://transportation.wisc.edu/commuter-solutions/bus/student-bus-pass-program/

x. Complete the online sexual violence prevention program

This is required for all new graduate students. The course will be activated in late summer and graduate students will be officially notified of their responsibility to complete the training at that time.

↗ uhs.wisc.edu/prevention/violence-prevention/grad-students

xi. Affecting some new students

a. If you are an international student here on a visa

You must check in with International Student Services immediately upon arrival.
Pyle Center, 702 Langdon Street, suite 130

↗ iss.wisc.edu

b. If you are an international student interested in a Social Security Number

Only F-1 and J-1 students employed on campus are eligible for a Social Security number. If you are eligible, find out how to sign up for a Social Security number and get answers to your tax questions from the Office of Human Resources Payroll and Benefits Services:

↗ ohr.wisc.edu

c. If you are required to take the ESLAT (English as a Second Language Assessment Test)

There are multiple opportunities to take this test. For schedule and location information, visit the English as a Second Language Program, (608) 263-3780. Students must bring their campus ID number and a photo ID (such as passport or Wiscard). If you have questions, please contact the ESL Office at askesl@english.wisc.edu.

↗ esl.wisc.edu

d. If you have been notified that you will receive financial aid through the FAFSA process (this is not referring to assistantship awards)

Your financial aid award will automatically be applied to your student account to pay tuition and fees. The Bursar's Office will send any remaining amount in the form of a check to your mailing address. Make sure your mailing address is up-to-date. You can also have an ACH transaction deposited directly to your bank account.

e. If you received a financial award that included tuition remission

If you received a financial award that included remission of tuition (unless the award was a fellowship), you are still responsible to pay segregated fees by the tuition due date.
Bursar's Office, (608) 262-3611

↗ bursar.wisc.edu

f. If you are a new graduate assistant:

Get information on your benefits package from the Office of Human Resources. Prior to your start date, you must check in with the Mechanical Engineering Payroll & Benefits Coordinator and submit necessary documents.

↗ hr.wisc.edu/benefits/new-employee-benefits-enrollment

g. **If you did not previously submit final transcripts:**

Bring the requested final transcript(s) to the Graduate School located in Bascom Hall, 500 Lincoln Drive, room 228. If you do not submit final transcripts by the third week of classes, you **will not** be able to register for future semesters until you do so. This is not required for students who completed their undergraduate degree at UW–Madison.

If your previous institution uses an electronic transcript delivery method please have that institution send your official transcripts to the UW–Madison Graduate School at transcripts@grad.wisc.edu.

III. General information for graduate students

i. Important dates

Each semester, review the Academic Calendar and important enrollment deadlines posted by the Office of the Registrar. The Graduate Student Services Office will email students at the beginning of each semester to remind students of the deadlines. ***It is your responsibility to be aware of and meet all deadlines.***

↗ secfac.wisc.edu/academic-calendar

↗ registrar.wisc.edu/dates

ii. Forms

Department of Mechanical Engineering form

↗ intranet.engineering.wisc.edu/mechanical-engineering/current-me-student-resources/

Graduate School academic policies

↗ grad.wisc.edu/academic-policies

IV. Campus and college resources

i. Campus and Visitor Relations Center

This center maintains lists of available off-campus housing and provides general information on academic and non-academic topics that may be of interest to students.
Union South, Suite 329, 1308 W. Dayton St., (608) 263-2400.

↗ info.wisc.edu

ii. Steenbock Library

A substantial collection of engineering materials is held at Steenbock Library, which also serves Agricultural & Life Sciences and Veterinary Medicine. The engineering librarians help connect students and researchers to high-quality information and user-centered services: books (both in print and electronic), journals, standards, and government documents (e.g., patents). Services include article and book delivery, citation management, and new publication alerts.

Steenbock Library, room 118, 550 Babcock Drive, (608) 262-0696, asksel@library.wisc.edu

↗ library.wisc.edu/steenbock

iii. Writing Center

The Writing Center provides free face-to-face and online consultations which focus on a number of different writing scenarios (i.e., drafts of course papers, resumes, reports, application essays, cover letters, theses, etc.). Writing Center instructors will not edit or proofread papers. Instead, their goal is to teach students to edit and proofread in order to become better, more confident writers.
6171 Helen C. White Hall, (608) 263-1992

↗ writing.wisc.edu

iv. Engineering Career Services

Engineering Career Services provides lifetime tools for successful career development in a rapidly changing world. ECS helps students in preparing for internships and co-ops, as well as, job searches (resume & cover letter writing, listing of potential employers, etc.), practicing interviewing skills (mock interviews, sample interview questions), and other important career information such as negotiating job offers and salaries.

Julie Rae, Assistant Director for Graduate Student Career Services, 1150 Engineering Hall, 1415 Engineering Drive, (608) 262-3471, ecs@engr.wisc.edu

↗ ecs.wisc.edu

v. McBurney Disability Resource Center

Students who have a documented disability, or suspect that they may have an undiagnosed disability, are encouraged to contact the McBurney Disability Resource Center to inquire about obtaining academic accommodations. The McBurney Center provides academic accommodations such as adaptive/assistive technology access, assistive listening devices, document conversion, elevator keys,

ASL interpreting, note taking support, testing accommodations, and reduced credit load recommendations to name a few. Students must provide documentation and be registered with the McBurney Center to receive a Verified Individualized Services & Accommodations (VISA) form needed to receive accommodations.

Students with disabilities are encouraged to inform their faculty advisor and instructor of their need for disability-related accommodations in a timely manner. Implementation of reasonable accommodations is a shared faculty and student responsibility. Faculty, either directly or in coordination with the McBurney Disability Resource Center, are expected to work with students to identify and provide reasonable accommodations.

↗ grad.wisc.edu/documents/disabilities

702 W. Johnson St., Suite 2104, Telephone: (608) 263-2741, Text: (608) 225-7956

↗ mcburney.wisc.edu

vi. Design Innovation Lab @ Wendt *(formerly Makerspace)*

The UW Design Innovation Lab @ Wendt includes 12,000 square feet of shop and flex space with a wide range of rapid prototyping equipment. The UW Design Innovation Lab @ Wendt is a place for students to collaborate, experiment, and create prototypes. You may visit and tour the UW Design Innovation Lab @ Wendt for free. If you wish to use equipment, there is a fee that must be paid once per semester.

Wendt Commons, 215 N. Randall Ave., (608) 571-7023, maker-contact@engr.wisc.edu

↗ making.engr.wisc.edu

vii. Design Innovation Lab @ ECB *(formerly TEAM LAB – Technical Education and Manufacturing Lab)*

The College of Engineering's Design Innovation Lab @ ECB is a 14,000-square-foot facility located in the lower level of the Engineering Centers Building (ECB). The Design Innovation Lab @ ECB provides students with the majority of the tools and equipment found in a modern machine shop for manufacturing metal parts. The lab is equipped with both manual and CNC mills and lathes, drill presses, grinders, belt sanders, band saws, and additional equipment. The lab also houses a full wood lab, welding lab, and sheet metal lab. You may visit and tour the Design Innovation Lab @ ECB for free. If you wish to use equipment then there is a permitting/training process. Permits are valid for the duration of a student's studies. Use of the equipment in the TEAM Lab requires a fee that must be paid once per semester.

Engineering Centers Building, room B1084, 1550 Engineering Drive, (608) 261-1112, https://making.engr.wisc.edu/

↗ making.engr.wisc.edu

V. Department services

i. Computer use

All enrolled engineering students may use the Computer-Aided Engineering (CAE) computer facilities located in the CAE Center, 1410 Engineering Drive, across the street from Engineering Hall. CAE users can access various computers at this location and at a number of CAE computer labs across the engineering campus.
CAE HelpDesk, room 116, 1410 Engineering Drive, (608) 262-5349, helpdesk@cae.wisc.edu

↗ cae.wisc.edu/labs

ii. Photocopying

Photocopying on the department and student services copy machines is *not* permitted for personal purposes, including for your enrolled courses. If photocopying is required for your research project, see your advisor for an access code number. Teaching assistants will be given an access code for the copier by the department administrator.

iii. Telephones

The majority of campus phone lines are based on VoIP (voice over internet). Student access to university telephone services is limited to internal university and local calls. University-related (research, teaching, extension) long-distance calls may be made on the telephone of your advisor with their permission.

- Campus calls (or to any local government number that starts with 26x-xxxx): dial the 7-digit number.
- Other local calls: 1, the 7-digit number

See other dialing patterns:

↗ kb.wisc.edu/72677

iv. Mailboxes

You are assigned a shared mailbox for department notices and messages, campus mail, and U.S. mail. The mailboxes are in the ground-floor hallway between the Mechanical Engineering Building and the Engineering Research Building. There is one graduate-student mailbox for each letter of the alphabet, sorted by last name.

Because of demands on space and staff time, please do not have personal mail sent to your engineering mailbox. The staff will *not* distribute your personal mail. The correct address for your mailbox is:

[your name]
Department of Mechanical Engineering
University of Wisconsin–Madison
1513 University Avenue
Madison, WI 53706-1572

v. Parking permit

Limited car/truck parking is available for approved student commuters and students with special needs on a space-available basis. Students may purchase university parking permits for Lots 34, 41, 46, 59, 76, and 83. There is frequent free campus bus service between these lots and the engineering campus. The best advice to students regarding parking on campus is don't bring a car. Most students walk, bike, or take the bus (using their free Madison Metro bus pass).

Permits are also available for motorcycles and mopeds, which must always be parked in designated stalls, not on sidewalks or unmarked areas.

↗ transportation.wisc.edu/permits/student-parking

Students must first get preapproval to confirm they fit the criteria for a permit. Start the process by completing a Student Parking Preapproval Application.

↗ transportation.wisc.edu/permits/student-parking/student-parking-application

vi. Health insurance

Health care is available at the University Health Service (UHS) for all UW–Madison students. See their website for details on the coverage offered. Hospitalization and emergency room services are not included in UHS benefits. Health insurance covering hospitalization and emergency services is strongly recommended. Information concerning group health insurance, which is available to those holding at least a 33.3% appointment as a graduate research assistant, grad Fellow, or teaching assistant, may be obtained from the department payroll & benefits coordinators. Unsupported graduate students are not eligible for insurance offered to RAs and TAs. Unsupported students may contact the Wisconsin Student Association for health insurance information.

↗ uhs.wisc.edu

vii. Desk assignment, keys, and building permits

Research assistant and teaching assistant requests for a desk should be made to your advisor or supervising professor.

Keys for offices or laboratories in the Mechanical Engineering Building can be obtained by submitting a key request form. Once the request is approved by your advisor, you will receive an email notifying you to come to the department office (2107 Mechanical Engineering Building) with your Wiscard to pick up your keys.

Wiscards serve as the key for the outside doors of all College of Engineering building. Access is automatically granted to all enrolled students in the College of Engineering. Students located in the Engineering Research Building (ERB) or Engineering Hall obtain key and building permit forms through their faculty advisor.

VI. Graduate student experience

i. Mechanical Engineering Graduate Student Advisory Council (ME GSAC)

The purpose of ME GSAC is to improve the graduate student experience in the Department of Mechanical Engineering through social, professional development, cultural, and networking opportunities. The association serves as a representative for the graduate student voice and works to create connections between graduate students, faculty and staff in the ME department. ME GSAC is open to any Mechanical Engineering or Engineering Mechanics graduate students (Ph.D. dissertators, Ph.D. pre-dissertators, M.S. students, and accelerated M.S. students).

↗ megsac.wiscweb.wisc.edu/

ii. Graduate Women in Mechanical Engineering+ (GWME+)

Graduate Women+ in Mechanical Engineering (GWME+) is a community of women and gender minorities who are graduate students and postdocs affiliated with the Mechanical Engineering (ME) department. They aim to foster a supportive environment for women and gender minorities to enhance their overall experience and provide leadership opportunities. They also aim to develop leadership skills, facilitate professional development, and other activities such as recruitment, mentoring, and networking events.

↗ engineering.wisc.edu/departments/mechanical-engineering/about/graduate-women-in-me/

iii. Graduate Engineering Mechanics Society (GEMS)

Graduate Engineering Mechanics Society (GEMS) is a community of individuals with research interests in Engineering Mechanics or related fields in mechanical engineering. They aim to foster a supportive and engaging environment through seminars, conversations, and leadership experiences.

↗ https://win.wisc.edu/organization/gems

iv. Wisconsin Involvement Network (WIN)

Badgers work hard and play hard. Supplement your graduate education by joining one of the more than 1,000 student organizations offered at UW-Madison. Whether you're interested in professional development opportunities, want to hone your engineering skills, or find a group that fullfills your passion, WIN is a great resource to build community outside of your engineering degree.

↗ win.wisc.edu/

v. Hoofers Club

The Wisconsin Hoofers is the premier outdoors club at the University of Wisconsin-Madison. With nearly 2,000 members, Hoofers is one of the oldest and largest student organization on campus. From sailing on Lake Mendota to climbing at Devil's Lake, Hoofers is a place where people of all abilities can learn outdoor skills and enjoy outdoor activities. Hoofers is proud to be part of the Wisconsin Union Directorate, the student programming and leadership board for the Wisconsin Union. Get outside with us and hoof on!

↗ hoofers.org/

vi. University activities

Many athletic and art events supported by the University have discounted student rates. There are also hundreds of free lectures, performances, and social activities open to students every year.

↗ today.wisc.edu

vii. Graduate Student Life

A guide to the graduate student experience at UW-Madison.

↗ Housing and Transportation
↗ Living in Madison
↗ Studying at UW
↗ Being a Badger
↗ Thriving in Grad School
↗ International Students

viii. International Student Internship/Co-op via CPT Opportunities

International Student Services (ISS) requires international students to have two full-time terms (Fall and Spring) of in-person enrollment before a student is eligible for CPT. Students in the accelerated MS programs *(ME MS – Accelerated Program, ME MS – Automotive Engineering, ME MS – Modeling and Simulation in Mechanical Engineering and EM MS – Aerospace Engineering)* are not allowed to:

- do full-time CPT in Fall or Spring terms
- do a CPT in their first term of enrollment
- do a full-time CPT in their final term of enrollment
- use CPT (internship/co-op) to extend their time enrolled in the program *(our programs do not require internship/co-op)*

It is imperative that students contact their ISS advisor early to discuss any questions they may have around CPT. Federal policies and ISS policies may change often and as such, the information above is not guaranteed to be accurate.

Students are not guaranteed to be permitted to enroll/complete an internship/co-op/CPT. Internship/co-op credits are not required in our program but, with faculty advisor approval, may be used as credit toward our programs (see program specific curriculum).

↗ https://iss.wisc.edu/employment/f1-employment/f-1-curricular-practical-training-cpt/

VII. Funding and financial information

Graduate students earn a monthly stipend when they hold a research assistant (RA) or teaching assistant (TA) appointment. In addition, there are various fellowships for which graduate students may apply. Information regarding assistantship payroll and policies/procedures may be found here: https://grad.wisc.edu/documents/assistantships/. Note that students in the MS Accelerated Program, MS Automotive Engineering, and MS Modeling and Simulation in Mechanical Engineering named options *are not eligible* to receive tuition remission from graduate assistantship appointments at this institution.

i. Research assistantships

Research assistant appointments are made by the department chair in consultation with individual professors according to their needs and the availability of funding for their research projects. The level of funding varies based on appointment percentage with the rate dependent on whether or not the student has obtained dissertator status. New projects may start at any time of the year. Thus, prospective students should contact the professors who have research related to their interests to determine RA position availability.

Graduate students with RA appointments must check in with the department payroll & benefits coordinators prior to their start date and submit the necessary documents available online at hr.wisc.edu/benefits/new-employee-benefits-enrollment.

Graduate Assistants along with all of us are now paid on the biweekly pay schedule. The schedule is here: https://uwservice.wisconsin.edu/calendars-schedules/.

Arrangements for leave are made through faculty advisors. Some Graduate Assistants are eligible for sick leave. Whether or not your appointment is eligibl for accrued sick leave will be found in your offer letter. https://hr.wisc.edu/policies/gapp/#leave-benefits

See section v. **Parental leave policy** for information related to parental leave. See section IX. **Enrollment** for information on enrollment requirements for RA appointments.

ii. Teaching assistantships

Teaching assistant appointments are made by the department chair. To apply for a TA position, submit an application using the online form found on the Mechanical Engineering intranet website. Please be certain to describe any prior teaching experience and classes you would be a good candidate to teach.

UW System policy requires non-native English speakers to demonstrate proficiency in spoken English before they are assigned classroom duties as a TA. Get information on spoken English requirements and the SPEAK test from the English as a Second Language Program. There are enrollment minimums for TAs (see Section XIII.ii).

↗ esl.wisc.edu/ita-training/speak

The department has adopted the College of Engineering's policy on the continuous improvement of teaching assistants. New TAs are required to attend New Educator Orientation (NEO) training organized by the College of Engineering held during the week before the first semester they teach.

↗ ceete.engr.wisc.edu/ta-training

If you have any questions about teaching assistantships, stop by the department office for help.

iii. Fellowships

University fellowships are awarded to graduate students by the university and/or department from funds controlled by the Graduate School, college, or department. Most fellowships are equivalent to an RA, but some are less and may be used to supplement an RA stipend. Some, but not all, fellowships are limited to U.S. students. Department fellowships are typically awarded in the spring semester for the subsequent academic year. Graduate fellowships are also awarded by organizations outside the university. Consult with your advisor about fellowship opportunities.

↗ grad.wisc.edu/funding

iv. Remission of tuition

You must have a research assistant appointment, teaching assistant appointment, program assistant appointment, or a combination thereof, equaling at least 33.3% for the length of the fall or spring term, to be eligible for full tuition remission for that term. Please note: students who receive tuition remission are still required to pay segregated fees by the tuition due date. If a student has had a qualifying appointment in the spring semester, it automatically carries over for the summer session but the student must be enrolled for 2 summer credits (3 credits if they are a dissertator).

Note that students in the MS Accelerated Program, MS Automotive Engineering, and MS Modeling and Simulation in Mechanical Engineering named options *are not eligible* to receive tuition remission from graduate assistantship appointments at this institution.

v. Parental leave policy

The Department of Mechanical Engineering and the College of Engineering are fully committed to providing a supportive climate for women and their partners who choose to have children during their graduate studies. The parental leave policy reduces academic and financial hardships for a) female graduate students during the late stages of their pregnancy, childbirth, and postpartum periods; and b) any graduate student who is a new parent providing care for an infant.

↗ sites.google.com/a/wisc.edu/graduate-parental-leave

VIII. Expectations of graduate students and faculty advisors

i. Mutual expectations

- As professionals in a diverse and inclusive environment, graduate students and faculty members will treat everyone in the department with equal respect and dignity.
- Faculty advisors and students will carry out their respective responsibilities with the aim of performing research at the level of a world-class university in an honest and ethical manner.
- When a student joins their advisor's research group, the student and advisor make a mutual commitment to perform research together toward the aim of the student's MS or PhD thesis and the associated intellectual products (publications, patents, presentations, etc.).
- Advisors and students will be aware of department policies as laid out in this handbook.
- Both the student and the advisor will make their expectations clear to each other[1]. Both the student and the advisor are expected to complete the Graduate On-Line Assessment & Achievement Learning System (GOAALS) report each year. Both students and advisors will inform each other of any significant changes that may affect a student's research or academic progress.

ii. Expectations of graduate students

- You are expected to follow the academic traditions of your advisor. Since the advisor's role and expectations can vary, discuss roles and expectations with your advisor (or prospective advisors).
- You are expected to develop, over time, the professionalism that is critical for success in your future careers. Working with high ethical standards is expected throughout the graduate program.
- Although graduate mentors and academic staff provide guidance, you are responsible for your own education, and for satisfying degree requirements of the Graduate School and of your specific graduate program.
- You are expected to develop a work schedule that allows for a healthy work-life balance. Research may require occasional periods of intense workload to meet important deadlines, but this should not be routine. Some research may also require long experimental campaigns, possibly requiring overnight supervision, but this responsibility will be shared.
- Graduate students on assistantships are expected to dutifully carry out their research/teaching in addition to meeting coursework requirements which means:
  - You should expect that your coursework and assistantship duties amount to a full-time professional commitment.
  - In consultation with your advisor(s), you should maintain a schedule to be in your office/lab.

[1] One mechanism that is available is the College of Engineering's Graduate On-Line Assessment & Achievement Learning System (GOAALS) that graduate students and their advisors must complete once per year.

- You should consult your faculty advisor(s) for guidance on course loads that are commensurate with assistantship responsibilities.
- You should coordinate, in advance, workload adjustments to accommodate temporary periods of intense coursework activity.
- You should communicate with your primary advisor regarding periods of absence such as leave and vacation[2].

- Thesis MS and PhD students are expected to engage in formal and informal professional development activities, including performing research, documenting research, contributing to team aspects of a research group, interacting with other experts and peers in their discipline, reading relevant publications, and attending and presenting research at meetings and conferences.
- You are expected to provide your advisor with timely updates on your research, academic progress, concerns, and problems.
- You are expected to attend individual and group meetings held by your faculty advisor.
- You are expected to notify your advisor(s) if you become aware of any safety issues or concerns with your work while on campus.

iii. Expectations of faculty advisors

- Faculty advisors will exercise the highest standards when working with all students.
  - They will uphold the University's statement on diversity and treat students fairly and without bias in accordance with Graduate School policies.
    ↗ diversity.wisc.edu
    ↗ grad.wisc.edu/academic-policies
  - They will not display hostile and intimidating behavior (HIB) when interacting with students.
    ↗ hr.wisc.edu/hib
  - They will participate in recurring training for HIB, bias, and professional ethics.
- Advisors will assist students in acquiring the highest level of knowledge and competence in the field that is possible and chair the committee that will determine whether the student has performed acceptably at each of their degree milestones.
- Advisors will ensure an appropriate working environment for their graduate students.
  - This includes physical safety and workload expectations that are fair and allow students to balance research and academic requirements with a healthy lifestyle.
  - This includes establishing a collegial and professional culture that is conducive to research creativity, productivity, and graduate education within their research groups.

