

M.S.M.E. GRADUATE PROGRAM GUIDELINES

Overview of the M.S. Program in Mechanical Engineering

Program Mission and Goals

The mission of the Mechanical Engineering program is to provide an intellectual environment and educational experience from which students and faculty contribute to society and to the Mechanical Engineering profession through research, teaching, and service. The graduate program emphasizes advanced concepts which are the basis of research, design, and development in Mechanical Engineering and related fields.

The goals of the program are to prepare graduates with mastery of fundamentals, proficiency in understanding technology, awareness of contemporary issues in engineering, and a basis for lifelong learning. The graduates should be able to function in a research environment, including a doctoral program of study, or as part of a design team in industry.

Curriculum

The graduate program is described in the Ohio University graduate catalog, and additional details are outlined in the Program Guidelines. The basic requirement for admission is a B.S. in Mechanical Engineering. Both thesis and non-thesis options are available for the M.S. program. Graduate work can be formulated with specialization in biomedical engineering, CAD/CAM, design, energy, manufacturing, materials, robotics and thermofluids. Topics of research interest include combustion and air pollution, computer-aided design and manufacturing, energy engineering and management, automated manufacturing systems, finite element analysis, materials processing, robotics, composites, Stirling engines and refrigeration, heat transfer, fluid mechanics, biomechanics, biomaterials, and mechanical design.

The minimum requirements for the thesis program are 48 credit hours, which include 36 credit hours of coursework and 12 credit hours of thesis work. For the non-thesis program, the minimum requirements are 51 credit hours, which include 45 credit hours of coursework and 6 credit hours of research. The Program of Study must include fundamental courses in the areas of thermo-fluids and mechanical systems. All students must take a combination of 5 required and fundamental core courses, and attend graduate colloquium (ME 580) for at least three quarters, and one quarter of Technical Writing Seminar (ET 602). Elective courses are to be selected from a list of approved courses.

During the first three quarters in the program, each full-time student must develop a specific Plan of Study in consultation with his/her advisor. Students must also formulate a proposal for their research, which is presented to the thesis or project committee for approval before completing their thesis or project work. All students are required to abide by the plagiarism guidelines in their courses and research work.

General Rules

1. All students are expected to follow the Program Guidelines set forth herein; otherwise students may be dropped from the program. Students receiving tuition scholarships/stipends must be registered as a full-time student (15 to 18 credit-hours) and follow the prescribed program of study. Failure to do so will result in cancellation of tuition and stipend support.
2. First-year, full-time students should register for 3 required courses per quarter, plus ME 580 (Graduate Colloquium) for each quarter. Additional credit-hours can be taken as ME 695 (Thesis) or ME 681 (Research) to meet the 15 to 18 credit-hour requirement. A student's advisor may require that only 2 courses be taken. Technical Writing Seminar (ET 602) should be taken during the first year.
3. Full-time students must select an advisor for their graduate program during the first academic year of full time academic study. Under special circumstances, the student can make a written request to delay the selection.
4. All full-time students must have an approved (signed) Plan of Study on file with the department by the end of the first academic year of full-time M.S. study. Failure to do so will result in the student being dropped from the program.
5. All students must take ME 580 (Graduate Colloquium) for 3 quarters, and make one research presentation. Full-time students should take this during the first academic year of study. Attendance will be taken, and all

students must have at least 80% attendance every quarter for 3 quarters.

6. A maximum of 4 credit hours of Special Investigation (ME 589) can be counted for graduation credits. Lecture classes taught as ME 589 are exempt from this policy.
7. A student must maintain a GPA of no less than 3.00 to graduate with the M.S.M.E. degree. If the GPA falls below 3.00, the student will be placed on probation for a quarter. Failure to improve his/her GPA to 3.00 during the probation quarter will result in expulsion from the program. A grade below a "C" (2.00) will disqualify a course from being used for credit.
8. Full-time students must have an approved (signed) thesis or project proposal on file with the department graduate office (Stocker 256) by the end of the second academic year, and must have successfully defended their project or thesis within three academic years. Failure to meet these requirements will indicate unsatisfactory progress towards degree completion and will result in the student being dropped from the program. The Thesis/Project Proposal approval form is attached to these guidelines or can be obtained from the M.E. department graduate secretary (Ms. Merry Cibula) in Room 256 and it must be submitted to her after all required signatures are obtained.
9. Part-time students must complete their degree within the time allotted by the university.

