Effective Summer 2018

This guide applies to students entering the program for the Summer 2018 Session. Students admitted prior to this time should continue to follow the guide that was in effect when they entered the program.

Administered by the

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Introduction

The Fundamentals of Applied Mechanics option of the Master of Science degree in Engineering Mechanics (FAM) is primarily designed for students with a science background who would like to transition to engineering. It may also be suitable for non-mechanics engineering students (electrical, chemical, etc.) who are interested in transitioning to mechanics. The goal of this program is to provide a bridge to careers in engineering or to a PhD program in mechanics. FAM is fast-paced; students are expected to complete the curriculum over a twelve-month period, starting in a summer session. Prospective graduate students with a background in mechanics are encouraged to consider our traditional MS and PhD Engineering Mechanics programs.

This guide describes the academic policies and procedures for students working toward the FAM degree. The FAM program is administered by the Department of Engineering Physics. Students should become familiar with the material in this guide and with the academic policies of the Graduate School (https://grad.wisc.edu/acadpolicy). It is the student’s responsibility to make sure that both Department and Graduate School requirements are met.

To our new FAM students, we welcome you to the University of Wisconsin-Madison and to the Department of Engineering Physics, and we wish you a successful graduate career!

Career Opportunities

Graduates of our Engineering Mechanics programs are sought by most industries and government agencies. Typical examples of project areas requiring engineers with a broad science and engineering background and with an emphasis in applied mechanics are outlined below:

Development of improved experimental, analytical and engineering methods as well as new materials for automobiles, air/spacecraft, submarines, high-speed rail systems, and other moving vehicles for improved safety, strength, and reliability.

Design of new types of structures projected for future needs, such as advanced energy systems, cryogenic structures, space stations, undersea structures and earthquake resistant installations.

Dynamic and vibrational design of rotating machinery, such as aircraft engines, high-speed gas and steam turbines, spinning disks for digital information storage, aircraft and automotive tire applications, and high-speed rotating drums and pumps.

Development of innovative experimental methods for studying machines, structural components and materials where new and unusual design conditions are encountered, such as very high or low temperatures, vibrational and repetitive loads, impact situations, moving loads, large magnetic or electrical fields, and biomedical environments.

Development of new theories, methods of analysis and computational techniques for treating unusual advanced design problems in engineering which may require higher levels of mathematics and computer training.

Research, development and testing of new materials such as metals, ceramics, composites, and plastics, to meet the changing requirements of the future that will be encountered in designing advanced energy systems, extremely high speed machinery, nonmetallic substitutes, micro-machines and biomedical apparatus. Advanced engineering in the research and development programs of major industries such as the automotive, aerospace, computer,
construction, farm equipment, home appliances, industrial machinery, nuclear, oceanographic, petroleum, tire and rubber, plastics and paper.

Engineering Career Services

The [Engineering Career Services](#) office with the College of Engineering provides support for students seeking engineering opportunities following graduation.

Admission

For admission to the FAM degree program, an applicant must have a bachelor’s degree in physical science or mathematics (some engineering disciplines will also be considered) and an undergraduate record that indicates an ability to succeed in graduate study. The Graduate School requires a minimum undergraduate grade point average of 3.0 on a 4.0 basis on the equivalent of the last 60 semester hours from the most recent bachelor’s degree. In special cases, students with grade point averages lower than 3.0 who meet all the general requirements of the Graduate School may be considered for admission on probation. Scores for the general GRE are required for all applicants who are not UW-Madison graduates. International applicants are required to submit TOEFL scores, and a minimum score of 100 is needed for admission. Exceptions to the TOEFL requirement are made if any of the following apply:

- English is the exclusive language of instruction at the undergraduate institution; **or**
- The student earned a degree from a regionally accredited U.S. college or university not more than 5 years prior to the anticipated semester of enrollment; **or**
- The student completed at least two full-time semesters of graded course work, exclusive of ESL courses, in a U.S. college or university, or at an institution outside the U.S. where English is the exclusive language of instruction. Completion of graded course work cannot be more than five years prior to the anticipated semester of enrollment.