[2] UW–Madison, Human resources, Graduate Assistantship Policies and Procedures, Benefits: https://hr.wisc.edu/policies/gapp/#benefits

    - Advisors will respect Graduate School policy that research assistantships are for performing work that is relevant to the student's course of study with occasional other duties that are not to exceed 5 hours per week.
      ↗ grad.wisc.edu/documents/research-assistant
    - Advisors will accommodate temporary periods of intense coursework activity, such as exam periods.
- Advisors will communicate on a regular basis with students regarding the progress of their research, including praise and constructive criticism as appropriate, always with the aim of educating students to become leading independent researchers in their field.
- Advisors will recognize students for their contributions to a research program. This recognition comes in the form of authorship/co-authorship of journal publications and reports and supporting students to present research findings at professional meetings and conferences. Advisors are expected to provide feedback to students' written documents in a timely manner.
- Advisors will assist students with course selection and academic planning.
- Advisors will assist students to identify possible research mentors and committee members.
- Advisors will communicate on a regular basis with students regarding professional development and enrichment activities and other opportunities. Advisors are expected to provide honest letters of recommendation when requested.
- Each advisor will set written policies on their general expectations for student-advisor meetings (frequency, duration,…), work hours, and vacation time. These policies will be reviewed at least annually with students. Minimum vacation guidelines for research assistantships[3] are set by the university and will be extended to all graduate students, regardless of source of support.

iv. Recourse if expectations are not being met

A set of expectations would be inconsequential if there were no recourse for not meeting them. When faculty advisors find that students are not meeting expectations, they will provide direct individual feedback**,** and document the findings in performance evaluations, if needed. Further recourse would follow the Department's policy on Satisfactory Progress in Research that is described in this handbook.

If graduate students find that their faculty advisor is not meeting expectations, they are encouraged to bring the matter to the attention of their advisor. If they feel uncomfortable doing so or would like another perspective, students should seek advice from the Dept. of Mechanical Engineering Associate Chair for Graduate Studies, Mechanical Engineering Department Chair, or the College of Engineering Assistant Dean of Graduate Studies. If the gravity of the situation warrants, students should follow the Department and College grievance procedures.

↗ https://engineering.wisc.edu/report-an-incident/academic-grievances-and-complaints/

[3] UW–Madison, Human resources, Graduate Assistantship Policies and Procedures, Benefits: https://hr.wisc.edu/policies/gapp/#benefits

v. Advisor selection

Per Graduate School policy, you must have a faculty advisor who assists you in planning a course sequence that meets degree requirements, and who will discuss career objectives with you. The responsibility for finding an advisor is solely that of students in the MS Mechanical Engineering: Research, Mechanical Engineering PhD, MS Engineering Mechanics: Research and Engineering Mechanics PhD programs.

Students enrolled in the accelerated MS programs (MS Mechanical Engineering: Accelerated Program, MS Mechanical Engineering: Automotive Engineering, MS Mechanical Engineering: Modeling and Simulation in Mechanical Engineering, MS Engineering Mechanics Aerospace Engineering) will be **automatically assigned** an advisor.

For MS Research and PhD programs. — The advisor should be a faculty member whose expertise and project/research interests match closely with those that the student intends to acquire. Students are encouraged to view faculty profiles on the department website and view individual faculty websites when searching for potential advisors. They should also visit with the professors in their interest area to discuss whether or not the faculty member would be willing to serve as their advisor. While no faculty member is obligated to accept a student's request to serve as advisor, invitations are often accepted except in cases where the faculty member judges that a different advisor would serve the student's needs better. Once you have secured an advisor, please complete the "Advisor Notification" form and submit it to the ME Graduate Coordinator. All newly admitted students will receive this form in their welcome email/packet.

↗ directory.engr.wisc.edu/me/faculty
↗ grad.wisc.edu/documents/advisor

Students may see their official advisor listed in MyUW. The official advisor is entered in the Student Information System (SIS) by the graduate program coordinator.

vi. Changing advisors

A student who later decides that a different faculty advisor would be preferable should discuss this with the current advisor and then feel free to seek the change. Selection of an advisor, or a change of advisors, should be based on the faculty member's ability to guide the student expertly into the chosen area of interest/research. When a student has selected, or changed advisors, please complete the "Add or Change Your Graduate Faculty Advisor" form and submit that to the Graduate Coordinator.

Any student considering changing their faculty research advisor is encouraged to seek advice from their Faculty Advisor, the Associate Chair for Graduate Studies (Director of Graduate Studies), Chair of the Department, or the Assistant Dean for Graduate Studies in the College of Engineering. There are many reasons why a graduate student in an MS: Research or PhD degree program may wish to change research advisor. Two reasons and their solutions are described below.

a. Changing research advisor due to change in research interest

The process by which a graduate student in an MS: Research or PhD degree program changes research advisors due to a change in research interest is as follows:

- The student should initiate discussions with the proposed research advisor and obtain assurance that the new research advisor is willing to accept the advising role and has a plan for financially supporting the student.
- It is the student's responsibility to inform their current advisor of their wish to move to a different research program.
- The student should complete the "Add or Change Your Graduate Faculty Advisor" form and submit the form to the Mechanical Engineering Graduate Coordinator.

b. Changing research advisor due to concerns about the research environment

Issues of misconduct (scholarly, ethical, harassment, bias, bullying, etc.) should be reported to one or more of the following individuals: Department Chair, Associate Chair for Graduate Studies (Director of Graduate Studies), or the Assistant Dean for Graduate Studies. Information communicated at the department level will be brought to the attention of the Dean and the course of action determined.

The College of Engineering expects that the climate and culture is conducive to learning and research scholarship, innovation, and entrepreneurship. Graduate students who find themselves in a research environment that does not meet those expectations, as substantiated through the course of an appropriate college-level investigation[4] and as determined by the Dean, will be given the opportunity to continue their studies under a different faculty research advisor. In this case, the department will facilitate the transition by guaranteeing funding, as needed, to cover the student's stipend as well as the research expenses (tuition remission costs and funds needed to conduct the research[5]) for a period of up to one year. The period of support can be extended beyond one year if necessary although the intended outcome is for the student to be fully integrated into the program of their new faculty advisor after one year.

vii. Additional advising contacts

You should always reference the department's website, this Handbook, the Graduate *Guide,* and the Graduate School's Academic Policies and Procedures for answers on various program-related questions. However, when you need further clarification on any of these policies or procedures, please contact the Mechanical Engineering Graduate Coordinator. The Graduate Coordinator can help answer questions with issues including satisfactory academic progress, academic deadlines, graduation completion, program-related forms, advising/course holds and permissions, and course offerings.

↗ guide.wisc.edu/graduate
↗ grad.wisc.edu/academic-policies

[4] Investigations will be conducted in accordance with FPP Ch. 9 by the Office of the Dean of the College of Engineering. The written report of the investigation along with any recommendations for corrective intervention will be provided to the Dean. The Dean in consultation with the assistant Dean for Human Resources and other engineering associate and assistant Deans at UW–Madison, will determine if corrective action is warranted and sufficient or if the case should be referred to the Office of the Provost for further investigation and possible disciplinary action up to and including dismissal; this process is described in FPP Ch. 9.02 and 9.03. Repeated incidents by the same faculty member will result in the case being referred immediately to the Office of the Provost for possible disciplinary action.

[5] The resources needed to conduct the research will be determined by the Dean in consultation with the new faculty advisor and the chair of the department.

IX. Enrollment

enroll.wisc.edu

i. Minimum credit requirements

During the fall and spring semesters, a full-time graduate student carries 8 to 15 credits, and during the 8-week summer session, 4 to 12 credits. Continuing students who are not funded in the summer are not required to enroll in courses to maintain their status as a graduate student. If you are funded in the summer, a minimum of 2 enrolled credits is required.

Dissertators are always required to enroll for 3 credits during the fall and spring. Enrollment in 3 credits during the summer session is required for graduate assistants, trainees, and fellows.

↗ grad.wisc.edu/documents/enrollment-requirements

Please note: pass/fail courses, audited courses, or courses numbered below 300 do not count towards minimum or maximum requirements. They are in essence counted as zero credits.

ii. Minimum full-time enrollment requirements

	Minimum enrollment for full-time status:	
Categories	**Fall or Spring**	**Summer (general 8-week DHH session)**
Dissertator	Exactly 3 credits directly related to research	Not required; unless receiving summer degree or if graduate assistant, trainee, or fellow, 3 credits required
RA, non-dissertator	8 credits	2 credits
TA/Lecturer (SA) 33%, non-dissertator	8 credits	2 credits minimum
TA/Lecturer (SA) 50%, non-dissertator	6 credits	2 credits minimum
PA 33%, non-dissertator	6 credits	Not required unless receiving summer degree, 2 credits minimum
PA 50%, non-dissertator	4 credits	Not required unless receiving summer degree, 2 credits minimum.
Fellow, non-dissertator	8 credits	2 credits for 12-month appointments. Not required for 9-month appointments.
Trainee, non-dissertator	8 credits	2 credits
International student (F-1/J-1 visa), non-dissertator, if no other category in this list	8 credits	4 credits when summer is admit semester (2 credits when summer is admit semester and student holds RA appointment or at least 33% TA or PA appointment)
If none of the above, full time enrollment is:	8 credits	4 credits

iii. Research and independent study courses

a. Research section enrollment

You may enroll in research courses (EMA 790, EMA 890, EMA 990; ME 790, ME 890, and ME 990) as approved by your faculty advisor providing that you meet the following pre-requisites:

- 790 sections are for MS students and require students to be both an EM or ME graduate student (respective to course) and be admitted to the MS-Research program.
- 890 and 990 sections are for PhD students and require students to be both an EM or ME graduate student (respective to course) and be admitted to the PhD program. 890 is for pre-dissertators and 990 is for dissertators.
- Students who do not meet the requirements for 790, 890, or 990 will need to request that their faculty advisor submit an email request for enrollment permission to the Mechanical Engineering Graduate Coordinator. The request must include your name, campus ID, the enrollment term, and the course number.

Research credits (790, 890, and 990) are graded as P (Progress), S (Satisfactory), or U (Unsatisfactory). Research credits are not weighted into a student's GPA.

A grade of P (Progress) for a research course means the course was not officially given a final grade by the faculty advisor. A grade of P may prevent a warrant from being requested and will prevent a student from graduating. Contact your faculty advisor or the Mechanical Engineering Graduate Coordinator with questions regarding resolving P grades.

b. Independent study enrollment

Dept. of Mechanical Engineering students who would like to enroll in an independent study course (EMA 599, ME 699, ME 999) must first meet with the intended faculty and agree upon a plan of study. The faculty advisor must submit an email request for enrollment permission to the Mechanical Engineering Graduate Coordinator. The request must include your name, campus ID, the enrollment term, and the course number.

Independent study credits (EMA 599, ME 699, ME 999) are graded with a letter grade (A–F) and are weighted with the student's GPA.

iv. Wait list

In Course Search & Enroll (enroll.wisc.edu), if a class is closed and the department is maintaining a waiting list, a yellow triangle will display on that course section. If you would like to be placed on the wait list you'll need to check the box titled 'Please Wait List Me' on the Enrollment Preferences page and continue through the enrollment to finalize your request. The Registrar's Office provides directions at https://kb.wisc.edu/registrar/15644. You will be allowed to place yourself on a wait list for a maximum of three class sections. You will receive permission to enroll from the waitlist through an email notification. You have 48 hours to enroll after receiving notification, so check your email daily. *Prerequisite: You must be enrolled in at least one course.*

v. Credit overload

To enroll for more than the maximum credit load in any given semester, you must submit a Credit Overload Request form. This form must be signed by your faculty advisor and turned in to the Graduate School, 217 Bascom Hall. The Graduate School will look closely at the rationale for the request, and if the request is approved, you will be notified that they can add the course. **This form MUST be submitted at least one week before the add deadline.**

- ↗ grad.wisc.edu/documents/forms
- ↗ registrar.wisc.edu/dates/

X. Commencement

Graduating students are encouraged to participate in the Commencement ceremony. Commencement ceremonies are held in December and May. Because there is no ceremony offered during the summer, students have the option to participate in the winter or spring ceremony. Students should think of their degree completion and participation in the commencement ceremony as two separate events.

To participate in the Commencement ceremony for any given semester, you apply for graduation in your Student Center. You can decide to participate in the ceremony up until the day of the ceremony. You need to apply for graduation before the deadline announced by the Chancellor's Office, if you want your name in the commencement program. Please watch for email announcements regarding Commencement.

↗ registrar.wisc.edu/applyforgraduation

Traditionally, PhD students are escorted by their faculty advisor. PhD students should discuss their commencement plans with their faculty advisor.

The Chancellor's Commencement website has more information on ordering the proper attire, dates, and times. **Remember to order your cap and gown!**

↗ commencement.wisc.edu

i. Degree completion letter

The Office of the Registrar and the Graduate School provide a Degree Completion Letter documenting degree completion until your degree is posted and your diploma arrives.

↗ registrar.wisc.edu/degreecompletion

ii. Duplicate or replacement diploma

If you need a duplicate or replacement diploma, please complete and submit the duplicate diploma request form to the Office of the Registrar. The cost is $50 (USD).

↗ registrar.wisc.edu/diploma

XI. Satisfactory progress: academic expectations

All graduate students are expected to make satisfactory progress toward their degree each semester. Satisfactory progress means taking a sufficient number of courses each semester, maintaining the required grade point average, moving ahead on the degree requirements, participating in required ethics and safety training, and making good progress on your thesis or dissertation. Your advisor, the Graduate Committee and the Graduate School are responsible for determining satisfactory progress. Continuation in the Graduate School is at the discretion of your program, the Graduate School, and your faculty advisor.

The Graduate School sets minimum standards that all graduate students in the university must meet. Many departments and programs have additional requirements that exceed these Graduate School minimum requirements. The definition of satisfactory progress varies by program. The *Graduate Guide* the Graduate School's minimum degree requirements and each program's minimum criteria for satisfactory progress.

↗ guide.wisc.edu/graduate

The Graduate School requires that you maintain a minimum graduate GPA of 3.00 in all graduate-level work (300 or above, excluding research, audit, credit/no credit, and pass/fail courses) taken as a graduate student unless probationary admission conditions require higher grades. If you are unable to complete coursework by the end of the semester, instructors may assign temporary I (Incomplete) grades if all but a small fraction of the coursework at the end of a semester was completed. Mechanical Engineering graduate students are allowed the subsequent semester of enrollment to complete coursework graded as incomplete. A course with a grade of PI does not count towards the degree requirements. Students cannot graduate with an Incomplete (I) grade on their record.

A student may be placed on probation or suspended from the Graduate School for low grades or for failing to resolve incompletes in a timely fashion. In special cases the Graduate School permits students who do not meet these minimum standards to continue on probation upon recommendation and support of their advisor.

↗ grad.wisc.edu/documents/probation

A student may be placed on probation or dismissed from the Department of Mechanical Engineering for failing to make satisfactory progress (see Section XVII. Disciplinary action and dismissal).

Most programs require satisfactory progress to continue guaranteed funding support. Unsatisfactory progress may cause students to lose a TA, RA, or Fellowship appointment, and possibly their status as a graduate student.

↗ grad.wisc.edu/documents/satisfactory-progress

i. Probation

If a student was admitted on probation and they satisfy the conditions outlined at the time of admission, probationary status will be removed automatically. Once their studies have begun, students are expected to make satisfactory progress toward their degree.

Students must be in good academic standing with the Graduate School, their program, and their advisor. The Graduate School regularly reviews the record of any student who received grades of BC,

C, D, F, or I in graduate-level courses (300 or above), or grades of U in research and thesis. This review could result in academic probation with a hold on future enrollment, and the student may be suspended from graduate studies.

The Graduate School may also put students on probation for incompletes not cleared within one term. Dissertators will not be placed on probation for incomplete grades in research courses. All incomplete grades must be resolved before a degree is granted.

Please note that any student who is on probation will not be able to enroll for the following semester until their final grades are submitted and the Graduate School has verified they are making satisfactory progress. For any questions relating to probation, please contact The Graduate School Academic Services, at (608) 262-2433 or gsacserv@grad.wisc.edu.

XII. Satisfactory progress: conduct expectations

i. Professional conduct

All students are expected to adhere to the highest standards of professional behavior and ethics. You should avoid even an appearance of improper behavior or lack of ethical standards while in Graduate School at UW–Madison, in all professional settings, and in their personal lives. You should conduct yourself according to the standards expected of members of the profession to which you aspire.

Concerns about infractions of Professional Conduct may be effectively handled informally between the instructor/advisor and the student. If a resolution is not achieved, a graduate program representative may be included in the discussion. Separate and apart from a violation of Professional Conduct, a student may face University disciplinary action with regard to the same action.

You are responsible for reading the information here as well as the information published on all the relevant websites. Lack of knowledge of this information does not excuse any infraction.

1. **Professional Ethics.** You shall:
    - show respect for a diversity of opinions, perspectives, and cultures;
    - accurately represent your work and acknowledge the contributions of others;
    - aim to gain knowledge and contribute to the knowledge base of others;
    - understand the UW Student Code of Conduct;
    ↗ conduct.students.wisc.edu
    - represent your profession and the program; and
    - strive to incorporate and practice disciplinary ideals in your daily lives.

    Resumes/CVs must reflect accurate information.
2. **Honesty and Integrity.** You shall:
    - demonstrate honesty and integrity as shown by honesty and ethics in research and IRB applications—including honesty in interpretation of data; commitment to an unbiased interpretation of academic and professional endeavors; and the need to document research activities, protect subject/client confidentiality, and HIPAA regulations.
    - follow through and pull your weight in group activities and understand where collaboration among students is or is not allowed;
    - not plagiarize others or past work (self-plagiarism), cheat, or purposefully undermine the work of others; and
    - avoid conflicts of interest for the duration of your time in the program.

    As a professional, honesty and integrity also extends to personal behavior in life outside of the academic setting by realizing that students are representatives of the program, UW–Madison, and the profession as a whole.

3. **Interpersonal and Workplace Relationships.** You shall interact with peers, faculty, staff and those your encounter in their professional capacity in a manner that is respectful, considerate, and professional. This includes and is not limited to:
    - attending all scheduled meetings,
    - honoring agreed-upon work schedules,
    - being on-time and prepared for work/meetings,
    - contributing collaboratively to the team,
    - keeping the lines of communication open,
    - offering prompt response to inquiries,
    - and employing respectful use of available equipment/technology/resources.

    Chronic or unexplained absences are unprofessional in the workplace and could be grounds for termination or removal of funding. To facilitate the free and open exchange of ideas, any criticism shall be offered in a constructive manner, and the right of others to hold different opinions shall be respected.

4. **Commitment to Learning.** You are expected to meet you educational responsibilities at all times. Be actively prepared for class and be ready for questions and answers. Be on time for every class and always show courtesy during class or if you have to leave class early. If possible, you should notify the instructor at least one day in advance of a planned absence. Students who are unable to attend class are responsible for finding out what occurred that day and should not expect instructors to give them individual instruction.

    Recognizing that the pursuit of knowledge is a continuous process, you shall show commitment to learning by persevering despite adversity and seeking guidance in order to adapt to change. You shall strive for academic excellence and pursue and incorporate all critique, both positive and negative, in the acquisition of knowledge in order to understand and respect the community in which you work.

5. **Professional Appearance.** You shall convey a positive, professional appearance in order to represent the program in a dignified manner. Appearance includes a person's dress, hygiene, and appropriate etiquette/protocols for the environment (including safety protocols and protective clothing in environments that require them).

This graduate program, the Graduate School, and the Division of Student Life all uphold the UW System policies and procedures in place for academic and non-academic misconduct. In addition, graduate students are held to the same standards of responsible conduct of research as faculty and staff. Furthermore, unprofessional behavior towards clients/subjects, faculty, staff, peers and public are significant issues in the evaluation and promotion of students. In turn, we hold expectations for the highest level of academic integrity and expect professional, ethical, and respectful conduct in all interactions. Students may be disciplined or dismissed from the graduate program for misconduct or disregard for professional conduct expectations regardless of their academic standing in the program. Separate and apart from a violation of Professional Conduct, a student may face University disciplinary action with regard to the same action.

ii. Hostile and intimidating behavior

Hostile and intimidating behavior, sometimes known by the shorthand term "bullying," is defined in university policy as "unwelcome behavior pervasive or severe enough that a reasonable person would find it hostile and/or intimidating and that does not further the University's academic or operational interests."

↗ hr.wisc.edu/hib/principles-and-policies

Hostile and intimidating behavior (HIB) can occur in the university setting. Even individual instances of such behavior can have a significant effect on the person it's aimed at, and can take a physical and emotional toll, reduce the effectiveness of a person's work or learning. It is a significant reason for unhealthy workplace climate and culture and should be addressed immediately. Hostile and intimidating behavior is prohibited by university policy.

a. What is hostile and intimidating behavior?

Hostile and intimidating behavior is defined as unwelcome behavior pervasive or severe to the extent that it makes the conditions for work inhospitable and impairs another person's ability to carry out his/her responsibilities to the university, and that does not further the University's academic or operational interests. A person or a group can perpetrate this behavior. The person need not be more senior than or a supervisor to the target. Unacceptable behavior may include, but is not limited to:

- Abusive expression (including spoken, written, recorded, visual, digital, or nonverbal, etc.) directed at another person in the workplace, such as derogatory remarks or epithets that are outside the range of commonly accepted expressions of disagreement, disapproval, or critique in an academic culture and professional setting that respects free expression;
- Unwarranted physical contact or intimidating gestures;
- Conspicuous exclusion or isolation having the effect of harming another person's reputation in the workplace and hindering another person's work;
- Sabotage of another person's work or impeding another person's capacity for academic expression, be it oral, written, or other;
- Abuse of authority, such as using threats or retaliation in the exercise of authority, supervision, or guidance, or impeding another person from exercising shared governance rights, etc.

