

GRADUATE STUDENT HANDBOOK

College of Engineering

Montana State University

Version 1: January, 2008

This document provides guidance for programs within the College of Engineering at Montana State University. Students should also refer to documents within their individual departments for more information. Unless specifically stated, in the case of inconsistencies, Division of Graduate Education policies take precedence. Information is available at <http://www.montana.edu/gradstudies>.

1.0 Introduction

This handbook has been prepared to provide basic information on graduate programs within the College of Engineering (COE) at Montana State University. Specific information on M.S. program requirements, the options within the Ph.D. in Engineering program and the Ph.D. in Computer Science can be obtained from the respective departments or from the following website:

http://www.coe.montana.edu/graduate_programs.html

Students are always welcome to contact program coordinators within their individual departments, their Department Head, the Associate Dean for Research and Graduate Studies within the COE, or the Division of Graduate Education (DGE).

A number of rules and regulations apply to all graduate students so that they remain in compliance with Division of Graduate Education (DGE) requirements (see www.montana.edu/wwwdg/catalog.shtml). Students are expected to become familiar with these policies. Because changes do occur, students should periodically check the DGE website and consult their advisor. If a student feels that there are circumstances that do not allow them to be in compliance with policy, the student should speak with their advisor to establish a course of action.

It is imperative that students become aware of requirements for their department, degree program and individual advisor. These requirements may be more specific than those stipulated by the DGE.

Students in graduate programs are expected to demonstrate a commitment to their programs and make progress toward completion of their degree. Students should not expect that degrees will be granted on the basis of time spent; competence in their chosen field must be exhibited. It is the responsibility of the student and his or her committee to ensure that the student is making satisfactory progress toward the degree.

2.0 Degree Options

In the COE, there are seven M.S. degrees (Table 1) that are associated with individual departments. An exception is the M.S. in Environmental Engineering, which allows a student to be housed in either Civil Engineering or Chemical and Biological Engineering. Admission into each of the M.S. programs is handled by the individual departments.

The Ph.D. in Engineering has seven options: Civil Engineering, Chemical Engineering, Electrical and Computer Engineering, Mechanical Engineering, Industrial Engineering, Applied Mechanics, or Environmental Engineering. For the Ph.D. in Engineering, students must seek admission through and be accepted by one of the departments in the COE, and in most cases, the option is housed within one department. Exceptions are Applied Mechanics and Environmental Engineering; for these two degrees, students may

reside within Mechanical or Civil Engineering (for Applied Mechanics) or within Chemical and Biological or Civil Engineering (for Environmental Engineering).

The Ph.D. in Computer Science is a separate degree program administered by the Computer Science department.

Table 1. Masters' Degree Programs, College of Engineering

| Degree Title | Academic Department |
|---|--|
| Chemical Engineering, M.S. | Chemical & Biological Engineering |
| Civil Engineering, M.S. | Civil Engineering |
| Computer Science, M.S. | Computer Science |
| Electrical Engineering, M.S. | Electrical & Computer Engineering |
| Environmental Engineering, M.S. | Chemical & Biological Engineering and Civil Engineering |
| Industrial & Management Engineering, M.S. | Mechanical & Industrial Engineering |
| Mechanical Engineering, M.S. | Mechanical & Industrial Engineering |
| Master of Construction Engineering Management | Civil Engineering |

Each department has faculty appointed to coordinate its graduate degree programs. These names can be obtained from the individual departments.

2.1 Ph.D. in Engineering

The Ph.D. in Engineering is overseen by the Associate Dean for Research and Graduate Studies in the COE and is administered by the Ph.D. Oversight Committee. This committee consists of faculty representatives from each of the degree options. The committee is responsible for approving policy for the degree program.

Independent research completed for the degree will advance the state of knowledge within the discipline and should lead to publication(s) in journal(s) appropriate to that discipline.

2.2 Ph.D. in Computer Science

The Ph.D. in Computer Science is overseen by the Department of Computer Science.

Research completed for the degree should advance the state of knowledge within Computer Science and lead to publication(s) in appropriate journal(s).

2.3 M.S. Plan A

The M.S. Plan A is a thesis/research degree with expectations for original research. Students should aspire toward a product that will be suitable for publication.

2.4 M.S. Plan B

The M.S. Plan B is a coursework-only degree with expectations of a professional paper that demonstrates in-depth knowledge in an area of interest to the student and advisor. Students enrolling in the Plan B will typically be obtaining an M.S. as the terminal degree within their discipline.