Students must be solely enrolled in the FAM program to be candidates for this degree. They are not permitted to earn more than one M.S. degree in Engineering Mechanics at UW-Madison.

Admission as a Special Student

The Graduate School will permit admission as a Special Student for students whose academic record is difficult to evaluate, but otherwise shows promise for graduate study. While graduate level work performed as a Special Student does not earn Graduate School credit, it can be used to meet admission requirements and to correct weaknesses in the student’s preparation for graduate study. After demonstrating satisfactory performance as a Special Student, a student can apply for admission as a regular graduate student. Upon admission to the FAM program, it is possible to apply as many as 15 credits of FAM-required courses (see FAM Curriculum below) taken as a Special Student toward the degree requirements. Students are advised to consult the Graduate School for current policies and regulations. Applicants should note that a tuition charge may be assessed.

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1 Given the accelerated pace of the FAM degree program, international students need to be fluent in English at the start of the program, hence the high TOEFL score requirement.
Grade Policy

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 enrollment after two semesters of below B-average grades unless unusual or extenuating circumstances have prevailed.

The FAM program requires that courses in which grades of BC, C, or below are received cannot be counted toward a graduate degree except as follows:

1. Credits of C will be allowed provided they are balanced by twice as many credits of A or by four times as many credits of AB.
2. Credits of BC will be allowed provided they are balanced by twice as many credits of AB or by an equal number of credits of A.

Advising

Upon entering the program, each student will be appointed a faculty advisor by the chair of the Graduate Studies Committee. The College of Engineering also provides support for students in named M.S. options, such as FAM; the program director for the College’s named option programs is Lee DeBaillie.

Wait Listed Courses: In any given semester, courses may fill up quickly depending on demand. Some courses may have a wait list established through the enrollment system. Students will be notified by email if they have been given permission to enroll from the wait list. The Department will assist students in enrolling for the courses they need. However, there is no guarantee that students will be allowed into a wait-listed section.

Financial Support: The Department of Engineering Physics does not offer assistantship positions to its FAM students. The two semesters of the program are academically accelerated, and students are not expected to have time for assistantship work.

Grievance Procedure

Students who feel that they have been treated unfairly have the right to a prompt hearing of their grievance. Such complaints may involve course grades, classroom treatment, advising, various forms of harassment, or other issues. Any student or potential student may use these procedures.

Procedures for proper accounting of student grievances:

- The student should speak first with the person toward whom the grievance is directed. In most cases, grievances can be resolved at this level.
- Should a satisfactory resolution not be achieved, the student should contact the program’s Grievance Advisor to discuss the grievance. The Graduate Student Coordinator can provide students with the name of this faculty member, who facilitates problem resolution through informal channels. The Grievance Advisor is responsible for facilitating any complaints or issues of students. The Grievance Advisor first attempts to help students informally address the grievance prior to any formal complaint. Students are also encouraged to talk with their
faculty advisors regarding concerns or difficulties if necessary. University resources for sexual harassment concerns can be found on the UW Office of Equity and Diversity website.

- If the issue is not resolved to the student’s satisfaction, the student can submit the grievance to the Grievance Advisor in writing, within 60 calendar days of the alleged unfair treatment.

- On receipt of a written complaint, a faculty committee will be convened by the Grievance Advisor to manage the grievance. The program faculty committee will obtain a written response from the person toward whom the complaint is directed. The response will be shared with the person filing the grievance.

- The faculty committee will determine a decision regarding the grievance. The Grievance Advisor 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.

- 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 College of Engineering.

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.

The Graduate School has established policies governing student conduct, academic dishonesty, and sexual and racial harassment. The Graduate School also has procedures for students wishing to appeal a grievance decision made at the college level. These policies are described in the Academic Policies and Procedures at https://grad.wisc.edu/acadpolicy/.

**Graduate Policy-Related Web Sites**

The Graduate School web site (https://grad.wisc.edu) has extensive information concerning policies and procedures for graduate students. Students are responsible for consulting these policies and procedures and for abiding by them.