Graduate Course Requirements – Graduate courses for the M.S.M.E. degree are divided into four categories as follows. Course requirements for the thesis and non-thesis option are provided in this section.

I. Required courses – category I

- a. ME 636 Applied Numerical Methods (4) – offered winter quarter
- b. ME 597 Engineering Analysis (4) – offered fall quarter
- c. ME 580 Graduate Colloquium (3 qtrs. @ 1 credit/qtr) – offered all quarters
- d. ET 602 Technical Writing Seminar (1) – offered all quarters

II. Fundamental courses – category II

- a. Thermo-Fluid Systems: ME 513, 514, 546, 595, 633
- b. Mechanical Systems: ME 510, 601, 604, 605, 663 or 563, 785, CE 523

III. Applied courses – category III (new courses will be periodically added to this category) ME 516, 522, 523, 527, 529, 530, 535, 555, 557, 560, 562, 566, 576, 594, 596, 731, 751, 784, BME 567

IV. Elective courses – category IV

Any graduate course from Mechanical Engineering (not listed above), Chemical Engineering, Civil Engineering, Electrical Engineering, or Industrial and Manufacturing Engineering. Computer Science courses and courses outside the College of Engineering must have prior approval from the Graduate Chairman. Up to 4 credit-hours of ME 589 special studies may be counted toward this requirement.

Thesis option (36 credit-hours of coursework are required):

1. All courses from category I must be taken.
2. One course minimum from category IIa must be taken.
3. One course minimum from category IIb must be taken.
4. Three courses minimum from category II (total) must be taken.
5. All other courses may be taken from categories II, III or IV.
6. 12 additional credit-hours of ME 695 (Thesis) are required (36 + 12 = 48).

Project (non-thesis) option (45 credit-hours of coursework are required):

1. All courses from category I must be taken.
2. One course minimum from category IIa must be taken.
3. One course minimum from category IIb must be taken.
4. Three courses minimum from category II (total) must be taken.
5. Five courses minimum from categories II and III (total) must be taken.
6. All other courses may be taken from categories II, III or IV.
7. 6 additional credit-hours of ME 681 (Research) are required (45 + 6 = 51).

Specialized Courses: Courses are listed below under different disciplines to help the student develop a suitable plan of study. Course are elective, category IV courses unless otherwise indicated (*=category II course. **=category III course).

a. Biomedical Engineering

- ME 566 (4) Mechanics of Biological Solids**
- BME 567 (4) Biomechanics of Human Motion**
- CHE 581 (3) Biochemical Engineering
- CHE 582 (3) Topics in Bioseparation
- CHE 583 (3) Biomedical Engineering
- ME 659 (5) Finite Element Applications in Bioengineering
- IT 591 (4) BioMedical Manufacturing

b. CAD/CAM

- ME 557 (4) CAD/CAM I**
- ME 560 (4) Computer-Integrated Manufacturing/Processes**
- ME 751 (4) Advanced Computer-Aided Design**
- ISE 626 (3) Artificial Neural Nets in Manufacturing
- ISE 660 (3) Geometric Modeling
- ISE 709 (3) Intelligent Systems

c. Design

- ME 576 (4) Automotive Engineering**
- ME 594 (3) Advanced Machine Design**
- ME 555 (4) Mechatronics I**
- ME 557 (4) CAD/CAM I**
- ME 522 (3) Stirling Cycle Machine Analysis**

d. Energy

- ME 516 (3) Combustion**
- ME 522 (3) Stirling Cycle Machine Analysis**
- ME 523 (3) Fuel Cell Design**
- ME 527 (3) Power Station Engineering**
- ME 531 (4) Atmosphere Pollution Control**
- ME 535 (3) Energy Engineering and Management**
- ME 731 (4) Transport Processes in Air Pollution Control**