Repeated acts or a pattern of hostile and/or intimidating behaviors are of particular concern. A single act typically will not be sufficient to warrant discipline or dismissal, but an especially severe or egregious act may warrant either.

b. What to do if you feel you've been the target of hostile and intimidating behavior

Undesired consequences of hostile and intimidating behavior can be avoided or minimized when the problem is addressed early on, but victims are often hesitant to pursue a formal process before the impact is severe. Educational opportunities and campus resources have been implemented with the intent of aiding all employees and students in defusing situations before they become severe. These resources, including trained personnel who can advise and mediate, comprise the "informal

approach." It is possible that situations will continue to arise in which informal interventions are not effective, and the "formal approach" has been designed to address those situations.

↗ hr.wisc.edu/hib/addressing-hib

You are encouraged to seek out advice and consultation after the first instance of hostile and intimidating behavior: consultation is not escalation. Discussing what's happened in a timely way can often prevent continued bullying. Here are some ways to do this:

- Seek advice from a trusted colleague;
- You may choose to seek informal resolution by approaching the individual yourself or with an intermediary;
- Consult your advisor, human resources representative, department chair, director, dean, or any campus resource to discuss options for resolution;
- Keep notes of what happened, when, where, and who was present. Retain copies of any correspondence.

Graduate students sometimes experience hostile and intimidating behavior from faculty members. If you are a student who is experiencing such behavior, you are entitled to support as a university employee through the Ombuds office, the Dean of Students office, and (if a grad student) the Graduate School. Graduate student workers should also consult with Graduate Coordinators, TAA Stewards, and/or the Graduate School.

↗ ombuds.wisc.edu
↗ doso.students.wisc.edu
↗ grad.wisc.edu/contacts

Mechanical Engineering graduate students with concerns may contact the Associate Chair for Graduate Studies, Chair of the Department of Mechanical Engineering, or the College of Engineering Assistant Dean for Graduate Affairs.

iii. Academic misconduct

Academic misconduct is an act in which a student (UWS 14.03(1)):

1. seeks to claim credit for the work or efforts of another without authorization or citation;
2. uses unauthorized materials or fabricated data in any academic exercise;
3. forges or falsifies academic documents or records;
4. intentionally impedes or damages the academic work of others;
5. engages in conduct aimed at making false representation of a student's academic performance; or
6. assists other students in any of these acts.

Examples of academic misconduct include but are not limited to:

1. cutting and pasting text from the Web without quotation marks or proper citation;
2. paraphrasing from the Web without crediting the source;
3. using notes or a programmable calculator in an exam when such use is not allowed;

4. using another person's ideas, words, or research and presenting it as one's own by not properly crediting the originator;
5. stealing examinations or course materials;
6. changing or creating data in a lab experiment;
7. altering a transcript;
8. signing another person's name to an attendance sheet;
9. hiding a book knowing that another student needs it to prepare for an assignment;
10. collaboration that is contrary to the stated rules of the course; or
11. tampering with a lab experiment or computer program of another student.

Graduate School Policy & Procedure: Misconduct, Academic
↗ grad.wisc.edu/documents/misconduct-academic

Office of Student Conduct and Community Standards: Academic Misconduct
↗ conduct.students.wisc.edu/academic-misconduct

University of Wisconsin System: Chapter UWS 14: Student Academic Disciplinary Procedures
↗ docs.legis.wisconsin.gov/code/admin_code/uws/14

iv. Non-academic misconduct

The university may discipline a student in non-academic matters in the following situations:

1. for conduct which constitutes a serious danger to the personal safety of a member of the university community or guest;
2. for stalking or harassment;
3. for conduct that seriously damages or destroys university property or attempts to damage or destroy university property, or the property of a member of the university community or guest;
4. for conduct that obstructs or seriously impairs university-run or university-authorized activities, or that interferes with or impedes the ability of a member of the university community, or guest, to participate in university-run or university-authorized activities;
5. for unauthorized possession of university property or property of another member of the university community or guest;
6. for acts which violate the provisions of UWS 18, Conduct on University Lands;
7. for knowingly making a false statement to any university employee or agent on a university-related matter, or for refusing to identify oneself to such employee or agent;
8. for violating a standard of conduct, or other requirement or restriction imposed in connection with disciplinary action.

Examples of non-academic misconduct include but are not limited to:

1. engaging in conduct that is a crime involving danger to property or persons, as defined in UWS 18.06(22)(d);
2. attacking or otherwise physically abusing, threatening to physically injure, or physically intimidating a member of the university community or a guest;
3. attacking or throwing rocks or other dangerous objects at law enforcement personnel, or inciting others to do so;
4. selling or delivering a controlled substance, as defined in 161 Wis. Stats., or possessing a controlled substance with intent to sell or deliver;
5. removing, tampering with, or otherwise rendering useless university equipment or property intended for use in preserving or protecting the safety of members of the university community, such as fire alarms, fire extinguisher, fire exit signs, first aid equipment, or emergency telephones; or obstructing fire escape routes;
6. preventing or blocking physical entry to or exit from a university building, corridor, or room;
7. engaging in shouted interruptions, whistling, or similar means of interfering with a classroom presentation or a university-sponsored speech or program;
8. obstructing a university officer or employee engaged in the lawful performance of duties;
9. obstructing or interfering with a student engaged in attending classes or participating in university-run or university-authorized activities;
10. knowingly disrupting access to university computing resources or misusing university computing resources.

Graduate School Academic Policies & Procedures: Misconduct, Non-Academic
↗ grad.wisc.edu/documents/misconduct-nonacademic

Office of Student Conduct and Community Standards: Non-Academic Misconduct
↗ conduct.students.wisc.edu/nonacademic-misconduct

University of Wisconsin System: Chapter UWS 17: Student Non-Academic Disciplinary Procedures
↗ docs.legis.wisconsin.gov/code/admin_code/uws/17

University of Wisconsin System: Chapter UWS 18: Conduct on University Lands
↗ docs.legis.wisconsin.gov/code/admin_code/uws/18

v. Research misconduct

Much of graduate education is carried out not in classrooms, but in laboratories and other research venues, often supported by federal or other external funding sources. Indeed, it is often difficult to distinguish between academic misconduct and cases of research misconduct. Graduate students are held to the same standards of responsible conduct of research as faculty and staff. The Graduate School is responsible for investigating allegations of research misconduct. This is often done in consultation with the Division of Student Life as well as with federal and state agencies to monitor,

investigate, determine sanctions, and train about the responsible conduct of research.
Associate Vice Chancellor for Research Policy, 333 Bascom Hall, (608) 262-1044.

Please see section on “Grievance procedures and misconduct reporting” for further information on reporting research misconduct of others.

Graduate School Policies & Procedures: Responsible Conduct of Research
↗ https://grad.wisc.edu/documents/responsible-conduct-of-research/
Office of the Vice Chancellor for Research and Graduate Education: Research Ethics
↗ research.wisc.edu/compliance-policy/research-ethics

Research and Graduate Education database: Reporting Research Misconduct
↗ kb.wisc.edu/gsadminkb/page.php?id=34486

Research and Graduate Education database: Responsible Conduct of Research Resources
↗ kb.wisc.edu/gsadminkb/search.php?cat=2907

XIII. Academic exception petition

Academic exceptions are considered on a case-by-case basis and should not be considered a precedent. Deviations from normal progress are highly discouraged, but the program recognizes that there are in some cases extenuating academic and personal circumstances. Petitions for exceptions to the Satisfactory Progress Expectations (academic or conduct), or other petitions shall be directed to the Associate Chair for Graduate Studies. The following procedures apply to all petitions:

1. The specific requirement/rule/expectation pertinent to the petition must be identified.
2. Detailed information regarding the reason for the exception must be provided in writing.
3. The student's academic advisor must provide written support for the petition.

The Graduate Committee will review the petition and in consultation with the student's advisor, may grant extensions to normal progress requirements for students who face circumstances (similar to tenure extensions) as noted in university regulations, including significant responsibilities with respect to elder or dependent care obligations, disability or chronic illness, or circumstances beyond one's personal control. Where warranted, the petition should provide good evidence of plans and ability to return to conformance with the standard and to acceptably complete the program.

Note that petitions for extension of academic timelines (e.g., qualifying exams) for childbirth and adoption will be automatically granted as they are covered by the parental leave policy. The normal extension will be one semester; anything beyond this will be granted only in the event of highly extraordinary circumstances. Extensions will be granted formally with a note of explanation to be placed in the student's file. Students who are granted an exception will be reviewed by the Graduate Committee and may be placed on probation (see section XIV. **Disciplinary action and dismissal**).

XIV. Disciplinary action and dismissal

The Mechanical Engineering Department will review the progress of each graduate student at the end of every semester. A student's failure to meet the program's Satisfactory Progress Expectations (academic or conduct) can result in disciplinary action, including immediate dismissal from the program.

Once every semester, the Graduate Committee will conduct a review of all graduate students in the program. A detailed review will be triggered by one or more of the following conditions:

- Cumulative GPA and/or Term GPA was below 3.0.
- An Incomplete was earned in a formal course.
- The advisor gave either an Incomplete or an Unsatisfactory grade on research credits.
- Not participating in the yearly safety and ethics seminars.
- Not taking ME 903 during the first two semesters as a graduate student in Mechanical Engineering programs.
- The Advisor indicated that the student is not making satisfactory progress in the College of Engineering's Graduate On-Line Assessment & Achievement Learning System (GOAALS).
- The Graduate Committee receives documentation from the Advisor that a student is not making satisfactory progress on their research.
- Qualifying exam not taken in required semester, both with or without an exception granted by the Graduate Committee.
- Student does not have an Advisor.
- Failure to complete Preliminary Examination within five years of completing Qualifying Examination.
- Failure to defend dissertation within five years of completing Preliminary Examination.
- Academic misconduct incident.
- Non-academic misconduct incident.
- Research misconduct incident.

The outcome of the Graduate Committee's review will be in the form of a recommendation to the Department Chair and will consist of one of the following:

- Student is in Good Standing. The student is considered to be making satisfactory progress toward their degree. Unless the Chair disagrees with the committee's recommendation, no further action will be taken and no additional notification will be provided.
- Student be placed on Departmental Probation. If the Graduate Committee finds that a student is not making satisfactory progress (see Sections XIII and XIV) they can recommend that the student be placed on Departmental Probation based on the supplied action plan or lack of progress on an existing action plan. The student is permitted to enroll in the subsequent semester, but the student and their advisor must put forward a specific plan with dates and deadlines in place in regard to removal of probationary status by the end of the following semester.

- Student be Dismissed from the Mechanical Engineering Department. The student has demonstrated a sustained lack of progress toward degree completion or has been found guilty of significant academic, non-academic, or research misconduct by the Dean of Students. If a student is on Departmental Probation for multiple semesters (sequential or dispersed) the Graduate Committee may recommend that the student be Dismissed from the Department of Mechanical Engineering. The student will not be allowed to enroll in the subsequent semester. Students who have been dismissed from the Mechanical Engineering program will need to reapply to the department if they want to pursue a degree in Mechanical Engineering. Applications will not be considered within one calendar year of dismissal.

In the event that the result of the review is a recommendation of Departmental Probation or Dismissal from the Department, the recommendation will be transmitted to the student by letter from the Graduate Committee, and the final decision of the Chair will be transmitted in a separate letter. No notification will be given to students in Good Standing.

If a student is on Departmental Probation, the Mechanical Engineering Graduate Committee may recommend revoking that student's funding guarantee. Graduate students can receive financial support through a scholarship, fellowship, assistantship, etc., without a funding guarantee. The lack of a funding guarantee only means that the student's Advisor and the Department of Mechanical Engineering are not obligated to financially support them.

A student will be removed from Departmental Probation and considered in Good Standing when they have completed their Action Plan in a satisfactory manner. In other words, once a student is again making satisfactory academic progress they will be considered in Good Standing, hence removed from Probation.

Funding guarantees are not automatically reinstated after a student is removed from Departmental Probation and is again in Good Standing.

XV. Grievance procedures and reporting misconduct and crime

i. 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. The Assistant Dean for Graduate Affairs (engr-dean-graduateaffairs@engr.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.

↗ grad.wisc.edu/documents/grievances-and-appeals

ii. Department of Mechanical Engineering's procedures for proper accounting of student grievances

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 Department Chair 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. Find University resources for sexual harassment, discrimination, disability accommodations, and other related concerns at the UW Office of Equity and Diversity.

   ↗ https://diversity.wisc.edu

   Other campus resources:

   The Graduate School
   ↗ grad.wisc.edu

   McBurney Disability Resource Center
   ↗ mcburney.wisc.edu

   Employee Assistance Office
   ↗ eao.wisc.edu

   Ombuds Office
   ↗ ombuds.wisc.edu

University Health Services
↗ uhs.wisc.edu

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.
↗ grad.wisc.edu/documents/grievances-and-appeals

iii. Reporting misconduct and crime

The campus has established policies governing student conduct, academic dishonesty, discrimination, and harassment/abuse as well as specific reporting requirements in certain cases. If you have a grievance regarding unfair treatment towards yourself, please reference the procedures and resources identified above.

If you learn about, observe, or witness misconduct or other wrongdoing, you may be required to report that misconduct or abuse. Depending on the situation, it may be appropriate to consult with your advisor, Graduate Program Coordinator, or other campus resources (such as the UW Office of Equity and Diversity, Graduate School, Mc Burney Disability Resource Center, Employee Assistance Office, Ombuds Office, and University Health Services).

a. Research misconduct reporting

The University of Wisconsin–Madison strives to foster the highest scholarly and ethical standards among its students, faculty, and staff. Graduate students and research associates are among the most vulnerable groups when reporting misconduct because their source of financial support and the progress in their careers may be at risk by raising questions of wrongdoing. They are also often the closest witnesses to wrong doing when it occurs and therefore must be appropriately protected from the consequences of reporting wrongdoing and be informed of their rights.

↗ research.wisc.edu/compliance-policy/research-ethics

b. Academic misconduct reporting

If you know a classmate is cheating on an exam or other academic exercise, notify your professor, teaching assistant, or proctor of the exam. As a part of the university community, you are expected to uphold the standards of the university. Also, consider how your classmate's dishonesty may affect the overall grading curve and integrity of the program.

c. Sexual assault reporting

Faculty, staff, teaching assistants, and others who work directly with students at UW–Madison are required by law to report first-hand knowledge or disclosures of sexual assault to university officials, specifically the Office for Equity & Diversity or the Division of Student Life. This effort is not the same as filing a criminal report. Disclosing the victim's name is not required as part of this report.

↗ doso.students.wisc.edu/report-an-issue

d. Child abuse reporting

As a UW–Madison employee (under Wisconsin Executive Order #54), you are required to immediately report child abuse or neglect to Child Protective Services (CPS) or law enforcement if, in the course of employment, the employee observes an incident or threat of child abuse or neglect, or learns of an incident or threat of child abuse or neglect, and the employee has reasonable cause to believe that child abuse or neglect has occurred or will occur. Volunteers working for UW–Madison sponsored programs or activities are also expected to report suspected abuse or neglect. Please find full details at:

↗ compliance.wisc.edu/titleix/mandatory-reporting

e. Reporting and response to incidents of bias/hate

The University of Wisconsin–Madison values a diverse community where all members are able to participate fully in the Wisconsin Experience. Incidents of bias/hate affecting a person or group create a hostile climate and negatively impact the quality of the Wisconsin Experience for community members. UW–Madison takes such incidents seriously and will investigate and respond to reported or observed incidents of bias/hate.

↗ doso.students.wisc.edu/report-an-issue

Engineering Mechanics Programs / Curriculum / Policies and Procedures

XVI. Graduate Student Seminar for Engineering Mechanics MS-Research and PhD students

Provided that students do not have a scheduling conflict, regular attendance of the Mechanics Seminar Series (see https://mechanics.wisc.edu/) is a professional expectation of our graduate students, regardless of formal enrollment in the seminar course (EMA 601).

All Engineering Mechanics MS Research and PhD graduate students are also expected to attend at least one additional research seminar or research group meeting where they may present their own research in a seminar format. First year graduate students are exempt from giving a presentation (although they may volunteer to give one), but all non-first-year graduate students are expected to present on an annual basis.

The goals of the presentation requirement include:

- Provide professional development opportunities for graduate students.
- Improve the oral presentation skills of graduate students.
- Improve the ability of graduate students to "think on their feet."
- Provide an opportunity for graduate students to further understand and explain the context of their research.
- Provide a forum in which conference presentations can be practiced in front of a large technical audience.
- Improve information exchange between research groups.
- Enhance the sense of community among students in the Engineering Mechanics graduate programs.

XVII. Engineering Mechanics Master of Science (MS) degree requirements

The Department of Mechanical Engineering offers several different Master of Science in Engineering Mechanics degrees options. These include the following named options:

- MS Engineering Mechanics: Research (2 tracks)
  - Thesis
  - Non-thesis
- MS Engineering Mechanics: Aerospace Engineering*

*This program is an accelerated MS program meant to be completed in 12 months (two terms for UW–Madison College of Engineering undergraduates or three terms for all other students). Students in this program do not have a research adviser. They will have an academic advisor assigned prior to beginning the program.

i. Course and grade requirements

a. Research—Thesis track

Curriculum: Total of 30 credits required:

a. Graduate Student Seminar: See section IX.

b. At least 15 course credits must be 600-level or above or from the following list: EMA 508, 519, 522, 523, 540, 541, 547, 548, 570.

c. Math Requirement: At least 3 credits (1 course) must be from a course in applied mathematics from the following list: EMA 547, 548; MATH 519, 521, 522, 540, 619, 623, 703, 704, 714, 715.

d. Breadth Requirement: Students must take at least 5 courses from the lists below. At least 3 courses must be identified by an *. The courses must span at least 2 of the 3 areas defined below. For each of the 2 areas, the student must take at least 2 courses.

   i. Solid Mechanics: EMA 506*, 508, 519*, 541*, 570, 605*, 611*, 615*, 630*, 700*, 703, 705*, 706, 708, 710, 722; ME 516, 753

   ii. Fluid Mechanics: EMA 521*,524*, 710; ME 563*, 572*, 573*, 769, 770, 774, 775; MATH 705

   iii. Dynamics: EMA 523*, 540*, 542*, 545*, 550, 610*, 642*, 742*, 745*, 747*; ME 577, 740, 747or 733, 748

e. Depth Requirement: At least 2 courses (6 credits) must be 700-level or above in mechanics, defined as from EMA or from List 1 in the handbook (see Coursework Requirements for the PhD degree).

   i. EMA 601 Special Topics courses may only be counted as 700-level if designated as such by the instructor.

ii. The following courses do not fulfill the 700-level or above depth requirements: EMA 790, 890, 990, or 999.

f. Independent Study/Research Credits: All MS-Research students must take at least 3 credits of EMA 599 (Independent Study). A maximum of 6 credits of EMA 599 may be used toward the 30-credit minimum for the degree. Students who conduct thesis research may use a combined total of 12 credits of EMA 599 and EMA 790 (Master's Research and Thesis) toward the 30-credit minimium. Credit for EMA 790 will be granted toward meeting the MS requirements only when a formal MS thesis is submitted and approved by the thesis committee.

   i. Research and Thesis Credits: EMA 790 is for research that is expected to lead to an MS thesis. EMA 890 is for PhD research where a student has not yet become a dissertator and the research will not be used for an MS thesis. EMA 990 is for PhD dissertation research where the student is a dissertator. Credits taken per semester are variable. Students should discuss the appropriate number of credit for a specific semester with their advisors.

g. [Optional] Seminar: Up to 3 credits of Mechanics Seminar may be used to count toward the 30-credit degree minimum.

h. Minimum Graduate Coursework (50%) Requirement:

   i. At least 15 credits applied toward the program's graduate degree credit requirement must be courses designed for graduate work. Classes that satisfy this requirement are indicated as having the attribute Minimum Graduate Coursework (50%) in the course guide: http://guide.wisc.edu/.

i. An oral examination on the thesis. Master's Thesis Guidelines:
↗ grad.wisc.edu/currentstudents/mastersthesis

Course Level and Type Information:

j. Acceptable courses are those numbered 500 and above, except where specified.

k. The schedule of active technical elective and graduate courses taught by Mechanical Engineering faculty is provided here: Mechanical Engineering Technical Elective and Graduate Course Plan - Google Drive. While the list is updated annually, it is subject to change. For information on cross-listed courses taught and/or owned by other departments, please contact that department directly.

Grade Policy:

l. The Gradute School requires an average record of B or better in all 300-level or above courses taken as a graduate student, regardless of whether a course counts for credit in the program. The Graduate School reviews each student's progress every semester and will usually refuse continued enrolment after two semesters of below B-average grades unless unusual or extenuating circumstances have prevailed. The Graduate School requires a minimum 3.0/4.0 GPA on the entire graduate record.

m. The Engineering Mechanics program requires a GPA of at least 3.0 based on all course credits attempted applicable to the degree credit requirement.

n. Also, all courses counting toward degree requirements must be taken for credit (not audit), and satisfactory grades are acceptable only for couses offered strictly on an S/U basis.

o. Credits with a grade of "D" or "F" cannot be used to satisfy requirements.

Satisfying Requirements with Previous Coursework:

p. With permission from their faculty advisors and the Associate Chair for Graduate Studies:

   i. Students may use up to 6 credits of technical coursework taken as part of a graduate program at another institution if they meet departmental MS requirements.

   ii. Students with a BS degree in engineering from UW-Madison may use up to 7 credits of their undergraduate work towards their MS degree.

   iii. Student with a BS degree from an ABET accredited engineering discipline at another institution may use up to 7 credits of undergraduate work in mechanics toward their MS degree.

q. **Use and Restrictions:**

   i. In all situations, the Graduate School stipulates that only coursework earned within tenyears of acceptance to a UW-Madison master's program may be considered.

   ii. Previously earned credits may not be used to satisfy depth (including all 700+) requirements.

   iii. For the breadth and math requirements of the EM MS – Research and PhD programs, students may apply previously earned credit that has been taken as part of a graduate program.

Advisor Approval of Study Plan:

r. The faculty advisor must always approve the courses a student takes in the MS program. Students should schedule an appointment with their adviser when selecting their courses. During the final semester, the faculty advisor will review the courses taken again and if approved sign the warrant request form.