Other useful web sites are:
- Engineering Physics Department  http://www.engr.wisc.edu/department/engineering-physics
- College of Engineering  http://www.engr.wisc.edu

**Limits on Credits per Term**

Full-time student status requires a student to enroll for a minimum of 8 credits of course work numbered 300 and above. The normal maximum number of credits is 15. A full-time student is limited to 12 credits during the summer.
Fundamentals of Applied Mechanics Curriculum

Credits Requirement: 30
Of the 30 credits counted towards the degree, at least 15 must be at the graduate level.

Summer Session 3-6 Credits
Required:
EMA 303 3cr Mechanics of Materials [on line]

Recommended prerequisite (strongly recommended):  
EMA 202 3cr Dynamics [on line]

Fall Semester 14 Credits
Required:
EMA 307 1cr Mechanics of Materials Lab  
EMA 506 3cr Adv Mechanics of Materials  
EMA 542 3cr Adv Dynamics  
EP 547 3cr Grad Eng Analysis I  
EMA 601 1cr Mechanics Seminar

Choose 1 of the following:  
EMA 405 3cr Prac Finite Elements  
EMA 605 3cr Intro to Finite Elements

Spring Semester 13 Credits
Required:
EP 548 3cr Grad Eng Analysis II  
EMA 601 1cr Mechanics Seminar

Choose 3 of the following (at least 1 of 3 must be either EMA 622, 642, 705):  
EMA 508 3cr Grad Composites  
EMA 519 3cr Grad Fracture Mechanics  
EMA 570 3cr Grad Experimental Mechanics  
EMA 611 3cr Grad Adv Mech Testing of Materials  
EMA 622 3cr Grad Mech of Continua  
EMA 642 3cr Grad Satellite Dynamics  
EMA 705 3cr Grad Adv Topics in Finite Elements

TOTAL = 30 cr; Grad = 15 cr

Note: EMA 202 is a recommended prerequisite, but it does not count toward the Graduate School's 30-credit minimum.

Satisfactory Progress
Students are expected to complete the FAM degree program in one calendar year, i.e. 12 months (summer session plus two semesters). One additional semester is permitted to complete the requirements, if needed.
Application Procedures for the Master's Degree

The following is a summary of some of the Graduate School requirements. This is not a complete list. Please review the Graduate School Catalog and the Graduate School Academic Policies and Procedures for a complete list, or contact the Graduate School.

To receive the master’s degree, contact the Graduate Student Services Office, 3182 Mechanical Engineering, at the beginning of the semester in which you intend to graduate. Have your advisor check that you have met Department requirements, then Student Services will check that you have met the Graduate School’s requirements and will request a warrant on your behalf from the Graduate School. You need to be enrolled for a minimum of two graduate-level credits (300 or above) for a grade (audits and pass/fail do not satisfy this requirement) during the semester in which you intend to graduate. For more information and for deadlines see Expecting your Master’s Degree? Procedures to Help, found at the website https://grad.wisc.edu/currentstudents/degree/.

If you have a prior master’s degree from this University, you must submit, along with your degree application, a letter from each department that includes an official (signed by advisor or Department Chair) list of courses used for each degree. Your warrant application is not complete until the two lists are received.

You must have a graduate GPA of at least 3.0/4.0 and no incomplete or progress grades on your record.

A signed warrant is a document needed to graduate. The warrant is issued by the Graduate School for one semester only. The warrant is signed by your academic advisor and the Department Chair, indicating that all degree requirements have been met. Warrants can be issued after all other incomplete and progress grades are cleared.

If the Department has signed and returned your warrant to the Graduate School, and you subsequently receive an incomplete or progress grade, you will graduate during the semester in which your grade is cleared.
Engineering Physics Faculty

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Graduate Student Services Office

The College Graduate Student Services Office is located in 3182 Mechanical Engineering. Questions about the application process can be directed to emgradadmission@engr.wisc.edu. For assistance with Graduate School requirements and warrant requests, contact Sara Hladilek, shladilek@wisc.edu, 262-8617.

Department Office Staff

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