e. Manufacturing

- ME 560 (3) Computer-Integrated Manufacturing/Processes**
- ME 562 (4) Manufacturing Processes**
- ISE 502 (4) Manufacturing Systems
- ISE 512 (4) Principles of Six Sigma
- ISE 535 (3) Quality Control and Reliability
- IT 591 (4) BioMedical Manufacturing

f. Materials and Deformable Solid Body Mechanics

- ME 563 (4) Mechanical Metallurgy*
- ME 663 (4) Mechanical Behavior of Engineering Materials*
- ME 784 (4) Fracture and Fatigue of Engineering Materials**
- ME 785 (4) Plasticity: Theory and Application*
- ME 566 (4) Mechanics of Biological Solids**
- CE 523 (4) Continuum Mechanics*
- CHE 531 (4) Advanced Topics in Materials Science and Engineering

g. Robotics and Rigid Body Mechanics

- ME 510 (4) Advanced Vibrations Analysis*
- ME 529 (4) Mechanics and Control of Robotic Manipulators**
- ME 555 (4) Mechatronics I**
- ME 601 (3) Advanced System Analysis and Control*
- ME 604 (3) Mechanics and Control of Multi-Degree-of-Freedom Systems*
- ME 605 (3) Dynamics: Theory and Applications*
- BME 567 (4) Biomechanics of Human Motion**

h. Thermo Fluids

- ME 513 (4) Conduction, Convection and Radiation*
- ME 514 (4) Convection Heat Transfer**

- ME 522 (3) Stirling Cycle Machine Analysis**
- ME 546 (3) Potential Flow Theory*
- ME 595 (4) Kinetic Theory and Statistical Thermodynamics*
- ME 633 (3) Numerical Heat Transfer and Fluid Flow*
- ME 731 (4) Transport Processes in Air Pollution Control**

g. Interdisciplinary Option: Students may take this option for non-thesis only. The Plan of Study must satisfy the Category I, II and III course requirements of the non-thesis option. The student must take at least 36 credit hours of courses from Groups I, II and III. The inter-disciplinary component is to be satisfied by 4 additional courses (with a minimum of 12 credit hours total) from any of the following:

- School of Business
- Department of Physics
- Department of Mathematics

Additional Notes:

- Students must meet the course requirements as well as the total credit hour requirement. Students who are waived from a required course must make-up the credit hours from any of the other categories (II, III or IV).
- Your thesis advisor or the graduate chairman can require you to take extra courses over and above the requirements by the ME Department.

Thesis Guidelines

1. The committee for the thesis option will consist of 4 members. At least two shall be ME faculty, the third can be a faculty from another OU engineering department, and one must be external to the college of engineering. All committee members must be college-approved graduate research faculty. Before the proposal defense, the external representative and committee must be approved by the college.
2. Thesis work must conform to the university policy on plagiarism. Students should follow college guidelines to avoid plagiarism in their theses and in all academic work. Plagiarism guidelines are provided in Section E.
3. A thesis or project proposal must be submitted or presented to the student's committee at least 3 months before the final defense. At the end of a successful proposal presentation, the committee will approve the current Plan of Study or update it with a new Plan of Study.
4. Students must adhere to all university thesis guidelines with regard to format, submission procedures and deadlines. This information is provided on the following website: <http://www.ohio.edu/graduate/etd.cfm>. The thesis and dissertation submission form is also located at this website. The Oral defense forms are provided at <http://www.ohio.edu/graduate/etd/Oral-Defense-Forms.cfm>. Deadlines for thesis oral defenses are provided at <http://www.ohio.edu/graduate/etd/Deadlines.cfm>.
5. Students are expected to use ASME, Chicago style or another accepted format to cite other's work in their theses. It is strongly encouraged that students manage their citations using the "Manage Sources" feature (under the "References" tab) in Microsoft Word 2007. This feature systematically requests the appropriate information from various types of sources, including websites, journal articles, books, etc., and arranges the information in the proper format for use in the document.
6. The thesis defense scheduling form must be approved by the advisor before it is given to the graduate chairman for signature.
7. The **final** thesis (pdf file) must be submitted to the College (Dean's) office at least two weeks before the defense in order for a plagiarism check to be conducted. The student will be required to sign a form asserting originality of the work. Instances of plagiarism will be referred to the University Judiciary for appropriate action.
8. Once the thesis has passed the college's plagiarism check, it can be distributed to the thesis committee for review. The committee must have a final paper copy of the thesis at least two weeks (14 days) prior to the defense such that a proper review can be made. Any committee member can require more time for thesis review. The university deadlines must also be met: <http://www.ohio.edu/graduate/etd/Deadlines.cfm>.
9. After the student has successfully defended his/her thesis, signed copies of the "report of the oral exam" (thesis approval form) must accompany the final thesis.
10. Prior to ME department approval for graduation, all keys and items borrowed from the department must be returned to the ME Department Office.