Additional Policies:

s. Term Enrollment Requirements:

   i. Full-time student status requires a student to enroll for a minimum of 8 credits numbered 500 and above, including research credits, each semester until the student becomes a PhD dissertator. The normal maximum number of credits is 15. Dissertators must enroll for three credits during the fall and spring semesters. (See https://grad.wisc.edu/documents/dissertatorstatus/)

   ii. Holders of research assistantships, teaching assistantships, traineeships, or fellowships are required to maintain full-time status each semester. Research assistants are expected to register for at least two credits (3 credits for dissertators) during the summer session. Teaching assistants with summer appointments need not normally be registered during the summer. Fellowship holders should consult the terms for their fellowship. A full-time student is limited to 12 credits during the summer.

t. Final term of enrollment: You must be enrolled for the semester in which you will graduate and successfully complete the courses in which you are enrolled.

u. Timeline for Completion: Students with a Bachelor of Science in Engineering Mechanics or equivalent are typically expected to complete the MS – Research degree in 3 semesters. Students with non-EM backgrounds will typically be permitted 4 semesters to complete their master's if more than 27 credits are required.

THESIS and DEFENSE:

v. Research Credits (EMA 790) will be granted toward meeting the MS requirements only when a formal MS thesis is submitted and approved by the thesis committee.

w. **COMMITTEE:**

- Candidates submitting an MS thesis must pass an oral defense administered by a three-member committee, selected by the faculty advisor.
- At least two of the committee members must be members of the UW-Madison Graduate Faculty. (For more information, see https://grad.wisc.edu/documents/committees/).
- Graduate faculty hold the title of professor, associate professor, or assistant professor as listed in the UW–Madison directory:
  ↗ wisc.edu/directories/
- To determine if a retired faculty member has emeritus status check the UW–Madison directory; if the person is listed in the directory with the title emeritus, then they have emeritus status.
- To have an academic staff member approved to serve on committees have them submit their current curriculum vitae to the ME Graduate Coordinator or to the Associate Chair for Graduate Studies (i.e., Director of Graduate Studies, Chair of the Graduate Committee) for approval by the department executive committee.
- Committee members beyond the third member must conform to the list on the graduate school's website (https://grad.wisc.edu/acadpolicy/#committees), and must be approved by the student's advisor.
  ↗ grad.wisc.edu/documents/committees

x. Defense: Typically, the student presents an overview of their thesis/research, and then the examiners ask questions in closed session.

y. Students must submit the final-draft copy of their thesis to the examination committee at least one week prior to the exam.

z. The final version of your thesis must be submitted to Memorial Library via the email process explained on the Graduate School **Completing Your Master's Degree** webpage, before the degree deadline. You should have an approval page (separate and prior to your title page) created for your advisor's signature and the date. Note that if you miss the deadline, you will be responsible for tuition and fees for an additional semester. Please thoroughly review The Graduate School **Completing Your Master's Degree** webpage for required document and submission specifics: https://grad.wisc.edu/current-students/masters-guide/.

b. Research—Non Thesis track

Curriculum: Total of 30 Credits required:

a. Graduate Student Seminar: See section IX.

b. At least 15 course credits must be 600-level or above or from the following list: EMA 508, 519, 522, 523, 540, 541, 547, 548, 570.

c. Math Requirement: At least 3 credits (1 course) must be from a course in applied mathematics from the following list: EMA 547, 548; MATH 519, 521, 522, 540, 619, 623, 703, 704, 714, 715.

d. Breadth Requirement: Students must take at least 5 courses from the lists below. At least 3 must be identified by an *. The courses must span at least 2 of the 3 areas defined below. For each of the 2 areas, the student must take at least 2 courses.

   i. Solid Mechanics: EMA 506*, 508, 519*, 541*, 570, 605*, 611*, 615*, 630*, 700*, 703, 705*, 706, 708, 710, 722; ME 516, 753

   ii. Fluid Mechanics: EMA 521*, 524*, 710; ME 563*, 572*, 573*, 769, 770, 774, 775; MATH 705

   iii. Dynamics: EMA 523*, 540*, 542*, 545*, 550, 610*, 642*, 742*, 745*, 747*; ME 577, 740, 747or 733, 748

e. Depth Requirement: At least 2 courses (6 credits) must be 700-level or above in mechanics, defined as from EMA or from List 1 in the handbook (see Coursework Requirements for the PhD degree).

   i. EMA 601 Special Topics courses may only be counted as 700-level if designated as such by the instructor.

   ii. The following courses do not fulfill the 700-level or above depth requirements: EMA 790, 890, 990, or 999.

f. Independent Study: All MS-Research students must take at least 3 credits of EMA 599 (Independent Study). A maximum of 6 credits of EMA 599 may be used toward the 30-credit minimum for the degree.

g. Research and Thesis Credits: Research and thesis credits (such as EMA 790) will not be counted toward the MS degree requirements in the non-thesis track of the MS – Research program.

h. [Optional] Seminar: Up to 3 credits of Mechanics Seminar may be used to count toward the 30-credit degree minimum.

i. Minimum Graduate Coursework (50%) Requirement:

   i. At least 15 credits applied toward the program's graduate degree credit requirement must be courses designed for graduate work. Classes that satisfy this requirement are indicated as having the attribute Minimum Graduate Coursework (50%) in the course guide: http://guide.wisc.edu/.

Course Level and Type Information:

j. Acceptable formal courses are those numbered 500 and above, except where specified.

k. The schedule of active technical elective and graduate courses taught by Mechanical Engineering faculty is provided here: Mechanical Engineering Technical Elective and Graduate Course Plan - Google Drive. While the list is updated annually, it is subject to change. For information on cross-listed courses taught and/or owned by other departments, please contact that department directly.

Grade Policy:

l. The Gradute School requires an average record of B or better in all 300-level or above courses taken as a graduate student, regardless of whether a course counts for credit in the program. The Graduate School reviews each student's progress every semester and will usually refuse continued enrolment after two semesters of below B-average grades unless unusual or extenuating circumstances have prevailed. The Graduate School requires a minimum 3.0/4.0 GPA on the entire graduate record.

m. The Engineering Mechanics program requires a GPA of at least 3.0 based on all course credits attempted applicable to the degree credit requirement.

n. Also, all courses counting toward degree requirements must be taken for credit (not audit), and satisfactory graes are acceptable only for couses offered strictly on an S/U basis.

o. Credits with a grade of "D" or "F" cannot be used to satisfy requirements.

Satisfying Requirements with Previous Courswork:

p. With permission from their faculty advisors and the Associate Chair for Graduate Studies:

   i. Students may use up to 6 credits of technical coursework taken as part of a graduate program at another institution if they meet departmental MS requirements.

   ii. Students with a BS degree in engineering from UW-Madison may use up to 7 credits of their undergraduate work towards their MS degree.

   iii. Student with a BS degree from an ABET accredited engineering discipline at another institution may use up to 7 credits of undergraduate work in mechanics toward their MS degree.

q. **Use and Restrictions:**

   i. In all situations, the Graduate School stipulates that only coursework earned within ten years of acceptance to a UW-Madison master's program may be considered.

   ii. Previously earned credits may not be used to satisfy depth (including all 700+) requirements.

   iii. For the breadth and math requirements of the EM MS – Research and PhD programs, students may apply previously earned credit that has been taken as part of a graduate program.

Advisor Approval of Study Plan:

r. The faculty advisor must always approve the courses a student takes in the MS program. Students should schedule an appointment with their adviser when selecting their courses. During the final

semester, the faculty advisor will review the courses taken again and if approved sign the warrant request form.

Additional Policies:

s. Term Enrollment Requirements:

   i. Full-time student status requires a student to enroll for a minimum of 8 credits numbered 300 and above, including research credits, each semester until the student becomes a PhD dissertator. The normal maximum number of credits is 15. Dissertators must enroll for three credits during the fall and spring semesters. (See https://grad.wisc.edu/documents/dissertatorstatus/)

   ii. Holders of research assistantships, teaching assistantships, traineeships, or fellowships are required to maintain full-time status each semester. Research assistants are expected to register for at least two credits (3 credits for dissertators) during the summer session. Teaching assistants with summer appointments need not normally be registered during the summer. Fellowship holders should consult the terms for their fellowship. A full-time student is limited to 12 credits during the summer.

t. Final term of enrollment: You must be enrolled for the semester in which you will graduate and successfully complete the courses in which you are enrolled.

u. Timeline for Completion: Students with a Bachelor of Science in Engineering Mechanics or equivalent are typically expected to complete the MS – Research, non-thesis degree in 3 semesters. Students with non-EM backgrounds will typically be permitted 4 semesters to complete their master's if more than 27 credits are required.

c. Aerospace Engineering

Curriculum: Total of 30 credits required:

a. Minimum Graduate Coursework (50%) Requirement:

   a. At least 15 credits applied toward the program's graduate degree credit requirement must be courses designed for graduate work. Classes that satisfy this requirement are indicated as having the attribute Minimum Graduate Coursework (50%) in the course guide: http://guide.wisc.edu/.

b. Engineering Analysis course: 3 credits

   Required:

   EP/EMA 547 Engineering Analysis I

   OR

   EP/EMA 548 Engineering Analysis II

c. Technical Elective: 3 credits

   Required: May be fulfilled through any of the following options:

   EMA 601 Topic: Mechanics Seminar *(this topic ONLY) (maximum of 2 credits permitted to count toward minimum degree requirements)*

   EP 468 Introducation to Engineering Research *(Graduate Student Section ONLY)*

   EMA 599 Independent Study

   ME 699 Advanced Independent Study

   (ME 702 Graduate Co-op/Internship – only permitted with faculty advisor approval and Academic Exception Appeal approved by the ME Graduate Committee – appeal must be approved PRIOR to going on co-op/internship)

d. Courses numbered 700 and above: 3 credits

   Required: Students must take at least one course (3 credits) in E M A in any course numbered 700 or greater. (Seminar, research, and co-op courses [such as EMA 790, EMA 890, EMA 990, EMA 702] are not eligible to satisfy this requirement.)

e. Depth Requirement (Topical Area)

   i. To establish sufficient depth in aerospace sciences, the courses selected must involve completion of at least two fo the five topical areas (found below). Check the future course offerings plan when choosing, since not all courses are offered every yer. Thus, not all topical areas can be completed each year. The schedule of technical elective and graduate courses taught by the Mechanical Engineering faculty is provided here: Mechanical Engineering Technical Elective and Graduate Course Plan.

f. Remaining Courses

i. The additional courses required to meet the 30-credit minimum for completion of the degree should be selected from among the additional courses listed within the topical list or the Electives lists found within Guide.

Topical Areas

Fluid and Thermal Sciences

- Required:*
  - EMA 521 Aerodynamics
- Select One:
  - EMA 524 Rocket Propulsion
  - ME 471 Gas Turbine and Jet Propulsion
  - ME 561 Intermediate Thermodynamics
  - ME 563 Intermediate Fluid Dynamics
  - ME 564 Heat Transfer
  - ME 572 Intermediate Gas Dynamics
  - ME 761 Topics in Thermodynamics
  - ME 764 Advanced Heat Transfer I – Conduction
  - ME 769 Combustion Processes
  - ME/CEE/EMA 775 Turbulent Heat and Momentum Transfer

Rigid Body Dynamics

- Required:*
  - EMA 542 Advanced Dynamics
- Select One:
  - EMA 523 Flight Dynamics and Control
  - EMA/ASTRON 550 Astrodynamics
  - EMA 642 Satellite Dynamics
  - ME 451 Kinematics and Dynamics of Machine Systems
  - ME 746 or ME/ECE 732 Dynamics of Controlled Systems
  - ME 751 Advanced Computational Dynamics

Structural Dynamics

- Select One:
  - ME 440 Intermediate Vibrations
  - EMA 545 Mechanical Vibrations
  - ECE 717 Linear Systems
- Select One:
  - ME/EMA 540 Experimental Vibrations and Dynamic System Analysis
  - EMA 610 Structural Finite Element Model Validation
  - EMA 740 Advanced Vibrations
  - EMA 747 Nonlinear and Random Mechanical Vibrations

Aerospace Mechanics and Materials

- Select Two Courses:
  - EMA 506 Advanced Mechanics of Materials I
  - EMA/CEE/ME 508 Composite Materials
  - EMA 519 Fracture Mechanics
  - EMA/MSE 541 Heterogeneous and Multiphase Materials
  - EMA 630 Viscoelastic Solids
  - EMA 700 Theory of Elasticity
  - EMA/ME 703 Plasticity Theory and Physics
  - EMA/ME 706 Plates, Shells and Pressure Vessels
  - EMA 710 Mechanics of Continua

Computation

- Select One:*
  - EMA 605 Introduction to Finite Elements
  - ME 573 Computational Fluid Dynamics
- Select One:
  - EMA 705 Advances Topics in Finite Elements
  - ME/CS/ECE 532 Matrix Methods in Machine Learning
  - ME/CS/ECE 539 Introduction to Artificial Neural Networks
  - ME 548 Introduction to Design Optimization
  - ME/CS/ISyE 558 Introduction to Computational Geometry
  - ME 748 Optimum Design of Mechanical Elements and Systems
  - ME/EMA/COMP SCI/ECE/EP 759 High Performance Computing for Applications in Engineering
  - MATH/CS 513 Numerical Linear Algebra
  - MATH/CS 514 Numerical Analysis
  - MATH/CS 714 Methods of Computational Mathematics I

**Students who have completed an equivalent course as an undergraduate may take an additional class from within same topical area the list that follows.*

Course Level and Type Information:

g. Acceptable formal courses are those numbered 300 and above.

Thesis Coursework:

h. Thesis research credits are not permitted.

Grade Policy:

i. The Graduate School requires an average record of B or better in all 300-level or above courses taken as a graduate student, regardless of whether a course counts for credit in the program. The Graduate School reviews each student's progress every semester and will usually refuse continued enrolment after two semesters of below B-average grades unless unusual or

extenuating circumstances have prevailed. The Graduate School requires a minimum 3.0/4.0 GPA on the entire graduate record.

j. The Engineering Mechanics program requires a GPA of at least 3.0 based on all course credits attempted applicable to the degree credit requirement.

k. Also, all courses counting toward degree requirements must be taken for credit (not audit), and satisfactory graes are acceptable only for couses offered strictly on an S/U basis.

l. Credits with a grade of "D" or "F" cannot be used to satisfy requirements.

Satisfying Requirements with Previous Courswork:

m. With permission from their faculty advisors and the Associate Chair for Graduate Studies:

   ii. Students may use up to 6 credits of technical coursework taken as part of a graduate program at another institution if they meet departmental MS requirements.

   iii. Students with a BS degree in engineering from UW-Madison may use up to 7 credits of their undergraduate work towards their MS degree.

   iv. Student with a BS degree from an ABET accredited engineering discipline at another institution may use up to 7 credits of undergraduate work in mechanics toward their MS degree.

n. **Use and Restrictions:**

   i. In all situations, the Graduate School stipulates that only coursework earned within five years of acceptance to a UW-Madison master's program may be considered.

   ii. Previously earned credits may not be used to satisfy the 700-level course requirement.

Advisor Assignment and Advisor Approval of Study Plan:

o. Students admitted to the MS – Aerospace Engineering program will be assigned a faculty advisor prior to enrollment.

p. The faculty advisor must always approve the courses a student takes in the MS program. Students should schedule an appointment with their adviser when selecting their courses. During the final semester, the faculty advisor will review the courses taken again and if approved sign the warrant request form.

Funding Information:

q. Students enrolled in the Master of Science in Engineering Mechanics, Aerospace Engineering program are not eligible to receive tuition remission from graduate assistantship appointments at this institution.

r. Students are strongly discouraged to pursue positions as Project Assistants, Teaching Assistants, or Research Assistants during their time in this program, as the rigor and accelerated nature of this program may not accomdate those work time commitments.

Additional Policies:

s. Full-time student status requires a student to enroll for a minimum of 8 credits of coursework numbered 300 and above in Fall and Spring semesters. The normal maximum number of credits is 15 credits. A full-time student is limited to 12 credits in the summer.

t. You must be enrolled for the semester in which you will graduate and successfully complete the courses in which you are enrolled.

u. Students are expected to complete the Aerospace Engineering MS degree program in 2 – 3 semesters. One additional semester is permitted to complete the requirements, if needed.

Career Opportunites:

v. Graduates of our Engineering Mechanics programs are sought by many industries and government agencies. With the aerospace emphasis of the Aersopace Engineering MS, graduates can capitalize upon the following career opportunities, to name a few:

   Commercial spaceflight continues to expand new employment opportunities. Space access is as important as ever, and the industry is transitioning from one in which the government was the key player to one that is driven commercially.

   Hypersonic aircraft have been the focal point for defense applications. The U.S. has increased its funding in this area and will continue to do so to maintain parity with other nations.

   Supersonic business jets are being developed by several companies that anticipate having commercial products in the coming years. The FAA's restrictions on supersonic flight over land are expected to be relaxed, potentially leading to a resurgence in high-speed flight as a major business area.

   Numerical simulation has supplemented and replaced portions of traditional aerospace design and development. Demand in this area will continue to grow as developments in computer hardware and computational methods lead to ever more realistic simulation of aerospace systems.

ii. Credits taken as a University Special Student

Applies to all options

Students are encouraged to enter a graduate program as early as possible and not to "try out" the program as University Special students. Officially entering the program allows the student to receive appropriate advising and be fully integrated into the program structure. If University Special student credits are accepted by a program to fulfill program requirements, it is done on a case-by-case basis and must be approved by the program. The number of credits that may transfer from a UW–Madison University Special student career to a UW–Madison graduate career is limited to no more than fifteen credits numbered 400 or above.

iii. Learning outcomes (learning goals)

Learning outcomes are the anticipated knowledge, skills, and values expected to be acquired by all students completing their master's degree.

1. Demonstrate a strong 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.

iv. Length of time to degree

a. Research— both Thesis and Non-Thesis tracks

The majority of Engineering Mechanics MS students will complete their degree in 3 years or less.[6] Any student unable to defend their thesis in this period will be reviewed by the Mechanical Engineering Graduate Committee to determine why it is taking longer than expected to complete their degree. It is recognized that there are many reasons why a graduate student may require more time to complete their degree. Therefore, the Mechanical Engineering Graduate Committee will request the following information from the student to review during their meeting:

- Date
- Name of student
- Name of advisor
- Accomplishments to date (300 words or less)
- Extenuating circumstances, if any
- Plans for degree completion (include predicted defense date)

[6] Data on Time to Degree can be found at the following Graduate School website: grad.wisc.edu/data/degrees-awarded

b. Aerospace Engineering

Students are expected to complete the Aerospace Engineering MS degree program in 2 – 3 semesters. One additional semester is permitted to complete the requirements, if needed. Any student unable to complete their degree in this period will be reviewed by the Mechanical Engineering Graduate Committee to determine why it is taking longer than expected to complete their degree. It is recognized that there are many reasons why a graduate student may require more time to complete their degree. Therefore, the Mechanical Engineering Graduate Committee will request the following information from the student to review during their meeting:

- Date
- Name of student
- Accomplishments to date (300 words or less)
- Extenuating circumstances, if any
- Plans for degree completion (include predicted graduation date)

v. MS degree final checklist

At least four weeks prior to the oral examination (MS Research—Thesis track students) or the degree deadline (MS Research—Non-Thesis track, Aerospace Engineering), students must complete and return the correct Warrant Request form. Warrant request forms:

↗ intranet.engineering.wisc.edu/mechanical-engineering/current-me-student-resources/

The completed and signed warrant request form should be submitted to the Mechanical Engineering Graduate Coordinator. The Graduate Coordinator will review your degree request and work with the Graduate School to create a degree warrant. When the warrant is ready, students will be notified via WiscMail. Students will then retrieve their degree warrant.

It is the student's responsibility to obtain signatures and dates and return the completed warrant to the ME Graduate Coordinator by the degree deadline in order to receive their degree. Degree deadlines:

↗ grad.wisc.edu/deadlines

XVIII. Engineering Mechanics PhD degree Requirements

i. Summary of steps toward a PhD in Engineering Mechanics

Admission to the Department of Mechanical Engineering, Engineering Mechanics Graduate Program.

Sufficient scores on the Engineering Mechanics qualifying examination.

Approval of "Doctoral Plan of Study" document by the Mechanical Engineering Graduate Committee.

Approval by the Preliminary Examination Committee.

Approval of dissertation and final examination.

ii. Course and grade requirements

Curriculum: Total of 60 credits required:

a. Graduate Student Seminar: See section IX.

b. At least 36 of the 60 credits must be technical coursework and satisfy the requirements below. All coursework for the PhD is technical and must be 500-level or above. Individual courses may satisfy more than one area. It is acceptable for students who earned an MS degree in Engineering Mechanics at UW-Madison to use coursework completed while in the UW-Madison MS degree program to meet the requirements below.

    a. 50% Minimum Graduate Level Coursework: 50% of credits (minimum 30 credits) applied toward the program's graduate degree credit requirement must be courses designed for graduate work (this includes, but is not limited to, graduate thesis/research, independent study, and practicum/internship credits). Classes that satisfy this requirement are indicated as having the attribute Minimum Graduate Coursework (50%) in the course guide.

    b. 600+Level EMA courses: At least 21 credits must be level 600-level and above or from the following list: EMA 508, 519, 522, 523, 540, 541, 547, 548, 570.

    c. Mathematics Requirement: At least 6 credits (2 courses) must be from a course in applied mathematics from the following list: EMA 547, 548; MATH 519, 521, 522, 540, 619, 623, 703, 704, 714, 715.

    d. Breadth Requirement: As part of their MS or PhD, 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 in the MS requirements above.

        Solid Mechanics

        Fluid Mechanics

        Dynamics

e. Depth Requirement: At least 4 courses (12 credits) must be 700-level or above in mechanics, applied mathematics, or computer science. At least 2 courses (6 credits) must be from EMA or List 1. The remaining 2 courses (6 credits) may be from EMA, List 1, or List 2.