Role of External Thesis Committee Member

One thesis committee member must be from outside of the Russ College of Engineering and Technology (such as from Physics, Chemistry, Math, Business, or Biology). This faculty member must have graduate faculty status in his/her college. In special cases it may be possible to have a college representative from another University. If the college representative is from a college that does not specify graduate faculty status, the faculty member must be engaged in teaching graduate courses, advising graduate students and publishing research results.

10. Basic Requirements

- a. This member must be able and willing to assess the general "technical quality of the work" in comparison to the expectations for Ohio University graduate students and judge whether the work is "thesis worthy" or "dissertation worthy". The college representative is not expected to have expertise in the technical content of the thesis, but to make sure that good research methods were used.
- b. This member must be able and willing to assess the general "quality of the thesis document" in comparison to the expectations for Ohio University graduate students and judge whether the written document is of acceptable quality for a thesis or dissertation. The Introduction and Literature Search should be understandable to any educated reader, and the citations must meet an acceptable standard. The college representative is not expected to act as an editor, but rather as an assessor.

11. Basic Expectations

- a. The member is expected to read the thesis proposal document and participate in the in the proposal defense (approximately 3 hour time commitment).
- b. The member is expected to read the thesis document and participate in the thesis defense (6 to 8 hour time commitment).
- c. The member is expected to notify the graduate chair of the M.E. department or the college's Assistant Dean for research of any concerns with the thesis advisor or the overall process.

Plagiarism Guidelines

Introduction

Plagiarism is using someone else's published ideas or words, without giving them the appropriate credit, so that you appear to be the original creator or author. Even if you change a few words of someone else's sentence, it is *still* plagiarism if the same idea is presented and not properly cited.

Plagiarism is a form of academic misconduct that is prohibited by the Student Code of Conduct. It is unacceptable in all academic work and all documents that you author, including assignments and project reports. Since published documents are stored and accessed in public places, it is quite possible that a published paper, thesis, or dissertation can be accused of plagiarism, perhaps years after it is published.

When you write a thesis/dissertation that includes discussion of results from other documents, plagiarism may creep in unintentionally. Therefore, it is particularly important that you recognize plagiarism and make special efforts to avoid it.

Plagiarism can also have legal consequences. Because of the Berne copyright convention, virtually all published material (including on-line, internet material) should be considered to have copyright protection whether it has a copyright notice or not.

Suggestions to help you avoid plagiarism

1. Take written notes when you read. Avoid copying complete sentences unless you want to quote the sentence.
2. Take some time (i.e., a day) after you read the original source text to write your draft.
3. Don't draft your paper with the original source text (or a photocopy) open next to you. Use your notes. Go back to the source later to check something you are unsure of it.

You can certainly use other peoples' ideas and words in your writing as long as you give them appropriate credit. There are established methods of giving credit to your source of ideas and words.