   EMA 601 Special Topics courses may only be counted as 700-level if designated as such by the instructor.

   The following courses do not fulfill the depth requirement: EMA 790, 890, 990, or 999.

LIST 1: 700-level or above courses in mechanics

EMA	All 700-level and higher, except EMA 790, 890, 990, and 999
CBE 720	Physiochemical Hydrodynanics
CivEngr/GLE 730	Engineering Properties of Soils
CivEngr/GLE 735	Soil Dynamics
MATH 705	Mathematical Fluid Dynamics
ME 740	Advanced Vibrations
ME 746 or ME/ECE 732	Dynamics of Controlled Systems
ME 747 or ME/ECE 733	Advaced Computer Control of Machines and Processes
ME 748	Optimal Design of Mechanical Elements and Systems
ME 751	Advanced Computational Dynamics
ME 753	Friction, Lubrication and Wear
ME 769	Combustion Processes
ME 770	Advanced Experimental Instrumentation
ME 774	Chem Kinetics of Combustion Systems
ME/EMA/CivEngr 775	Turbulent Heat and Momentum Transfer

LIST 2: Other 700-level or above courses in physics, computer science, and math

CS/MATH 714	Methods of Computational Mathematics I
CS/MATH 715	Methods of Computational Mathematics II
CS/ECE 760	Machine Learning
CS/ECE 761	Mathematical Foundations of Machine Learning
ECE 717	Linear Systems
ECE 719	Optimal Systems
ECE/CBE/MATH 777	Nonlinear Dynamics, Bifurcations and Chaos
ECE/CS/STAT 861	Theoretical Foundations of Machine Learning
MATH 703	Methods of Applied Mathematics 1
MATH 704	Methods of Applied Mathematics 2
ME 718	Modeling and Simulation in Polymer Processing
ME 758	Solid Modeling
ME 761	Topics in Thermodynamics
ME 764	Advanced Heat Transfer I-Conduction
MS&E 748	Structural Analysis of Materials
MS&E 750	Imperfections and Mechanical Properties
MS&E 760	Molecular Dynamics & Monte Carlo Simulations in Material Sci
PHYSICS 711	Theoretical Physics - Dynamics

PHYSICS 715	Statistical Mechanics
PHYSICS 721	Theoretical Physics - Electrodynamics
PHYSICS 731	Quantum Mechanics I
PHYSICS 732	Quantum Mechanics II
PHYSICS 751	Advanced Solid State Physics
PHYSICS 801	Nanostructures in Science & Technology *(Nanostructures in Science and Technology topic ONLY)*

c. Research/Thesis Credits: The remaining credits are research thesis credits (EMA 890 and EMA 990) and are required with an overall grade of S. Thesis credits must be from the Department of Mechanical Engineering, except in the case of an approved co-advisor; credit then can be obtained through the co-advisor's department. Pre-dissertators should enroll in EMA 890 and dissertators in EMA 990.

d. Technical Minor Requirement: The technical minor is a University Doctoral Minor and will appear on the official transcript. The minor field of study must be distinct from the student's major area, *i.e.,* the primary research area. For example, students applying computation to investigate crack propagation may choose Computer Science as a technical minor. However, the same students may not use enrollment in the Mechanical Engineering sections of mechanics courses to satisfy the minor requirement. The topic should be chosen in consultation with the faculty advisor, and it must be approved by the ME Graduate Committee.

The Doctoral Minor Agreement Form must be on file with the ME Graduate Coordinator no later than halfway through the minor program. EM forms are available on the ME Intranet webpage. For Option A (see below), check with your minor department to determine if they have a form you must complete.

↗ intranet.engineering.wisc.edu/mechanical-engineering/current-me-student-resources/

Students must complete one minor option below:

↗ grad.wisc.edu/academic-policies

↗ policy.wisc.edu/library/UW-1200

- **Minor Option A** (external).—Requirements for external minor are defined by the department of that minor. Not all courses in Option A may satisfy the Mechanical Engineering Department Formal Credits requirement. Selection of this option requires the approval of the minor by the minor department. To declare a department minor, contact the minor department to learn their process. This should be done early in the PhD career and may be required before beginning or completing any minor coursework.
- **Minor Option B** (distributed).—Requires a minimum of 9 course credits, total, from two ore more departments outside the major, in related courses selected for their relevance to a particular area of concentration. The following rules apply:

    1. Courses typically included on or within the scope of the EMA qualifying exam shall not be considered acceptable for the PhD Minor Option B.
    2. At least 6 credits must be taken in courses listed in the UW-Madison Guide as "Grad 50%" courses.

To declare Option B, access the Add/Change Program form via MyUW and request to add the Distributed Minor. This should be done early in the PhD career. Contact the ME Graduate Coordinator with any questions.

The Engineering Mechanics PhD program does not allow use of a graduate/professional certificate to satisfy this technical minor requirement.

Course Level and Course Information:

e. Acceptable courses are those numbered 500 and above.

f. The schedule of active technical elective and graduate courses taught by Mechanical Engineering faculty is provided here: Mechanical Engineering Technical Elective and Graduate Course Plan - Google Drive. While the list is updated annually, it is subject to change. For information on cross-listed courses taught and/or owned by other departments, please contact that department directly.

Grade Policy:

g. The Gradute School requires an average record of B or better in all 300-level or above courses taken as a graduate student, regardless of whether a course counts for credit in the program. The Graduate School reviews each student's progress every semester and will usually refuse continued enrolment after two semesters of below B-average grades unless unusual or extenuating circumstances have prevailed. The Graduate School requires a minimum 3.0/4.0 GPA on the entire graduate record.

h. The Engineering Mechanics program requires a GPA of at least 3.0 based on all course credits attempted applicable to the degree credit requirement.

i. Also, all courses counting toward degree requirements must be taken for credit (not audit), and satisfactory graes are acceptable only for couses offered strictly on an S/U basis.

j. Credits with a grade of "D" or "F" cannot be used to satisfy requirements.

Satisfying Requirements with Previous Courswork:

k. All credits earned toward the Engineering Mechanics MS degree at UW-Madison apply toward the EM PhD, provided they satisfy the Graduate School's time constraint. The following applies to other situations where an MS degree was earned.

    a. With advisor and ME Grad Committee approval, students may use up to 15 credits from prior MS coursework toward the PhD, provided all of the following are met.

        i. The student has completed an MS degree in a relevant field.

        ii. The coursework proposed by the student is at the graduate level and was taken as part of the student's completed MS program.

        iii. The student's faculty advisor agrees that the prior coursework proporsed by the student satisfies the EM PhD program requirements in terms of subject area and rigor.

iv. A member of the ME Graduate Committee who is familiar with the EM PhD program confirms the advisor's recommendation.

b. Students who have not completed an MS in a relevant field are eligible to apply for credit for other previous coursework, according to the policies as outlined in the *Satisfying Requirements with Previous Coursework* section of the MS – Research Thesis track program.

l. **Use and Restrictions:**

i. In all situations, the Graduate School stipulates that only coursework earned within ten years of acceptance to a UW-Madison PhD program may be considered.

ii. Previously earned credits may not be used to satisfy depth (including all 700+) requirements.

iii. Previously earned credits may not be used to satisfy any technical minor requirements.

iv. For the breadth and math requirements of the EM MS – Research and PhD programs, students may apply previously earned credit that has been taken as part of a graduate program.

Additional Policies:

m. Full-time student status requires a student to enroll for a minimum of 8 credits of coursework numbered 300 and above in Fall and Spring semesters. The normal maximum number of credits is 15 credits. A full-time student is limited to 12 credits in the summer.

n. You must be enrolled for the semester in which you will graduate and successfully complete the courses in which you are enrolled.

iii. Credits taken as a University Special Student

Students are encouraged to enter a graduate program as early as possible and not to "try out" the program as University Special students. Officially entering the program allows the student to receive appropriate advising and be fully integrated into the program structure. If University Special student credits are accepted by a program to fulfill program requirements, it is done on a case-by-case basis and must be approved by the program. The number of credits that may transfer from a UW–Madison University Special student career to a UW–Madison graduate career is limited to no more than fifteen credits numbered 400 or above.

iv. Learning outcomes (learning goals)

Learning outcomes are the anticipated knowledge, skills, and values expected to be acquired by all students completing their PhD degree.

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.

v. Qualifying for the PhD program

Students wanting to continue graduate study toward their PhD degree in the Department of Mechanical Engineering must take the PhD qualifying examination. The written portion of the exam is offered before the start of each spring and fall semester. You are allowed a maximum of two opportunities to pass the qualifying examination. The objectives of this exam are to:

- Ensure a standard of excellence associated with the degree of PhD in Engineering Mechanics from the University of Wisconsin–Madison.
- Ensure that you have basic competency in the technical material related to your intended research program.
- Offer a growth experience, i.e., an opportunity to synthesize knowledge across a broader range than generally done in any class.

a. When to take the exam

The written portion of the qualifying exam is offered twice a year, generally the week before classes start in the fall and spring semesters (typically late August and mid-January). The associated literature review presentation must be completed within the timing limits detailed below.

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.

In special cases, one additional semester may be allowed before the exam must be taken. To obtain approval to delay the exam for one semester, the student must submit a written request (see section XIII. Academic exception petition) before the last week of class in the semester preceding the exam. Extensions are granted only when it is clearly demonstrated that unusual circumstances warrant the delay. Students without an approved extension who miss taking the exam at the required time will forfeit one of their opportunities to take the exam.

Students may sign up for the Fall exam beginning Feb 15 of each year. Students may sign up for the Spring exam beginning September 15 of each year. The sign-up form is at https://go.wisc.edu/quals. Periodically, an email will be sent to Department of Mechanical Engineering graduate students as a reminder to sign up for the exam and to provide additional information.

b. The exam

The exam is composed of two 2-hour written subject-area exams and an oral literature review.

Each area exam is designed to test knowledge in a general and fundamental Engineering Mechanics area. They are not intended to test each student in their specific research area. An area is considered general and fundamental if it is commonly included in BS EM curricula at R1 institutions. We will only offer area exams relevant to our department: (areas for which at least 2 students per year take the exam on average) The area exams are intended to test students' proficiency at solving entry-level graduate course problems. The scope of each area exam shall be explicitly delineated in terms of textbook chapters and/or a list of specific topics. Practice exams are available at https://intranet.engineering.wisc.edu/mechanical-engineering/current-me-student-resources/ under PhD Qualifying Exams.

You must select two area exams from the following:

- Controls
- Kinematics/Dynamics
- Heat Transfer
- Dynamic Systems/Vibrations
- Fluid Mechanics
- Solid Mechanics
- Thermodynamics
- Materials Processing
- Computer Aided Engineering.

You must write the last 4 digits of your campus ID, rather than your name, at the top of each page to facilitate anonymous grading. Students retaking area exams may choose different area exams than in the initial attempt.

In addition to the two area exams, you must present a literature review to a committee of three Mechanical Engineering professors composed of your advisor and two assisting members. Generally, this committee will later form part of your PhD committee. In consultation with your advisor, you will select the assisting members, determine professor availability, and schedule a room for the presentation. The latest the presentation can be given is five calendar days following the last day of the corresponding area exams. The earliest the presentation can be given is September 15 (if area exams are to be taken in January) or February 15 (if area exams are to be taken in August/September). Faculty cannot be assisting members for more than three students in a given term.

The committee selects three papers for you to review, as follows. First the advisor selects five papers on a specific technical topic (not reviews of fields). Then, the assisting members select down to three papers from the five. The committee emails the references of the three papers to you, 13 to 15

calendar days before the presentation. Professors cannot provide advance insight into which papers are likely to become exam papers. You prepare your presentation independently. You present a review of the papers, which is at most 15 minutes long. A question-and-answer session follows, with assisting members asking questions first. Questions should be closely related to the specific technical topic represented in the papers. The target duration for the entire exam is 30 to 45 minutes. Each professor independently submits their grade immediately following the presentation. The professors are not allowed to discuss the student, exam, or grades until all three grades have been submitted. The grades are not to be based on the delivery or the polish of the presentation. The grading rubric for the literature review is:

30%—Convey the relevance / significance / main contribution(s) of each paper

20%—Describe commonalities among the papers

20%—Describe differences between the papers

20%—Understand and address faculty questions

10%—Meet time constraints

Professors will consider this scoring scale when grading a (literature review or area) portion of the exam:

100%—Outstanding

90%—Very good

80%—Good

70%—Capable enough to get by as a PhD

65%—Minimum cumulative percentage for passing

55%—Minimum individual exam percentage for passing

Your literature review score is computed as (your advisor's score × 0.5) + (first assisting member score × 0.25) + (second assisting member score × 0.25).

To pass the PhD qualifying exam, you must receive scores of at least 55 on each of your literature review and two area exams. You must also achieve a cumulative score of at least 65, computed as (literature review score × 0.4) + (first area exam score × 0.3) + (second area exam score × 0.3).

If you do not pass in the first attempt, your literature review score and each area exam score will be provided to you. You can retake any or all component(s) at the next offering in attempt to pass (retaining prior scores for any components not retaken). For components that are retaken, the new score is used even if it is lower than the previous score for that component. In the event that one area exam is taken in the second attempt, and it is a new area exam not taken in the first attempt, the score on this exam will replace the lower of the scores from the first attempt. Students who do not pass the exam after a second attempt will fail the qualifying examination, and can no longer enroll in the program in subsequent semesters.

All written examination materials become the property of the department and will not be returned to you.

vi. Proposed course program (doctoral plan of study)

A proposed course program is to be submitted for approval by the Department before the end of the semester following the semester in which the qualifying examination was passed. **Do not wait until you want to present your preliminary exam to submit your plan for approval.** It can take six or more weeks to have your plan approved because the Mechanical Engineering Graduate Committee only meets once per month and not over the summer, so plan accordingly. For example, if you submit your course plan in June it may not be approved until October. Any subsequent changes to the program must be approved by the student's advisor and the Graduate Committee. Forms:

↗ intranet.engineering.wisc.edu/mechanical-engineering/current-me-student-resources/

vii. Preliminary examination

After acceptance of the student's doctoral plan of study, the student must take an oral preliminary examination. Students are expected to pass the PhD preliminary examination no later than the end of the third year of graduate studies, or by the end of the second regular semester following the one in which the PhD qualifying examination was passed, whichever is later. They are required to take the preliminary examination within four years of passing the PhD qualifying examination.

In preparation for this examination, the student shall submit a written thesis proposal containing a discussion of the thesis problem, a survey of pertinent literature, an evaluation of the importance of the problem, an outline of the proposed method of solving the problem, drawings of any equipment to be constructed, a cost estimate, and any preliminary results obtained. The student will then defend the thesis proposal in an oral preliminary examination. The examination committee will normally be the same as selected for the final oral examination (see below). It will include members from at least two UW-Madison Graduate School degree programs (see https://grad.wisc.edu/academic-programs/), including the student's major degree program, and the chair or co-chair must be a member of the student's major program. The committee membership will be selected in order to make a critical evaluation of the proposed thesis.

Warrant: The candidate must apply for a warrant from the ME Graduate Coordinator. The form is available on the ME Intranet webpage. The ME Graduate Coordinator needs a signed copy of the department approved Doctoral Plan and the minor must be officially declared through the Graduate School before a preliminary exam warrant can be requested.

Should the candidate not pass the preliminary examination, the student is granted a second opportunity to be held within six months of the first examination.

viii. Dissertator status

Students are eligible to obtain Dissertator status, if they so choose, at the beginning of any semester after they have finished all coursework and have passed the preliminary examination. The process typically occurs with the completion of the preliminary exam warrant process. The graduate school confirms through an email letter when a student has achieved dissertator status. Dissertators must enroll in exactly 3 credits to maintain their dissertator status during the Fall or Spring semesters.

Enrollment in 3 credits during the Summer session is required for graduate assistants, trainees, or fellows. Unless the advisor directs otherwise, the 3 credits must be EMA 990.

Continuous Enrollment: Dissertators should register each semester until the PhD thesis is filed. If the student fails to do so, a PhD Dissertation and Degree Completion Fee equal to 12 times the current dissertator per-credit rate is required.

↗ grad.wisc.edu/documents/dissertator-status

ix. PhD final oral examination (defense) guidelines

An oral examination on the findings of the PhD research is required at the end of the thesis work. This thesis defense is made before a committee of at least five members, who have had access to a copy of the thesis for at least 10 days prior to the oral examination. It is advisable to choose this committee as close to that of the preliminary examination committee as practical. At least 4 of the committee members must be members of the UW-Madison Graduate Faculty. The committee must include members from at least two of the UW-Madison Graduate School degree programs. The chair or co-chair must be a member of the student's major degree program, and at least 3 of the committee members must be members of the Department of Mechanical Engineering faculty. One of the members of the committee may be from outside the UW-Madison, subject to approval by the Mchanical Engineering Faculty. (Departmental requirements exceed the Graduate School minimum requirements at https://grad.wisc.edu/documents/committees/.)

Warrant: The candidate must apply for a warrant from the ME Graduate Coordinator. The form is available on the ME Intranet webpage. This examination shall be publicly announced at least one week prior to the examination date. Faculty and students are invited to attend, and guests are also welcome to attend the open session of the exam.

x. Thesis

The thesis must be the candidate's own work; it reports on the original research carried out by the student for the PhD degree. It may be the result of research enterprises in which others have collaborated, but in such cases the candidate is required to present a substantial portion which represents the candidate's own contribution.

The total cost and preparation of the thesis is the responsibility of the student. Detailed instructions for thesis preparation are available from the Graduate School Office in Bascom Hall, and on the Graduate School webpage: https://grad.wisc.edu/current-students/doctoral-guide/.

ProQuest Copy: The submitted thesis must meet the specifications of the Graduate School. See the above link for detailed information.

Industrial/Research Sponsor Copy: The faculty advisor will determine if additional copies are needed. He/she will also advise the student as to the specifications of the copy.

xi. Criteria for Satisfactory Progress

It is important that graduate students make satisfactory progress in their program of study. One measurement of the student's progress is his or her schedule for completing various requirements for the PhD degree. The relevant deadlines are listed below. Students not meeting these deadlines are considered to not be making satisfactory progress and may become ineligible for financial support

and/or may be dropped from the program.

1. The qualifying examination must be first taken no later than completion of the MS requirements, or the beginning of the fifth semester of graduate study, whichever comes first. Students entering the program with a master's degree in EM or ME, and taking the qualifying exam in that same major, must take the exam by the beginning of their third semester.
2. The Graduate School PhD Minor Agreement Form must be on file with the Department of Mechanical Engineering (via the ME Graduate Coordinator) halfway through the minor program.
3. Students are expected to submit the Doctoral Plan of Study one month before the end of the semester following the one in which the qualifying exam is passed.
4. Students are expected to schedule and pass the PhD preliminary examination no later than the end of the third year of graduate studies, or by the end of the second regular semester following the one in which the PhD qualifying examination is passed, whichever is later. A candidate who fails to take their preliminary exam within four years of passing their qualifying exam must retake the qualifying exam unless there are extenuating circumstances (such as medical) and the ME Graduate Committee approves a delay. Students in this situation should meet with their advisor and develop a plan for taking the preliminary exam, subject to approval by the ME Graduate Committee.
5. A candidate who fails to take the final oral examination and deposit the dissertation in the Memorial Library within 5 years after passing the preliminary examination must take another preliminary examination. See the Graduate School's policies on preliminary examinations and time limits for additional information.

xii. Criteria for Satisfactory Progress in Research

Progress in research is evaluated by a graduate student's faculty advisor and is officially recorded in grading for research credits. The Engineering Mechanics program procedures for unsatisfactory progress are as follows:

1. Upon first occurrence of a grade of U (unsatisfactory) in any of 790 (MS thesis), 890 (predissertator), and 990 (dissertator) research, the faculty advisor will notify the ME Graduate Committee (MEGC) and submit a copy of each annual performance record for that student to the MEGC. The MEGC will then meet with the faculty advisor to discuss the student's research performance and what steps are planned to help the student achieve a satisfactory level of progress in research. The faculty advisor will then meet with the student to communicate the plan with the student.
2. Upon any subsequent occurrence of a grade of U in 790, 890, or 990 research, the faculty advisor will again notify the MEGC and resubmit annual performance records. The MEGC will meet with the faculty advisor to decide whether to end the student's PhD candidacy. The faculty advisor will inform the student of the MEGC /advisor decision. The MEGC will document its recommendations, including justifications and materials reviewed, and submit the recommendations to the Department Chair. The student will also be provided with the documented recommendations.
3. If the student disagrees with a decision to end PhD candidacy, within 10 days of being notified of the decision, he or she may submit a written petition to the MEGC that clearly describes

specific efforts made to improve performance and how continuation of PhD candidacy will lead to a satisfactory research outcome. The MEGC will then decide whether to 1) grant an extended research-probation period under the same faculty advisor, 2) grant a research-probation period under a new faculty advisor, or 3) retain the original decision. The MEGC will notify the Department Chair of its recommendation.

4. If an extension period is granted, the current faculty advisor will conduct a performance review with the student at the end of the period. The advisor will then meet with the MEGC, which will decide to either reinstate the student to non-probationary PhD candidacy or end the student's PhD candidacy. The MEGC will notify the Department Chair of its recommendation.