Frequently Asked Questions (FAQ) about Plagiarism

- **Is it still plagiarism if I didn't intentionally copy someone else's work and present it as my own, that is, if I plagiarized it by accident?**

Yes, it is still plagiarism. Colleges and universities put the burden of responsibility on students for knowing what plagiarism is and then making the effort necessary to avoid it. Leaving out the quotation marks around someone else's word or omitting the attribution after a summary of someone else's theory may be just a mistake (a matter of inadequate documentation) but faculty can only judge what you submit to them, not what you intended.

- **If I include a list of works consulted at the end of my papers, doesn't that cover it?**
No. A works-cited list (or bibliography) tells your readers what you read but does not indicate how and where this material has been used in your paper. Putting one or more references at the end of a paragraph containing source material is a version of the same problem. The solution is to cite the source at the point that you quoted, paraphrased, or summarized it. To be even clearer about what comes from where, also use what are called in-text attributions. See the next FAQ on these.
- **What is the best way to help my readers distinguish between what my sources are saying and what I'm saying?**
Be overt. Tell your readers in the text of your paper, not just in citations, when you are drawing on someone else's words, ideas, or information. Do this with phrases like "According to ..." or "As noted in ...", so-called in-text attributions.
- **Are there some kinds of information that I do not need to cite?**
Yes. Common knowledge and facts you can find in almost any encyclopedia or basic reference text generally don't need to be documented (that is, John F. Kennedy became president of the United States in 1960). This distinction can get a little tricky because it isn't always obvious what is and is not common knowledge. Often, you need to spend some time in a discipline before you discover what others take to be known to all. When in doubt, cite the source.
- **If I put the information from my sources into my own words, do I still need to include citations?**
Yes. Sorry, but rewording someone else's ideas doesn't make it your own. Paraphrasing is a useful activity because it helps you to better understand what you are reading, but paraphrases and summaries have to be documented and carefully distinguished from ideas and information you are representing as your own.
- **If I don't actually know anything about the subject, is it okay to hand in a paper that is taken entirely from various sources?**
It's okay if (1) you document the borrowings and (2) the assignment called for a summary. Properly documented summarizing is better than plagiarizing, but most assignments call for something more. Often comparing and contrasting your sources will begin to give you ideas, so that you can have something to contribute. If you're really stumped, go see the professor.
- **Is it plagiarism if I include things in my paper that I thought of with another student or a member of my family?**
Most academic behavior codes, under the category called "collusion," allow for students' cooperative efforts only with the explicit consent of the instructor.
The same general rule goes for plagiarizing yourself, that is, for submitting the same paper in more than one class. If you have questions about what constitutes collusion in a particular class, be sure to ask your professor.
- **What about looking at secondary sources when my professor hasn't asked me to do this? Is this a form of cheating?**
It can be a form of cheating if the intent of the assignment was to get you to develop a particular kind of thinking skill. In this case, looking at others' ideas may actually retard your learning process and leave you feeling that you couldn't possibly learn to arrive at ideas on your own. Professors usually look favorably on students who are willing to take the time to do extra reading on a subject, but it is essential that, even in class discussion, you make it clear not to present others' ideas as your own. In class discussions, if you bring up an idea you picked up on the Internet, be sure to say so explicitly.

David Rosenwasser & Jill Stephen, *Writing Analytically, Third Edition*, Thomson/Heinle, USA, 2003, p. 177.

B. Non-Thesis Option

- Students in the non-thesis option will have a committee of two ME faculty members for their projects.
- Non-thesis students must write a short project proposal, and it must be approved by the committee at least 4 weeks prior to completion of the work and submission of the project report. A project proposal form signed by the committee must be submitted to the department to update the committee's approval of the Plan of Study.
- A proposal presentation and a final oral defense may be required by any member of the committee. The oral defense can be made in the ME 580 seminar course at the discretion of the advisor and committee member.
- Non-thesis students must complete 6 hours of ME 681. The advisor must submit a special grade report to credit 6 hours of ME 681 when the project is completed.
- The final project report in pdf file format must be submitted to the M.E. Graduate Secretary at least two weeks before the student submits it to the committee for final approval, in order for a plagiarism check to be conducted. The student will be required to sign a form asserting originality of the work. Instances of plagiarism will be referred to the University Judiciary for appropriate action.

Additional Notes on Program Guidelines

- Violation of department guidelines may result in expulsion from the M.S. program or revocation of financial aid.
- Copying or other unethical behavior may result in the student being reported to the University Judiciary Committee for appropriate action.
- Special cases which do not fall within these guidelines or require a waiver of a guideline will be decided upon by the graduate committee.
- Students are not allowed to take any courses outside the program of study until they have completed 5 courses from the recommended list of courses (Groups I, II, and III) and received committee approval for their research proposal. Any exceptions must be approved by the graduate committee.
- Financial aid may be withheld or cancelled by the department graduate committee if a student does not follow his/her Plan of Study.
- All students must sign a Statement of Originality when they submit their thesis.

Information for International Students

- International students should consult the office listed below for rules and regulations of the United States Citizenship and Immigration Service (USCIS).
Office of International Affairs
International Student and Faculty Services (ISFS)
348 Baker University Center, 1 Park Place
Athens, OH 45701
Phone: (740)593-4330 web: <http://www.ohio.edu/isfs>
- Note that for international students, the visa rules restrict the number of employment hours.
- **Curricular Practical Training (CPT) for F-1 Students:** An overview of this internship program and its requirements are available from the ISFS office. In addition, the following requirements must be met for CPT approval for the M.S.M.E. degree.
 - The student must have completed all course requirements and made significant progress on the thesis/project. An acceptable draft of the thesis/project should be submitted to the advisor. The graduate chairman will review the draft before signing the CPT papers.
 - The student must be committed to returning to the program of study after the CPT (within a maximum of 1 year) and make progress towards completing the program of study during the year by spending some time on the research and/or writing/correcting the thesis document.
 - In the event that the student does not make reasonable progress in completing the program of study (as determined by the M.E. graduate committee) within one year after obtaining the CPT, the graduate committee, in consultation with the advisor, will initiate steps to drop the student from the program.
 - For CPT approval, the student's Plan of Study must include a 1 credit-hour internship course (ME 689), and the plan must be signed by all members of the thesis/project committee. The credit hours for this internship cannot be used to satisfy course credit hour requirements for graduation. The student must also submit a "report of activities" and the end of each quarter in which ME 689 is registered. The report must describe the work activities of the CPT for that quarter and how it relates to the student's M.S.M.E. education.
- **Optional Practical Training (OPT) for F-1 Students:** An overview of this work experience program and its requirements are available from the ISFS office. In addition, the following requirements must be met for OPT approval by the M.E. Department.
 - The student must have completed all course and credit-hour requirements.
 - The student must have a final thesis or project draft completed at the time of OPT application. This draft must be acceptable to the advisor as a final draft. The graduate chairman will review the draft before signing the OPT papers.
 - The student must defend the thesis/project before the OPT assignment begins.

Guidelines for Teaching or Graduate Assistant (GA)

Each GA is expected to work 15 hours/week. To fulfill this requirement, the GA will:

- Contact the assigned faculty supervisor as soon as possible.
- Meet the faculty supervisor on a regular, weekly schedule.
- Provide contact phone number and e-mail address to faculty supervisor.
- Assist in compiling course material and setting-up course equipment as required.
- Establish and maintain office hours for student consultation (post office hours, if possible).
- Grade homework on a timely basis.
- Attend all assigned lecture classes and laboratory sessions.
- GA's may not accept additional employment outside the department exceeding 5 hours without written approval of the department. All GA's must be present during assigned class or laboratory hours and office hours as assigned by their supervisor.
- All GA's are expected to conduct themselves in a professional and ethical manner, especially in regards to contact with undergraduate students, and in proper use and maintenance of University equipment.

Exceptions to the above can be made by the faculty supervisor if the GA hours exceed 20 hours/week or if there is a conflict with the TA's classes, etc.

If the GA does not perform according to the above guidelines, the GA contract will be terminated.

All GA's will be evaluated by faculty supervisors at the end of the quarter to determine if their performance was satisfactory for the quarter. This will be used to determine eligibility for future GA assignments.