A PhD student whose candidacy has been ended due to unsatisfactory research progress may remain eligible for an MS degree, but the student loses his or her guarantee of assistantship support.

xiii. Check-out procedure

1. Keys must be returned to the Mechanical Engineering Department Office (room 2107 Mechanical Engineering Building) prior to leaving. Your degree may be delayed if you do not follow this requirement. The purpose is to ensure that all department equipment is returned and that your office and desk are clean and ready to be used by another person. The checkout process should not be done at the last minute. One week before leaving would be ideal.
2. If you had an assistantship appointment in your last semester, contact the Mechanical Engineering Payroll & Benefits Coordinator to let them know when you upload your dissertation to ProQuest. Ideally, please contact them before, or on the day, you complete the upload. At minmum, you must do this before you leave campus. Any overpayment of payroll/benefits due to failure to report the termination of an appointment, may result in a repayment requirement.
3. For Domestic students, your diploma will be sent to your mailing address. For International students, your diploma will be sent to your diploma address. Please confirm this address is correct in your Student Center. Diplomas are sent 12 to 14 weeks after graduation to the mailing address or diploma address, respectively.
   ↗ registrar.wisc.edu/diploma
4. An online survey will be emailed to all graduate students completing their degree. This survey is extremely helpful to the department in tracking where students go after graduation. We greatly appreciate your cooperation in completing this survey.
5. You can keep your wisc.edu email but you will only have access to Office 365 email, calendar, people/contacts and tasks. Students who graduate can also apply for a UW alumni email from the Wisconsin Alumni Association.
   ↗ Leaving the University Knowledge Base
   ↗ uwalumni.com/resources-services/email/
6. Feel free to contact the ME Gradute Coordinator if you have any questions or concerns in the future, and please keep in touch!

xiv. Length of time to degree

The majority of Mechanical Engineering PhD students complete their degree in 6 years (or less)[7]. Any student unable to defend their thesis in this period will be reviewed by the Mechanical Engineering Graduate Committee to determine why it is taking longer than expected to complete their degree. There are many reasons why a graduate student may require more time to complete their degree. Therefore, the Mechanical Engineering Graduate Committee will request the following information from you to review during their meeting:

- Date
- Name of student
- Name of advisor
- Accomplishments to date (300 words or less)
- Extenuating circumstances, if any
- Plans for degree completion (include predicted defense date)
- A list of publications published, in press, or submitted

[7] Data on Time to Degree can be found at the following Graduate School website: grad.wisc.edu/data/degrees-awarded

XIX. Doctoral minor in Engineering Mechanics

Students from outside the Engineering Mechanics graduate program can receive a doctoral minor in Engineering Mechanics. The requirements for an external minor in Engineering Mechanics are listed below. The minor must be approved by the Mechanical Engineering Department. Submit the form to the ME Graduate Coordinator, for approval.

↗ intranet.engineering.wisc.edu/mechanical-engineering/current-me-student-resources/

i. Requirements for external minor

1. A student who has earned an MS degree in Engineering Mechanics will be considered to have fulfilled the minor requirements.
2. A minimum of 10 credits in EMA courses, including 3 credits in 700-level or above courses. In addition,
    a. All courses used for the minor must be level 300 or above and taken after the bachelor's degree.
    b. Ordinarily only one course (maximum of 3 credits) of independent study is allowed (599, 690, 799, 999).
    c. Research and thesis courses may not be used for the minor.
    d. No more than 5 credits completed 5 or more years prior to admission to the PhD major may be used.
    e. Courses taken 10 or more years ago may not be used.
    f. Courses taken pass/fail or for audit may not be used.
    g. Courses with grades of "S" given in courses graded on a credit/no credit basis are acceptable.
3. A GPA of 3.0 or higher must be maintained for the minor.
4. A maximum of 6 credits may be transferred from other institutions to satisfy the minor requirements.
5. The minor must be approved by the ME Associate Chair for Graduate Studies. The form is available on the ME Intranet page.
6. The EM Minor must be officially declared before it can be earned. Begin the declaration process early in your PhD career. To declare the EM minor, follow these steps:
    i. Access the Graduate School Add/Change Program form in your MyUW. Request to "Add" the EM doctoral minor.
    ii. Contact the ME Graduate Coordinator to obtain the EM minor coursework approval form.
    iii. Fill out the form as indicated and return it to the ME Graduate Coordinator.
    iv. The ME Department will review your request and make a decision.
    v. You will be notified via email of the decision and the following steps.

Contact the ME Graduate Coordinator with any questions on the minor and the declaration process.

Mechanical Engineering Programs / Curriculum / Policies and Procedures

XX. Mechanical Engineering Master of Science (MS) degree Requirements

The department of Mechanical Engineering offers several different Master of Science degrees options. These include the following named options:

- MS Mechanical Engineering: Research
- MS Mechanical Engineering: Automotive Engineering*
- MS Mechanical Engineering: Modeling and Simulation in Mechanical Engineering*
- MS Mechanical Engineering Accelerated Program*

*These programs are accelerated MS programs meant to be completed in 12 months (two terms for UW–Madison College of Engineering undergraduates or three terms for all other students). Students in these programs do not have a research adviser. They will have an academic advisor assigned prior to beginning the program.

i. Course and grade requirements

a. Research

Curriculum: Total of 30 credits required:

a. ME 903: Graduate Seminar (0 credits) is required in both of the first 2 semesters in residence at UW–Madison. Delays are granted on a case-by-case basis and must be requested by submitting the "Mechanical Engineering Graduate Program Academic Policy Exception Request" form to the Mechanical Engineering Graduate Coordinator prior to the start of the term. Two terms of ME 903 are required to earn the degree.

b. At least 18 formal course credits

   i. At least 9 formal course credits in Mechanical Engineering (M E) and/or Engineering Mechanics (E M A) taken at UW–Madison.

   ii. At least 3 formal credits must be numbered 700 or higher and taken at UW–Madison (see i. below for more details).

c. At least 9 research credits (ME 790)

d. Minimum Graduate Coursework (50%) Requirement:

   i. 50% of credits applied toward the program's graduate degree credit requirement must be courses designed for graduate work (this includes, but is not limited to, graduate thesis/research, independent study, and practicum/internship credits). Classes that satisfy this requirement are indicated as having the attribute Minimum Graduate Coursework (50%) in the course guide.

e. An oral examination on the thesis. Master's Thesis Guidelines:
   ↗ grad.wisc.edu/currentstudents/mastersthesis

Course Level and Type Information:

f. A formal course is defined as any course offering that is not a seminar course, thesis research course, or independent study course.

g. Acceptable formal courses are those numbered 400 and above.

h. At most one 300-level course in engineering, math, or the sciences, taken at UW–Madison, can be used towards the total formal course credit requirement. The 300-level course can be from Mechanical Engineering if approved by the student's advisor and the Mechanical Engineering Graduate Committee. A course at the 300-level can only be transferred from a UW–Madison undergraduate program if it was taken as a technical elective (i.e., non-required course).

i. The MS program must include at least 3 formal course credits numbered 700 or higher . These are advanced courses referred to as 700-level courses. A limited selection of courses, with course numbers less than 700 in other departments, have been approved to satisfy this 700-level requirement (list can be found on the ME Intranet [NetID required]):
↗ intranet.engineering.wisc.edu/mechanical-engineering/current-me-student-resources/

j. The schedule of active technical elective and graduate courses taught by Mechanical Engineering faculty is provided here: Mechanical Engineering Technical Elective and Graduate Course Plan - Google Drive. While the list is updated annually, it is subject to change. For information on cross-listed courses taught and/or owned by other departments, please contact that department directly.

GPA and Grade Requirements:

k. A GPA of at least 3.0 based on all formal course credits attempted applicable to the degree credit requirement, and a GPA of at least 3.0 in Mechanical Engineering formal courses.

l. Credits with a grade of "D" or "F" cannot be used to satisfy requirements.

Previously Earned Graduate Credits from outside UW–Madison:

m. *With faculty advisor approval,* students may transfer up to 9 credits of previously earned graduate coursework from other institutions toward the minimum credit requirement and the minimum graduate coursework (50%) requirement. No credits from other institutions can be counted toward the minimum graduate residence credit requirement. Coursework earned ten or more years prior to admission is not allowed to satisfy requirements.Previously earned courses must be ones for which graduate credit was awarded at the outside institution.

Previously Earned UW–Madison Undergraduate Degree Coursework:

n. *With faculty advisor approval,* students may transfer a maximum of 7 credits from a UW-Madison undergraduate degree to be applied toward the minimum credit requirement. Only coursework that is applicable to the degree curriculum is eligible. These credits are not allowed to count toward the minimum graduate coursework (50%) requirement unless taken in courses numbered 700 or above. No credits can be counted toward the minimum graduate residence credit requirement. Coursework earned ten or more years prior to admission is not allowed to satisfy requirements. The grades from these courses will not be counted towards the student's graduate GPA. The form for approval of these credits:
↗ intranet.engineering.wisc.edu/mechanical-engineering/current-me-student-resources/

Advisor Approval of Study Plan:

o. The faculty advisor must always approve the courses a student takes in the MS program. Students should schedule an appointment with their adviser when selecting their courses. During the final semester, the faculty advisor will review the courses taken again and if approved sign the warrant request form.

Additional Policies:

p. You must be enrolled for the semester in which you will graduate and successfully complete the courses in which you are enrolled.

THESIS and DEFENSE:

q. **COMMITTEE:** A final thesis defense must be presented to a thesis committee of at least three members (but no more than five) consisting of the student's advisor who is the committee chair (who must be a member of the Mechanical Engineering faculty), one other graduate faculty or former graduate faculty up to one year after resignation or retirement, and one of the following: a third graduate faculty member, a retired faculty member with emeritus status, or a UW–Madison academic staff member who has been approved by the Mechanical Engineering executive committee.

- Graduate faculty hold the title of professor, associate professor, or assistant professor as listed in the UW–Madison directory:
  ↗ https://www.wisc.edu/directories/
- To determine if a retired faculty member has emeritus status check the UW–Madison directory, if the person is listed in the directory with the title emeritus, then they have emeritus status.
- To have an academic staff member approved to serve on committees have them submit their current curriculum vitae to the ME Graduate Coordinator or to the Associate Chair for Graduate Studies (i.e., Director of Graduate Studies, Chair of the Graduate Committee) for approval by the department executive committee.Committee members beyond the third member must conform to the list on the graduate school's website (https://grad.wisc.edu/acadpolicy/#committees), and must be approved by the student's advisor.
  ↗ grad.wisc.edu/documents/committees

r. Students must submit the final-draft copy of their thesis to the examination committee at least one week prior to the exam.

s. The final version of your thesis must be submitted to Memorial Library via the email process explained on the Graduate School **Completing Your Master's Degree** webpage, before the degree deadline. You should have an approval page (separate and prior to your title page) created for your advisor's signature and the date. Note that if you miss the deadline, you will be responsible for tuition and fees for an additional semester. Please thoroughly review The Graduate School **Completing Your Master's Degree** webpage for required document and submission specifics: https://grad.wisc.edu/current-students/masters-guide/.

b. Accelerated Program

Curriculum: Total of 30 credits required:

b. ME 903: Graduate Seminar (0 credits) is required in both of the first 2 semesters in residence at UW–Madison. Delays are granted on a case-by-case basis and must be requested by submitting the "Mechanical Engineering Graduate Program Academic Policy Exception Request" form to the Mechanical Engineering Graduate Coordinator prior to the start of the term. Two terms of ME 903 are required to earn the degree.

c. At least 24 formal course credits:

   i. At least 15 formal course credits in Mechanical Engineering (M E) taken at UW–Madison.

d. Non-Formal coursework: Independent Study, Seminar, Co-op, Internship (up to 6 credits total permitted, but not required):

   i. Up to 6 credits of independent study are permitted but not required.

   ii. Up to 3 credits of a seminar course are permitted but not required.

   iii. Up to 3 credits of co-op, internship (such as ME 702) are permitted if approved by appropriate entities, such as faculty advisor and International Student Services. These credits are permitted but not required.

e. Thesis Coursework

   i. Thesis research credits are not permitted.

f. Minimum Graduate Coursework (50%) Requirement:

   i. 50% of credits applied toward the program's graduate degree credit requirement must be courses designed for graduate work (this includes, but is not limited to, independent study, and practicum/internship credits). **At least 9 of these credits must be Mechanical Engineering (ME) credits completed in residency at UW-Madison.** Classes that satisfy this requirement are indicated as having the attribute Minimum Graduate Coursework (50%) in the course guide.

Course Level and Type Information:

g. A formal course is defined as any course offering that is not a seminar course, thesis research course, independent study course, co-op/internship course, etc.

h. Acceptable formal courses are those numbered 400 and above.

i. At most two 300-level courses in engineering, math, or the sciences, taken at UW–Madison, can be used towards the total formal course credit requirement. The 300-level courses can be from Mechanical Engineering if approved by the student's advisor and the Mechanical Engineering Graduate Committee. Courses at the 300-level can only be transferred from a UW–Madison undergraduate program if they were taken as technical electives (i.e., non-required courses).

GPA and Grade Requirements:

j. A GPA of at least 3.0 based on all formal course credits attempted applicable to the degree credit requirement, and a GPA of at least 3.0 in Mechanical Engineering formal courses.

k. Credits with a grade of "D" or "F" cannot be used to satisfy requirements.

Previously Earned Graduate Credits from outside UW–Madison:

l. *With faculty advisor approval,* students may transfer up to 12 credits of previously earned graduate coursework from other institutions toward the minimum credit requirement and the minimum graduate coursework (50%) requirement. No credits from other institutions can be counted toward the minimum graduate residence credit requirement. Coursework earned ten or more years prior to admission is not allowed to satisfy requirements.Previously earned courses must be ones for which graduate credit was awarded at the outside institution.

Previously Earned UW–Madison Undergraduate Degree Coursework:

m. With *faculty advisor approval,* students may transfer a maximum of 7 credits from a UW-Madison undergraduate degree to be applied toward the minimum credit requirement. Only coursework that is applicable to the degree curriculum is eligible. These credits are not allowed to count toward the minimum graduate coursework (50%) requirement unless taken in courses numbered 700 or above. No credits can be counted toward the minimum graduate residence credit requirement. Coursework earned ten or more years prior to admission is not allowed to satisfy requirements. The grades from these courses will not be counted towards the student's graduate GPA. The form for approval of these credits:
↗ intranet.engineering.wisc.edu/mechanical-engineering/current-me-student-resources/

Advisor Approval of Study Plan:

n. The faculty advisor must always approve the courses a student takes in the MS program. Students should schedule an appointment with their adviser when selecting their courses. During the final semester, the faculty advisor will review the courses taken again and if approved sign the warrant request form.

Funding Information:

o. Students enrolled in the Master of Science in Mechanical Engineering, Accelerated Program are not eligible to receive tuition remission from graduate assistantship appointments at this institution.

p. Students are strongly discouraged to pursue positions as Project Assistants, Teaching Assistants, or Research Assistants during their time in this program, as the rigor and accelerated nature of this program may not accomdate those work time commitments.

Additional Policies:

q. You must be enrolled for the semester in which you will graduate and successfully complete the courses in which you are enrolled.

r. Students must remain in the program for two semesters before being able to add or change programs. During and after the second semester they can make add or change program requests with the approval of the Faculty who will serve as their advisor in the new program. If approved,

an add/change program request goes into effect the term after completion or discontinuation of the Accelerated Program named option MS program. Students in the Accelerated Program cannot be enrolled in any other program at the same time.

Courses Offered in Various Areas of Emphasis:

The following is a non-exclusive list of graduate level Engineering courses that are offered in the different areas of emphasis. This is a list of potential program courses, but is not intended to be a list of required courses.

Course No.	Course Name	Usually Offered
Advanced Manufacturing		
ME 417	Transport Phenomena in Polymer Processing	Spring
ME 418	Engineering Design with Polymers	Fall
ME 419	Fundamentals of Injection Molding	Fall
ME 429	Metal Cutting	Fall
ME 437	Advanced Material Selection	Spring
ME 449	Redesign & Prototype Fabrication	Spring
ME/MS&E 462	Welding Metallurgy	Spring
ME 514	Polymer Additive Manufacturing	Spring
ME 964	Metal Additive Manufacturing (Prof. Chen)	Spring
ME 964	Advanced Machining (Prof. Min)	Spring
MS&E 401	Metal Additive Manufacturing (Prof. Thoma)	Spring
MS&E 461 / ME 601	Advanced Metal Casting (Prof. Metzloff)	Fall
Biomechanics		
603-F	FE for Biomechanics	Spring
ME 414	Design of Orthopedic Implants	Fall
ME 415	Biomechanics of Human Movement	Fall
ME 601	Mechanics of Soft Materials	Fall
ME 615	Tissue Mechanics	Fall
ME 964	Advanced Tissue Mechanics	Fall
Computation & Data-Driven Engineering		
ME 448	Mechanical Systems Analysis	Fall (odd)
ME 459	Computing Concepts for Applications in Engineering	Spring
ME 468	Computer Modeling & Simulation of Autonomous Vehicles and Robotics	Fall
ME 535	Computer-Aided Geometric Design	Fall
ME 548	Introduction to Design Optimization	Spring
ME 549	Product Design	Fall
ME 748	Optimum Design of Mechanical Elements and Systems	Fall (even)
ME 751	Matrix Methods in the Design and Analysis of Mechanisms	Fall
ME 759	High Performance Computing for Applications in Engineering	Fall
ME 964	Scientific Computing and Machine Learning for Engineering Applications	Fall

ME 964	Computational Nanomechanics	Fall (even)
Energy Systems		
ME 461	Thermal System Modeling	Spring
ME 469	Internal Combustion Engines	Fall
ME 471	Gas Turbine Technology	Fall
ME 505	Biofluidics	Spring
ME 520	Two-Phase Flow and Heat Transfer	Spring
ME 561	Intermediate Thermodynamics	Fall
ME 563	Intermediate Fluid Dynamics	Spring
ME 564	Heat Transfer	Spring
ME 565	Power Plant Technology	Fall
ME 566	Cryogenics	Fall
Course No.	**Course Name**	**Usually Offered**
ME 567	Solar Energy Technology	Fall
ME 569	Applied Combustion	Fall
ME 573	Computational Fluid Dynamics	Fall
ME 601	Design of Photovoltaic Arrays	Spring
ME 601	Energy, Sustainability, and Technology	Fall
ME 601	Fundamentals of Precision Measurements	Fall
ME 601	HVAC	Fall
ME 601	Physics of Gases	Fall
ME 601	Printed Electronics: Manufacturing, Devices, and Applications	Spring
ME 761	Advanced Thermodynamics	Spring
ME 764	Advanced Heat Transfer I-Conduction	Spring
ME 769	Combustion Processes	Spring
ME 770	Advanced Experimental Instrumentation	Spring
ME 774	Chem Kinetics of Combust Systems	Spring
ME 775	Turbulent Heat and Momentum Transfer	Fall
Mechanics		
ME 440	Intermediate Vibrations	Fall
ME 448	Mechanical Systems Analysis	Fall
ME 451	Kinematics and Dynamics of Machine Systems	Spring
ME 460	Applied Thermal / Structural Finite Element Analysis	Spring
ME 570	Experimental Mechanics	Fall
ME 601	Fluid Power	Fall
ME 601	Mechanical Dissection	Fall
ME 740	Advanced Vibrations	Spring
ME 753	Friction, Lubrication and Wear	Spring
Robotics, Controls & Sensing		
ME 439	Introduction to Robotics	Fall & Spring
ME 445	Mechatronics in Control & Product Realization	Spring

ME 446	Automatic Control	Fall
ME 447	Computer Control of Machines and Processes	Spring
ME 468	Computer Modeling and Simulation of Autonous Vehicles and Robots	Spring-alt. years
ME 601	Introduction to Feedback Control of Autonomous Systems	Spring
ME 739	Kinematics, Dynamics, and Control of Robotic Manipulators	Spring-alt. years

The schedule of active technical elective and graduate courses taught by Mechanical Engineering faculty is provided here: Mechanical Engineering Technical Elective and Graduate Course Plan.

c. Automotive Engineering

(NOTE: Fall 2023 is the last term in which students were allowed to enroll in the MS – Automotive Engineering program. All enrolled students will be able to complete the degree. After all remaining students have completed the program it will be permanently closed. This decision does not reflect on the quality of the degree or enrolled students: it was made due to low enrollment.)

Curriculum: Total of 30 credits required:

a. ME 903: Graduate Seminar (0 credits) is required in both of the first 2 semesters in residence at UW–Madison. Delays are granted on a case-by-case basis and must be requested by submitting the "Mechanical Engineering Graduate Program Academic Policy Exception Request" form to the Mechanical Engineering Graduate Coordinator prior to the start of the term. Two terms of ME 903 are required to earn the degree.

b. At least 24 formal course credits

   i. At least 15 formal course credits in Mechanical Engineering (M E) taken at UW–Madison.

   ii. 4 courses (12 credits) from the list below must be taken as part of the degree program. *The time offered given in the listings above is based on typical course offerings and may vary.*

Dept.	No.	Name	Credits	Term Offered	50% Grad Course
ME	469	Internal Combustion Engines	3	Fall	No
ME	561	Intermediate Thermodynamics	3	Fall	Yes
ME	569	Applied Combustion	3	Fall	Yes
ME	572	Intermediate Gas Dynamics	3	Fall	Yes
ME	573	Computational Fluid Dynamics	3	Fall	Yes
ME	761	Topics in Thermodynamics	3	Fall, odd years	Yes
ME	764	Advanced Heat Transfer – Conduction	3	Fall, even years	Yes
ME	770	Advanced Experimental Instrumentation	3	Fall, even years	Yes
ME	775	Turbulent Heat and Momentum Transfer	3	Fall	Yes
ME	461	Thermal Systems Modeling	3	Spring	No
ME	466	Air Pollution Effects, Measurements and Control	3	Spring	No
ME	563	Intermediate Fluid Dynamics	3	Spring	Yes
ME	564	Heat Transfer	3	Spring	Yes
ME	769	Combustion Processes	3	Spring, odd years	Yes
ME	774	Chemical Kinetics of Combustion Systems	3	Spring, even years	Yes

iii. During the summer term, students are required to enroll in the following 6 credits of internal combustion engine practicum courses:
    - ME 669 Engine Experiments (3 credits, 50% Grad Course requirement)
    - ME 673 Internal Combustion Engine Simulations (3 credits, 50% Grad Course requirement).

c. Non-Formal coursework: Independent Study, Seminar, Co-op, Internship (up to 6 credits total permitted, but not required):

ii. Up to 6 credits of independent study are permitted but not required.

iv. Up to 3 credits of a seminar course are permitted but not required.

v. Up to 3 credits of co-op, internship (such as ME 702) are permitted if approved by appropriate entities, such as faculty advisor and International Student Services. These credits are permitted but not required.

d. Thesis Coursework

i. Thesis research credits are not permitted.

e. Minimum Graduate Coursework (50%) Requirement:

i. 50% of credits applied toward the program's graduate degree credit requirement must be courses designed for graduate work (this includes, but is not limited to, independent study, and practicum/internship credits). Classes that satisfy this requirement are indicated as having the attribute Minimum Graduate Coursework (50%) in the course guide.

Course Level and Type Information:

f. A formal course is defined as any course offering that is not a seminar course, thesis research course, independent study course, or co-op/internship course, etc.

g. Acceptable formal courses are those numbered 400 and above.

h. At most two 300-level courses in engineering, math, or the sciences, taken at UW–Madison, can be used towards the total formal course credit requirement. The 300-level courses can be from Mechanical Engineering if approved by the student's advisor and the Mechanical Engineering Graduate Committee. A course at the 300-level can only be transferred from a UW–Madison undergraduate program if it was taken as a technical elective (i.e., non-required course).

i. The schedule of active technical elective and graduate courses taught by Mechanical Engineering faculty is provided here: Mechanical Engineering Technical Elective and Graduate Course Plan - Google Drive. While the list is updated annually, it is subject to change. For information on cross-listed courses taught and/or owned by other departments, please contact that department directly.

GPA and Grade Requirements:

j. A GPA of at least 3.0 based on all formal course credits attempted applicable to the degree credit requirement, and a GPA of at least 3.0 in Mechanical Engineering formal courses.

k. Credits with a grade of "D" or "F" cannot be used to satisfy requirements.

Previously Earned Graduate Credits from outside UW–Madison:

l. *With faculty advisor approval,* students may transfer up to 12 credits of previously earned graduate coursework from other institutions toward the minimum credit requirement and the minimum graduate coursework (50%) requirement. No credits from other institutions can be counted toward the minimum graduate residence credit requirement. Coursework earned ten or more years prior to admission is not allowed to satisfy requirements. Previously earned courses must be ones for which graduate credit was awarded at the outside institution.

Previously Earned UW–Madison Undergraduate Degree Coursework:

m. With *faculty advisor approval,* students may transfer a maximum of 7 credits from a UW-Madison undergraduate degree to be applied toward the minimum credit requirement. Only coursework that is applicable to the degree curriculum is eligible. These credits are not allowed to count toward the minimum graduate coursework (50%) requirement unless taken in courses numbered 700 or above. No credits can be counted toward the minimum graduate residence credit requirement. Coursework earned ten or more years prior to admission is not allowed to satisfy requirements. The grades from these courses will not be counted towards the student's graduate GPA. The form for approval of these credits:
↗ intranet.engineering.wisc.edu/mechanical-engineering/current-me-student-resources/

Advisor Approval of Study Plan:

n. The faculty advisor must always approve the courses a student takes in the MS program. Students should schedule an appointment with their adviser when selecting their courses. During the final semester, the faculty advisor will review the courses taken again and if approved sign the warrant request form.

   Suggested Course Credit Enrollment Plan (Students must maintain fulltime enrollment):
   - Fall Semester – 12 credits
   - Spring Semester – 12 credits
   - Summer Session – 6 credits

Funding Information:

o. Students enrolled in the Master of Science in Mechanical Engineering, Automotive Engineering are not eligible to receive tuition remission from graduate assistantship appointments at this institution.

p. Students are strongly discouraged to pursue positions as Project Assistants, Teaching Assistants, or Research Assistants during their time in this program, as the rigor and accelerated nature of this program may not accomdate those work time commitments.

Additional Policies:

q. You must be enrolled for the semester in which you will graduate and successfully complete the courses in which you are enrolled.

r. Students must remain in the program for two semesters before being able to add or change programs. During and after the second semester they can make add or change program requests with the approval of the Faculty who will serve as their advisor in the new program. If approved, an add/change program request goes into effect the term after completion or discontinuation of the Automotive Engineering program named option MS program. Students in the Automotive Engineering program cannot be enrolled in any other program at the same time.

d. Modeling and Simulation in Mechanical Engineering

Curriculum: Total of 30 credits required:

a. ME 903: Graduate Seminar (0 credits) is required in both of the first 2 semesters in residence at UW–Madison. Delays are granted on a case-by-case basis and must be requested by submitting the "Mechanical Engineering Graduate Program Academic Policy Exception Request" form to the Mechanical Engineering Graduate Coordinator prior to the start of the term. Two terms of ME 903 are required to earn the degree.

b. At least 24 formal course credits

   i. At least 15 formal course credits in Mechanical Engineering (M E) taken at UW–Madison.

   ii. A minimum of 6 courses (18 credits total) must be taken from the courses listed below:

- ME 440: Intermediate Vibrations (3 credits)
- ME 441: Kinematics, Dynamics, and Control of Robotic Manipulators (3 credits)
- ME 451: Kinematics and Dynamics of Machine Systems (3 credits)
- ME 459: Computing Concepts for Applications in Engineering (3 credits)
- ME 460: Applied Thermal / Structural Finite Element Analysis (3 credits)
- ME 468: Computer Modeling and Simulation of Autonomous Vehicles and Robots (3 credits)
- ME 516: Finite Elements for Biological and Other Soft Materials (3 credits)
- ME 531: Digital Design and Manufacturing (3 credits)
- ME 532: Matrix Methods in Machine Learning (3 credits)
- ME 535: Computer-Aided Geometric Design (3 credits)
- ME 548: Introduction to Design Optimization (3 credits)
- ME 558: Introduction to Computational Geometry (3 credits)
- ME 564: Heat Transfer (3 credits)
- ME 573: Computational Fluid Dynamics (3 credits)
- ME 601: Topic: Applied & Computational Math w/Engr Apps *(this topic ONLY)* (3 credits)
- ME 748: Optimum Design of Mechanical Elements and Systems (3 credits)
- ME 751: Advanced Computational Dynamics (3 credits)
- ME 759: High Performance Computing for Applications in Engineering (3 credits)
- ME 764: Advanced Heat Transfer I-Conduction (3 credits)
- ME 964: Topic: 'Sci Computing for Apps in Eng' OR 'Sci Comp and Machine Learning' OR 'Sci Comp for Engineering Apps' *(this topic ONLY)* (3 credits)

- EMA 521: Aerodynamics (3 credits)
- EMA 522: Aerodynamics Lab (3 credits)

c. Non-Formal coursework: Independent Study, Seminar, Co-op, Internship (up to 6 credits total permitted, but not required):

iii. Up to 6 credits of independent study are permitted but not required.

vi. Up to 3 credits of a seminar course are permitted but not required.

vii. Up to 3 credits of co-op, internship (such as ME 702) are permitted if approved by appropriate entities, such as faculty advisor and International Student Services. These credits are permitted but not required.

d. Thesis Coursework

i. Thesis research credits are not permitted.

e. Minimum Graduate Coursework (50%) Requirement:

i. 50% of credits applied toward the program's graduate degree credit requirement must be courses designed for graduate work (this includes, but is not limited to, independent study, and practicum/internship credits). Classes that satisfy this requirement are indicated as having the attribute Minimum Graduate Coursework (50%) in the course guide.

Course Level and Type Information:

f. A formal course is defined as any course offering that is not a seminar course, thesis research course, independent study course, or co-op/internship course, etc.

g. Acceptable formal courses are those numbered 400 and above.

h. At most two 300-level courses in engineering, math, or the sciences, taken at UW–Madison, can be used towards the total formal course credit requirement. The 300-level courses can be from Mechanical Engineering if approved by the student's advisor and the Mechanical Engineering Graduate Committee. Courses at the 300-level can only be transferred from a UW–Madison undergraduate program if they were taken as technical electives (i.e., non-required courses).

GPA and Grade Requirements:

i. A GPA of at least 3.0 based on all formal course credits attempted applicable to the degree credit requirement, and a GPA of at least 3.0 in Mechanical Engineering formal courses.

j. Credits with a grade of "D" or "F" cannot be used to satisfy requirements.

Previously Earned Graduate Credits from outside UW–Madison:

k. *With faculty advisor approval*, students may transfer up to 12 credits of previously earned graduate coursework from other institutions toward the minimum credit requirement and the minimum graduate coursework (50%) requirement. No credits from other institutions can be counted toward the minimum graduate residence credit requirement. Coursework earned ten or more years prior to admission is not allowed to satisfy requirements. Previously earned courses must be ones for which graduate credit was awarded at the outside institution.

Previously Earned UW–Madison Undergraduate Degree Coursework:

l. With *faculty advisor approval*, students may transfer a maximum of 7 credits from a UW-Madison undergraduate degree to be applied toward the minimum credit requirement. Only coursework that is applicable to the degree curriculum is eligible. These credits are not allowed to count toward the minimum graduate coursework (50%) requirement unless taken in courses numbered 700 or above. No credits can be counted toward the minimum graduate residence credit requirement. Coursework earned ten or more years prior to admission is not allowed to satisfy requirements. The grades from these courses will not be counted towards the student's graduate GPA. The form for approval of these credits:
↗ intranet.engineering.wisc.edu/mechanical-engineering/current-me-student-resources/

Advisor Approval of Study Plan:

m. The faculty advisor must always approve the courses a student takes in the MS program. Students should schedule an appointment with their adviser when selecting their courses. During the final semester, the faculty advisor will review the courses taken again and if approved sign the warrant request form.

Suggested Course Credit Enrollment Plan (Students must maintain fulltime enrollment):

- Fall Semester – 12 credits
- Spring Semester – 12 credits
- Summer Session – 6 credits

Funding Information:

n. Students enrolled in the Master of Science in Mechanical Engineering, Modeling and Simulation in Mechanical Engineering are not eligible to receive tuition remission from graduate assistantship appointments at this institution.

o. Students are strongly discouraged to pursue positions as Project Assistants, Teaching Assistants, or Research Assistants during their time in this program, as the rigor and accelerated nature of this program may not accomdate those work time commitments.

Additional Policies:

p. You must be enrolled for the semester in which you will graduate and successfully complete the courses in which you are enrolled.

q. Students must remain in the program for two semesters before being able to add or change programs. During and after the second semester they can make add or change program requests with the approval of the Faculty who will serve as their advisor in the new program. If approved, an add/change program request goes into effect the term after completion or discontinuation of the Modeling and Simulation in Mechanical Engineering program named option MS program. Students in the Modeling and Simulation in Mechanical Engineering program cannot be enrolled in any other program at the same time.

ii. Credits taken as a University Special Student

Applies to all options

Students are encouraged to enter a graduate program as early as possible and not to "try out" the program as University Special students. Officially entering the program allows the student to receive appropriate advising and be fully integrated into the program structure. If University Special student credits are accepted by a program to fulfill program requirements, it is done on a case-by-case basis and must be approved by the program. The number of credits that may transfer from a UW–Madison University Special student career to a UW–Madison graduate career is limited to no more than fifteen credits numbered 400 or above.

iii. Learning outcomes (learning goals)

Learning outcomes are the anticipated knowledge, skills, and values expected to be acquired by all students completing their master's degree.

1. Demonstrate a strong 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.

iv. Length of time to degree

a. Research—Thesis

The majority of Mechanical Engineering MS Research—Thesis students complete their degree in 2 years[8]. Any student unable to defend their thesis in this period will be reviewed by the Mechanical Engineering Graduate Committee to determine why it is taking longer than expected to complete their degree. It is recognized that there are many reasons why a graduate student may require more time to complete their degree. Therefore, the Mechanical Engineering Graduate Committee will request the following information from the student to review during their meeting:

- Date
- Name of student
- Name of advisor
- Accomplishments to date (300 words or less)
- Extenuating circumstances, if any
- Plans for degree completion (include predicted defense date)

[8] Data on Time to Degree can be found at the following Graduate School website: grad.wisc.edu/data/degrees-awarded

b. Automotive Engineering / Modeling and Simulation in Mechanical Engineering / Accelerated

The Mechanical Engineering MS — Automotive Engineering / Modeling and Simulation in Mechanical Engineering / Accelerated degrees are designed to be completed in 12 months. Any student unable to complete their degree in this period will be reviewed by the Mechanical Engineering Graduate Committee to determine why it is taking longer than expected to complete their degree. It is recognized that there are many reasons why a graduate student may require more time to complete their degree. Therefore, the Mechanical Engineering Graduate Committee will request the following information from the student to review during their meeting:

- Date
- Name of student
- Accomplishments to date (300 words or less)
- Extenuating circumstances, if any
- Plans for degree completion (include predicted graduation date)

v. MS degree final checklist

At least four weeks prior to the oral examination (MS Research—Thesis students) or the degree deadline (MS Research—Independent Study, Accelerated Program, Automotive Engineering, Modeling and Simulation in Mechanical Engineering students), students must complete and return the correct Warrant Request form. Warrant request forms:

↗ intranet.engineering.wisc.edu/mechanical-engineering/current-me-student-resources/

The completed and signed warrant request form should be submitted to the Mechanical Engineering Graduate Coordinator. The Graduate Coordinator will review your degree request and work with the Graduate School to create a degree warrant. When the warrant is ready, students will be notified via WiscMail. Students will then retrieve their degree warrant.

It is student responsibility to obtain signatures and dates and returned the completed warrant to the ME Graduate Coordinator by the degree deadline in order to receive your degree. Degree deadlines:

↗ grad.wisc.edu/deadlines

XXI. Mechanical Engineering PhD degree Requirements

i. Summary of steps toward a PhD in Mechanical Engineering

Admission to the Department of Mechanical Engineering Graduate Program.

Sufficient scores on the Mechanical Engineering qualifying examination.

Approval of "PhD Program and Minor Approval" document by the Mechanical Engineering Graduate Committee.

Approval by the Mechanical Engineering Preliminary Examination Committee.

Approval of dissertation and final examination.

ii. Course and grade requirements

Curriculum: Total of 60 credits required:

o. ME 903: Graduate Seminar (0 credits) is required in both of the first 2 semesters in residence at UW–Madison. Delays are granted on a case-by-case basis and must be requested by submitting the "Mechanical Engineering Graduate Program Academic Policy Exception Request" form to the Mechanical Engineering Graduate Coordinator prior to the start of the term. Two terms of ME 903 are required to earn the degree.

p. Research/Thesis Credits: At least 18 research thesis credits (ME 790, ME 890, ME 990) are required with an overall grade of S. Thesis credits must be from the Department of Mechanical Engineering, except in the case of an approved co-advisor; credit then can be obtained through the co-advisor's department. Pre-dissertators should enroll in ME 890 and dissertators in ME 990.

q. A minimum of 36 formal course credits beyond the BS degree.

i. A minimum of 9 credits (usually three courses) numbered 700 or higher:

- 3 credits (usually one course) of the 700-level courses must be taken in Mechanical Engineering (M E) and/or Engineering Mechanics (E M A) at UW–Madison.

ii. A minimum of one math course (3 or more credits). The following courses would satisfy the math course requirement:

- ME 601: Special Topics: Computational Math w/Engr Apps *(this topic ONLY)*
- ME 964: Special Advanced Topics: 'App & Comp Math w/Eng Apps' OR 'Comp Math with Apps in Eng' OR 'Sci Computing for Apps in Eng' *(this topic ONLY)*
- EMA/EP 476: Introduction to Scientific Computing for Engineering Physics
- EMA/EP 547: Engineering Analysis I
- EMA/EP 548: Engineering Analysis II
- MATH 321: Applied Mathematical Analysis

- MATH 322: Applied Mathematical Analysis
- 400-level and above Math Department courses
- 400-level and above Statistics Department courses
- Graduate "transfer credits" equivalent to the above

iii. Minor requirements: Students must complete one minor option below:
↗ grad.wisc.edu/academic-policies
↗ policy.wisc.edu/library/UW-1200

- **Minor Option A** (external).—Requirements for external minor are defined by the department of that minor. Not all courses in Option A may satisfy the Mechanical Engineering Department Formal Credits requirement. Selection of this option requires the approval of the minor by the minor department.
- **Minor Option B** (distributed).—Requires a minimum of 12 formal course credits. The coursework should form a coherent group of courses for which graduate credit is allowed The approval of the advisor and the graduate and departmental committees is required.
- **Minor Option C** (Graduate/Professional certificate).— Requires successful completion of a Graduate/Professional certificate in a program outside of the student's doctoral major program.

r. Minimum Graduate Coursework (50%) Requirement:

iv. 50% of credits applied toward the program's graduate degree credit requirement must be courses designed for graduate work (this includes, but is not limited to, graduate thesis/research, independent study, and practicum/internship credits). Classes that satisfy this requirement are indicated as having the attribute Minimum Graduate Coursework (50%) in the course guide.

Course Level and Type Information:

s. A formal course is defined as any course offering that is not a seminar course, thesis research course, independent study course, co-op/internship course, etc.

t. Acceptable formal courses are those numbered 400 and above.

u. At most two 300-level courses in engineering, math, or the sciences, taken at UW–Madison, can be used towards the total formal course credit requirement. The 300-level course can be from Mechanical Engineering if approved by the student's advisor and the Mechanical Engineering Graduate Committee. A course at the 300-level can only be transferred from a UW–Madison undergraduate program if it was taken as a technical elective (i.e., non-required course).

v. The PhD program must include at least 9 formal course credits numbered 700 or higher with at least 3 credits take in ME/EMA as a graduate student at UW–Madison. These are advanced courses referred to as 700-level courses. A limited selection of courses, with course numbers less than 700 in other departments, have been approved to satisfy this 700-level requirement (list can be found on the ME Intranet [NetID required]):
↗ intranet.engineering.wisc.edu/mechanical-engineering/current-me-student-resources/

w. The schedule of active technical elective and graduate courses taught by Mechanical Engineering faculty is provided here: Mechanical Engineering Technical Elective and Graduate Course Plan - Google Drive. While the list is updated annually, it is subject to change. For information on cross-listed courses taught and/or owned by other departments, please contact that department directly.

GPA and Grade Requirements:

x. A cumulative GPA of at least 3.00 is required.

y. PhD candidates may not have more than two incompletes on their record at any time.

z. Students must earn a "C" or above in all formal coursework. Credits with a grade of "D" or "F" cannot be used to satisfy requirements.

Previously Earned Graduate Credits from outside UW–Madison:

aa. *With faculty advisor approval,* students may transfer up to 28 credits of previously earned graduate coursework from other institutions toward the minimum credit requirement and the minimum graduate coursework (50%) requirement. No credits from other institutions can be counted toward the minimum graduate residence credit requirement. Coursework earned ten or more years prior to admission is not allowed to satisfy requirements.Previously earned courses must be ones for which graduate credit was awarded at the outside institution. The form can be found on ME Intranet (NetID required):
↗ intranet.engineering.wisc.edu/mechanical-engineering/current-me-student-resources/

Previously earned UW–Madison Undergraduate Degree Coursework:

bb. With *faculty advisor approval,* students may transfer a maximum of 7 credits from a UW-Madison undergraduate degree to be applied toward the minimum credit requirement. Only coursework that is applicable to the degree curriculum is eligible. These credits are not allowed to count toward the minimum graduate coursework (50%) requirement unless taken in courses numbered 700 or above. No credits can be counted toward the minimum graduate residence credit requirement. Coursework earned ten or more years prior to admission is not allowed to satisfy requirements. The grades from these courses will not be counted towards the student's graduate GPA. The form for approval of these credits can be found on the ME Intranet (NetID required):
↗ intranet.engineering.wisc.edu/mechanical-engineering/current-me-student-resources/

Additional Information:

p. University Special Student Status: Students are encouraged to enter a graduate program as early as possible and not to "try out" the program as University Special students. Officially entering the program allows the student to receive appropriate advising and be fully integrated into the program structure. If University Special student credits are accepted by a program to fulfill program requirements, it is done on a case-by-case basis and must be approved by the program. The number of credits that may transfer from a UW–Madison University Special student career to a UW–Madison graduate career is limited to no more than 15 credits numbered 400 or above. Those credits earned in such a term still appear in the transcript history as "University Special" student, but the Registrar's Office adds a statement in the transcript "All

credits taken in [term] as a University Special student have been accepted by the Graduate School toward a degree program.

q. You must be enrolled for the semester in which you will graduate and successfully complete the courses in which you are enrolled.

iii. Learning outcomes (learning goals)

Learning outcomes are the anticipated knowledge, skills, and values expected to be acquired by all students completing their PhD degree.

7. Demonstrate an extraordinary, deep understanding of mathematical, scientific, and engineering principles in the field.
8. Demonstrate an ability to formulate, analyze, and independently solve advanced engineering problems.
9. Apply the relevant scientific and technological advancements, techniques, and engineering tools to address these problems.
10. Recognize and apply principles of ethical and professional conduct.
11. 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.
12. Demonstrate an ability to conduct original research and communicate it to their peers.

iv. Qualifying for the PhD program

Students wanting to continue graduate study toward their PhD degree in the Department of Mechanical Engineering must take the PhD qualifying examination. The written portion of the exam is offered before the start of each spring and fall semester. You are allowed a maximum of two opportunities to pass the qualifying examination. The objectives of this exam are to:

- Ensure a standard of excellence associated with the degree of PhD in Mechanical Engineering from the University of Wisconsin–Madison.
- Ensure that you have basic competency in the technical material related to your intended research program.
- Offer a growth experience, i.e., an opportunity to synthesize knowledge across a broader range than generally done in any class.

a. When to take the exam

The written portion of the qualifying exam is offered twice a year, generally the week before classes start in the fall and spring semesters (typically late August and mid-January). The associated literature review presentation must be completed within the timing limits detailed below.

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 Mechanical Engineering 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.

In special cases, one additional semester may be allowed before the exam must be taken. To obtain approval to delay the exam for one semester, the student must submit a written request (see section XIII. Academic exception petition) before the last week of class in the semester preceding the exam. Extensions are granted only when it is clearly demonstrated that unusual circumstances warrant the delay. Students without an approved extension who miss taking the exam at the required time will forfeit one of their opportunities to take the exam.

Students may sign up for the Fall exam beginning Feb 15 of each year. Students may sign up for the Spring exam beginning September 15 of each year. The sign-up form is at https://go.wisc.edu/quals. Periodically, an email will be sent to Mechanical Engineering graduate students as a reminder to sign up for the exam and to provide additional information.

b. The exam

The exam is composed of two 2-hour written subject-area exams and an oral literature review.

Each area exam is designed to test knowledge in a general and fundamental Mechanical Engineering area. They are not intended to test each student in their specific research area. An area is considered general and fundamental if it is commonly included in BSME curricula at R1 institutions. We will only offer area exams relevant to our department: (areas for which at least 2 students per year take the exam on average). The area exams are intended to test students' proficiency at solving entry-level graduate course problems. The scope of each area exam shall be explicitly delineated in terms of textbook chapters and/or a list of specific topics. Practice exams are available at intranet.engineering.wisc.edu/mechanical-engineering/current-me-student-resources/ under PhD Qualifying Exams.

You must select two area exams from the following:

- Controls
- Kinematics/Dynamics
- Heat Transfer
- Dynamic Systems/Vibrations
- Fluid Mechanics
- Solid Mechanics
- Thermodynamics

- Materials Processing
- Computer Aided Engineering.

You must write the last 4 digits of your campus ID, rather than your name, at the top of each page to facilitate anonymous grading. Students retaking area exams may choose different area exams than in the initial attempt.

In addition to the two area exams, you must present a literature review to a committee of three Mechanical Engineering professors composed of your advisor and two assisting members. Generally, this committee will later form part of your PhD committee. In consultation with your advisor, you will select the assisting members, determine professor availability, and schedule a room for the presentation. The latest the presentation can be given is five calendar days following the last day of the corresponding area exams. The earliest the presentation can be given is September 15 (if area exams are to be taken in January) or February 15 (if area exams are to be taken in August/September). Faculty cannot be assisting members for more than three students in a given term.

The committee selects three papers for you to review, as follows. First the advisor selects five papers on a specific technical topic (not reviews of fields). Then, the assisting members select down to three papers from the five. The committee emails the references of the three papers to you, 13 to 15 calendar days before the presentation. Professors cannot provide advance insight into which papers are likely to become exam papers. You prepare your presentation independently. You present a review of the papers, which is at most 15 minutes long. A question-and-answer session follows, with assisting members asking questions first. Questions should be closely related to the specific technical topic represented in the papers. The target duration for the entire exam is 30 to 45 minutes. Each professor independently submits their grade immediately following the presentation. The professors are not allowed to discuss the student, exam, or grades until all three grades have been submitted. The grades are not to be based on the delivery or the polish of the presentation. The grading rubric for the literature review is:

30%—Convey the relevance / significance / main contribution(s) of each paper
20%—Describe commonalities among the papers
20%—Describe differences between the papers
20%—Understand and address faculty questions
10%—Meet time constraints

Professors will consider this scoring scale when grading a (literature review or area) portion of the exam:

100%—Outstanding
90%—Very good
80%—Good
70%—Capable enough to get by as a PhD
65%—Minimum cumulative percentage for passing
55%—Minimum individual exam percentage for passing

Your literature review score is computed as (your advisor's score × 0.5) + (first assisting member score × 0.25) + (second assisting member score × 0.25).

To pass the PhD qualifying exam, you must receive scores of at least 55 on each of your literature review and two area exams. You must also achieve a cumulative score of at least 65, computed as (literature review score × 0.4) + (first area exam score × 0.3) + (second area exam score × 0.3).

If you do not pass in the first attempt, your literature review score and each area exam score will be provided to you. You can retake any or all component(s) at the next offering in attempt to pass (retaining prior scores for any components not retaken). For components that are retaken, the new score is used even if it is lower than the previous score for that component. In the event that one area exam is taken in the second attempt, and it is a new area exam not taken in the first attempt, the score on this exam will replace the lower of the scores from the first attempt. Students who do not pass the exam after a second attempt will fail the qualifying examination, and can no longer enroll in the program in subsequent semesters.

All written examination materials become the property of the department and will not be returned to you.

v. Proposed course program (PhD program and minor approval)

A proposed course program is to be submitted for approval by the Department before the end of the semester following the semester in which the qualifying examination was passed. **Do not wait until you want to present your preliminary exam to submit your plan for approval.** It can take six or more weeks to have your plan approved because the Mechanical Engineering Graduate Committee only meets once per month and not over the summer, so plan accordingly. For example, if you submit your course plan in June it may not be approved until October. Any subsequent changes to the program must be approved by the student's advisor and the Graduate Committee. Forms:

↗ intranet.engineering.wisc.edu/mechanical-engineering/current-me-student-resources/

vi. Preliminary examination

1. To be eligible to take the preliminary exam, you must have passed the qualifying exam, obtained final approval of your course program by the Graduate Committee, and have completed at least 32 graduate credits. If the course program has not been approved, it can take six weeks or longer for programs to be approved during the fall and winter term (programs are not approved during the summer).
2. The preliminary examination time and content is set and administered by the advisor and the committee.
3. A second attempt for the preliminary exam is allowed only if the qualifying exam was passed on the first attempt.
4. The exam must be taken at least nine months before the final thesis exam.
5. The normal expectation is that the preliminary examination be completed within 5 years of taking the qualifying exam (the preliminary examination is generally taken within 1 to 3 years of passing

the qualifying exam). Students requiring more time must submit a written request (see section XIII. **Academic exception petition**).

6. You must complete a PhD Preliminary Exam Warrant Application at least four weeks prior to the preliminary examination (this is in addition to the time required for course program approval). The request form and an unofficial transcript must be submitted to the ME Graduate Coordinator. The request is reviewed and processed by the Mechanical Engineering Graduate Coordinator and Graduate School. You will receive an email notifying you when your warrant is available. After the preliminary exam, this warrant must be signed and returned to the ME Graduate Coordinatorbefore the dissertator eligibility deadline in order to be a dissertator for the following semester.
   ↗ intranet.engineering.wisc.edu/mechanical-engineering/current-me-student-resources/
   ↗ deadlines: grad.wisc.edu/current-students/doctoral-guide
7. You must submit the final-draft copy of the preliminary exam report to the examination committee at least one week prior to the exam.
8. You must be enrolled for a minimum of 2 graduate-level credits during the semester in which you take you PhD preliminary examination. This is a minimum: if you have other degree minimums through their RA, TA or grader appointments or through ISS that are higher, you must follow those requirements.

a. PhD preliminary examination guidelines

1. Preliminary exam committee membership:
   a. The preliminary exam committee consists of a minimum of four members, which includes the chair (your faculty advisor). In consultation with your faculty advisor (who serves as chair of the committee), you select three additional committee members based on the criteria set forth in **PhD final oral examination (defense) membership: Committee members one through five**.
   b. Typically, these members also serve on the final examination committee. Inclusion of the fifth committee member for the preliminary exam is optional.
2. Prepare a written report, **not to exceed 50 pages** (double-spaced typing with figures), and distribute it to the committee members at least one week before the examination. If this deadline cannot be met, the preliminary examination will be postponed.
3. The written report should include the following:
   - Introduction to the thesis topic and objectives of the research.
   - Review of the previous work directly related to the thesis objective including a broad review of related work and an in-depth review of a few key papers.
   - Description of the dissertation plan including procedures and methods to be used, and an indication of expected results.
   - A list of the references cited.
4. The written report should follow the same style guidelines as required for the dissertation.
   ↗ grad.wisc.edu/current-students/doctoral-guide

5. The advisor will review your background for the committee members—i.e., BS degree, MS degree, work experience—and circulate the transcript at the start, prior to your presentation.
6. The preliminary examination will last about 1-1/2 hours: 1/2 hour for your oral presentation of the written report, 3/4 hour for the discussion of questions raised by the committee members, and 1/4 hour for evaluation by the committee members.
7. Your oral presentation reiterates the written report in a concise and factual manner. Committee members may ask specific questions at any time during the examination.
8. The committee (including the committee chair) will ask additional questions of a general nature regarding the thesis topic after the oral presentation is completed.
9. You will leave the room after there are no additional questions. The committee privately evaluates the written report, oral presentation, and responses to questions prior to voting to pass or fail.
10. The committee members sign your warrant making sure all dates are complete, and you return the warrant to the Graduate Student Services Office.

vii. Dissertator status

Students are eligible to obtain Dissertator status, if they so choose, at the beginning of any semester after they have finished all coursework and have passed the preliminary examination. The process typically occurs with the completion of the preliminary exam warrant process. The graduate school confirms through an email letter when a student has achieved dissertator status. Dissertators must enroll in exactly 3 credits to maintain their dissertator status during the Fall or Spring semesters. Enrollment in 3 credits during the Summer session is required for graduate assistants, trainees, or fellows. Unless the advisor directs otherwise, the 3 credits must be ME 990.

↗ grad.wisc.edu/documents/dissertator-status

viii. PhD dissertation formatting guidelines

The Graduate School issues rules regarding the dissertation format. Since these rules may change from year-to-year, it is your responsibility to get a current copy of these rules from the Graduate School.

↗ grad.wisc.edu/current-students/doctoral-guide

In addition to The Graduate School, your advisor and thesis committee members may have certain format requirements. The following suggestions are offered for your consideration in preparing your thesis:

- Put references in numerical order. The ASME style format or equivalent should be used.
- All figures and tables must have titles.
- Use SI units with other units in parentheses if provided.
- Use standard abbreviations such as g not gm.
- Avoid using the first person; rather, use the third person.
- Include a nomenclature with symbols listed in alphabetical order.
- A list of figures and a list of tables are required.

- The experimental error should be stated for all experimental results. Show error bars for all data and provide values for confidence intervals (state the confidence level) for all tabular results.
- All equations should be numbered consecutively.
- Do not write out numbers. (Use 1/4 m (or 0.25 m) instead of one-quarter meter.).

Review ASME journal articles and follow their style:
↗ asme.org/publications-submissions/journals/information-for-authors/journal-guidelines

ix. PhD final oral examination (defense) committee membership

A final dissertation oral exam (defense) must be presented to the dissertation committee. The final dissertation oral exam (defense) committee must be made up of at least five members but no more than eight members.

1. Committee members one through five:
    i. Committee members one through five are required.
    ii. Members one through five are required to be UW-Madison faculty and consist of your advisor, who chairs the committee, three other graduate faculty or former graduate faculty up to one year after resignation or retirement, and one of the following: another graduate faculty, a retired faculty member with emeritus status, or a UW–Madison academic staff member who has been approved by the Mechanical Engineering executive committee to serve on your dissertation committee. At least one faculty member on the committee must be from outside the Mechanical Engineering Department: this individual may not be your faculty advisor. Members of the committee from outside of Mechanical Engineering should be selected to have a background appropriate to evaluate the dissertation. The faculty from outside the Mechanical Engineering Department must have at least a 0% appointment (i.e., affiliate status) in another department.
    iii. READERS: Three of the five committee members (the student's faculty advisor counts as one of these three) are to be designated as readers who will read the thesis and provide corrections as needed. The two non-reader committee members will review the thesis in preparation for the doctoral examination.
    iv. Graduate faculty hold the title of professor, associate professor, or assistant professor as listed in the UW–Madison directory: wisc.edu/directories.
    v. To determine if a retired faculty member has emeritus status, check the UW–Madison directory, if the person is listed in the directory with the title emeritus, then they have emeritus status.
    vi. To have an academic staff member approved to serve on a dissertation committee, have them submit their current curriculum vitae to the ME Graduate Coordinator or to the Associate Chair for Graduate Studies (i.e., Director of Graduate Studies, Chair of the Graduate Committee) for approval by the department executive committee.
2. Committee members six through eight:

i. Committee members six through eight are optional. (There is no penalty for not including members beyond the required five.)

ii. Members six through eight may be from UW-Madison or from outside the UW-Madison community. Members from outside of Mechanical Engineering should be selected to have a background appropriate to evaluate the dissertation.

iii. Committee members beyond the fifth member must conform to the list on the graduate school's website, and must be approved by the student's advisors: grad.wisc.edu/documents/committees

x. PhD final oral examination (defense) guidelines

1. The exam is predominantly, but not exclusively, on the dissertation.
2. The committee members should receive the dissertation manuscript at least **two weeks** prior to the examination date. If this deadline cannot be met, the examination will be postponed.
3. The thesis defense will last about two hours: 1/2 hour for your oral presentation of your thesis, 1 hour for questions by the committee members, and 1/2 hour for private discussion by the committee members. The committee members may ask questions at any time during the exam.
4. The committee will pay particular attention to see that your own contributions are clearly delineated and thoroughly documented in the dissertation. Dissertations must acknowledge contributions received from other individuals, including co-authors of published work that appears in the document, such as in designing the research, executing the research, analyzing the data, interpreting the data/research, or writing, proofing, or copyediting the manuscript.
5. The advisor will review your background for the committee members—i.e., BS degree, MS degree, work experience—and circulate the transcript at the beginning of the examination. You may be asked to leave the room for a few minutes at this time.
6. Your oral presentation should be concise and factual. The introduction and review should be brief and the presentation should emphasize the research methods and results. The committee is primarily interested in your own work. Questions by the committee during the presentation are generally for clarification purposes only.
7. After the formal presentation is completed, the committee members will ask extensive questions referring to specific parts of the thesis and the oral presentation. Every committee member will be allowed sufficient time to ask you questions. The committee chair will act as the moderator, but will not answer for you, except, for example, to clarify the question.
8. After approximately 1-1/2 hours, you will be asked to briefly summarize the most important new findings of the thesis research. Upon polling the committee to determine that the members have no further questions, you will be asked to leave the room.
9. Private discussion by the committee will focus on the evaluation of the thesis research itself, evaluation of your thesis defense, and evaluation of the candidate's overall record. There should be time for each member of the committee to consider each of these items, and, if necessary, to formulate instructions to be implemented by your advisor.

xi. PhD degree final checklist

1. At least four weeks prior to the final examination, you must complete and return the PhD Final Oral Defense Warrant Request. The request form must be submitted to the ME Graduate Coordinator. The request is then reviewed and processed by the Mechanical Engineering Graduate Coordinator and Graduate School. You will receive an email notifying you when your warrant is available.
   ↗ intranet.engineering.wisc.edu/mechanical-engineering/current-me-student-resources/
   ↗ Office of the Registrar – UW–Madison (wisc.edu)
2. You must submit the final-draft copy of your dissertation to the examination committee at least **two weeks** prior to the exam.
3. You and your committee members will receive an email from the Mechanical Engineering Graduate Coordinator a few days prior to your defense with information about accessing the warrant.
4. After the exam, your committee will sign the e-warrant. You will be notified by the Mechanical Engineering Graduate Coordinator when the warrant is available for you to download and submit to ProQuest.
5. The completed warrant and dissertation must be uploaded into the Graduate School ProQuest/UMI ETD Administrator website **on or before the degree deadline**. Please review the Graduate School Guide to Preparing Your Doctoral Dissertation:
   ↗ grad.wisc.edu/current-students/doctoral-guide
6. Also reference the check-out procedure below.

It is your responsibility to verify that all graduation requirements have been met.

xii. Check-out procedure

7. Keys must be returned to the Mechanical Engineering Department Office (room 2107 Mechanical Engineering Building) prior to leaving. Your degree may be delayed if you do not follow this requirement. The purpose is to ensure that all department equipment is returned and that your office and desk are clean and ready to be used by another person. The checkout process should not be done at the last minute. One week before leaving would be ideal.
8. If you had an assistantship appointment in your last semester, contact the Mechanical Engineering Payroll & Benefits Coordinator to let them know when you upload your dissertation to ProQuest. Ideally, please contact them before, or on the day, you complete the upload. At minmum, you must do this before you leave campus. Any overpayment of payroll/benefits due to failure to report the termination of an appointment, may result in a repayment requirement.
9. For Domestic students, your diploma will be sent to your mailing address. For International students, your diploma will be sent to your diploma address. Please confirm this address is correct in your Student Center. Diplomas are sent 12 to 14 weeks after graduation to the mailing address or diploma address, respectively.
   ↗ registrar.wisc.edu/diploma

10. An online survey will be emailed to all graduate students completing their degree. This survey is extremely helpful to the department in tracking where students go after graduation. We greatly appreciate your cooperation in completing this survey.
11. You can keep your wisc.edu email but you will only have access to Office 365 email, calendar, people/contacts and tasks. Students who graduate can also apply for a UW alumni email from the Wisconsin Alumni Association.
    ↗ Leaving the University Knowledge Base
    ↗ https://www.uwalumni.com/resources-services/email/
12. Feel free to contact the ME Gradute Coordinator if you have any questions or concerns in the future, and please keep in touch!

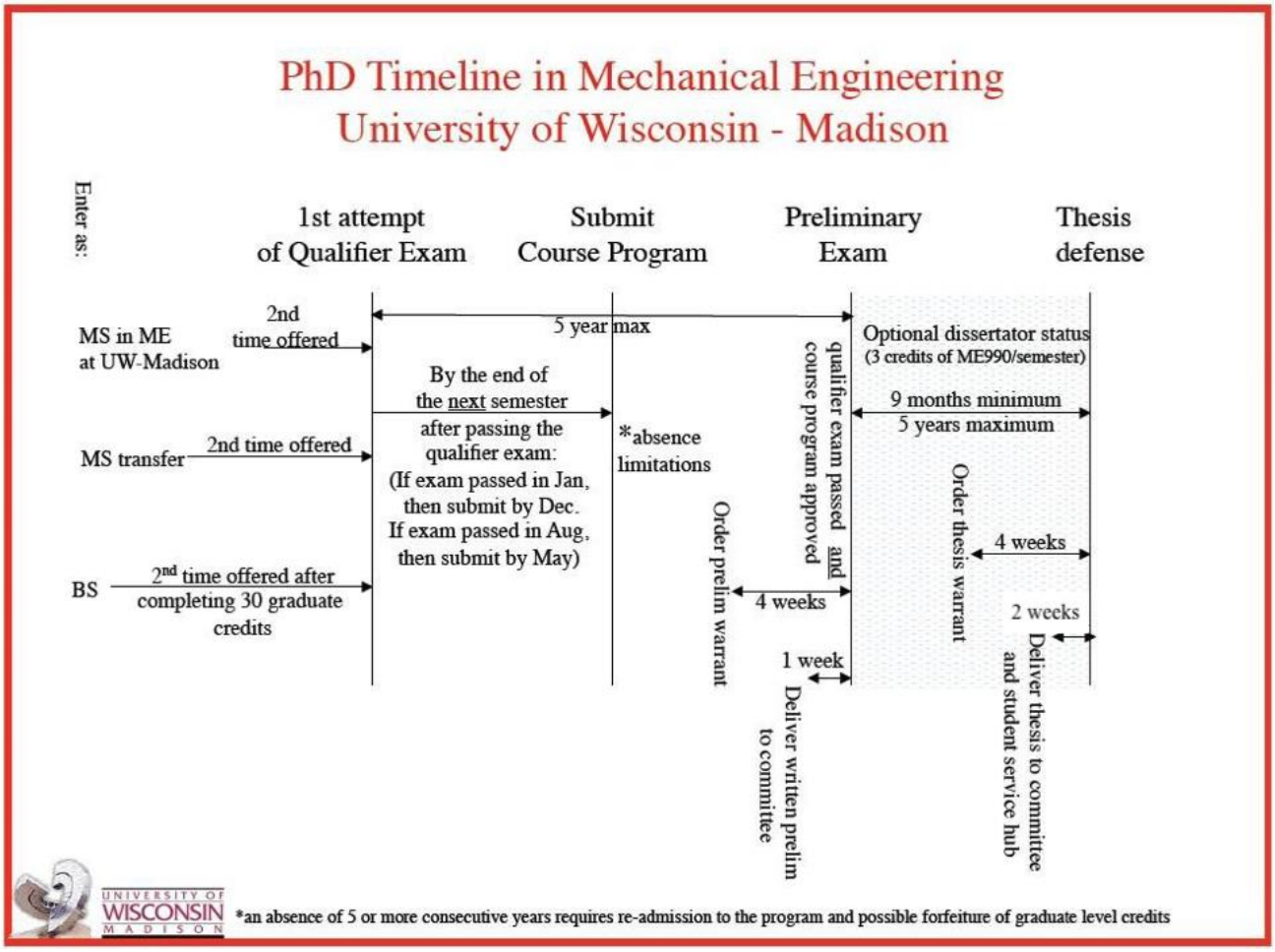
xiii. Length of time to degree

The majority of Mechanical Engineering PhD students complete their degree in 6 years[9]. Any student unable to defend their thesis in this period will be reviewed by the Mechanical Engineering Graduate Committee to determine why it is taking longer than expected to complete their degree. There are many reasons why a graduate student may require more time to complete their degree. Therefore, the Mechanical Engineering Graduate Committee will request the following information from you to review during their meeting:

- Date
- Name of student
- Name of advisor
- Accomplishments to date (300 words or less)
- Extenuating circumstances, if any
- Plans for degree completion (include predicted defense date)
- A list of publications published, in press, or submitted

[9] Data on Time to Degree can be found at the following Graduate School website: grad.wisc.edu/data/degrees-awarded

xiv. PhD timeline overview



XXII. Doctoral minor in Mechanical Engineering

Students from outside of Mechanical Engineering graduate program can receive a doctoral minor in Mechanical Engineering. The requirements for an external minor in Mechanical Engineering are listed below. The minor must be approved by the Mechanical Engineering Department. Submit the form to the ME Graduate Coordinator, for approval.

↗ intranet.engineering.wisc.edu/mechanical-engineering/current-me-student-resources/

i. Requirements for external minor

7. A minimum of 9 formal course credits taken in Mechanical Engineering (M E) are required.
8. Courses must be numbered 400 or above in Mechanical Engineering (M E).
9. One of the courses (3 credits) must be numbered 700 or above in Mechanical Engineering (M E).
10. A maximum of one course may be cross listed with the student's major department.
11. A minimum grade of B or higher is required for all courses taken for the minor. Grades of BC and below are not accepted.
12. Research, independent study, and seminar courses are not permitted.
13. A maximum of 6 credits may be from prior graduate coursework taken at an institution other than UW-Madison.