3.0 Admission

Students may apply directly to the DGE (see information below) or may contact departments for information on available funding opportunities and faculty who are available to supervise graduate students. Students should contact the department before submitting an application to the DGE. Several departments have preliminary applications online that can assist students in determining if a suitable graduate project is available.

Procedures for admission are as stated in the Division of Graduate Education online graduate catalogue (<http://www.montana.edu/wwwdg/apply.shtml>). Students should complete this application and submit it to the department/program of interest in the College of Engineering. Applicants should make sure that all required materials are sent, including transcripts, letters of recommendation, results of the Graduate Record Examination, TOEFL or IELTS results (for foreign students), and application fee. There may be other requirements; students should check with the department of interest for further information. After receipt of the completed application, the department will review the application and make a recommendation to the Vice-Provost for Graduate Education concerning admission to the department. The department will then make a final determination consisting of one of the following:

Accept (regular admission). The student has met all of the requirements of the DGE and the individual degree program. The GRE scores are sufficiently high. The student has an academic record that suggests success in graduate school. A mentor/advisor in the student's area of interest is likely to be available.

Accept with Provisions (provisional admission). Provisions may be that the student's undergraduate grade point average is not sufficiently high, that there are deficiencies in course background, or other issues.

Reject. Admission may be rejected for several reasons. The student's prior record may not meet standards, there is limited potential for success in graduate school, the degree program presently has more students than can be handled reasonably, there is no ability to support the student's research, or a mentor in the student's area of research is not available.

Students who do not have an undergraduate degree in an engineering discipline from an accredited (ABET) institution may apply. If the student is seeking an M.S. degree, they will likely be admitted provisionally until they complete a subset of coursework required for an undergraduate engineering degree. Upon completion of their M.S., these students

are then eligible to sit for the Fundamentals of Engineering examination, which is necessary for professional registration. Not all states will allow the graduate to subsequently sit for the Professional Engineering examination; students should be aware of registration requirements in states where they may seek employment. If a student is entering a Ph.D. program, there is no explicit requirement to complete these courses. However, the student must be sufficiently grounded so that they can complete their qualifying examination and have the prerequisites to enroll and succeed in graduate level engineering coursework.

4.0 Degree Requirements

Degree requirements vary depending upon the degree being sought. Students should familiarize themselves with these requirements, which can be obtained from the COE website at: http://www.coe.montana.edu/graduate_programs.html

4.1 Program of Study and Committees

Students are allowed to select their advisor. Students who have programs that are interdisciplinary in nature benefit from engaging faculty from other departments who can bring insight and advice to the student. Specific requirements for committee composition exist in some departments, and students should consult with their advisor. The advisor and committee members are then approved by the department head.

Ph.D. students will have at least four faculty on their committee as required by the Division of Graduate Education. The chair can be any tenured or tenure-track faculty in the COE, and at least two of the committee members must be from the COE. The DGE will appoint another faculty from outside of the area of study (graduate representative) who ensures that policies and procedures are being fairly administered. This person must be present at the comprehensive examination and the dissertation defense.

M.S. students are required to have three committee members. As per DGE requirement, only the chair must be a tenured or tenure track faculty from the home department.

In most cases, students construct their own program of study based on the degree requirements with input from their advisor and graduate committee. Students are encouraged to complete as many courses on their program of study as possible during the first year of matriculation. The program of study is approved by the student's committee prior to submission to DGE. **The program of study and the committee roster are due to DGE by the end of the third semester of matriculation.**

Students may enroll in courses outside of their program of study that are approved by the advisor. If the student's tuition is covered by grant funds or a TA, there is no obligation for course work outside of the program of study to be covered; the student should consult with their advisor as to any restrictions.

4.2 Examination Requirements

All Ph.D. students must take a qualifying exam. Qualifying exams may be required for M.S. students, depending on the program. All Ph.D. and M.S. students are required to take a comprehensive exam. The format of the exam may differ between Ph.D. degree programs in Engineering and Computer Science. There may also be differences between M.S. programs. In some cases, Plan A M.S. students may have their comprehensive exam combined with their thesis defense. All Plan A M.S. students must have a thesis defense. All Ph.D. students must have a dissertation defense. Plan B M.S. students must develop a professional paper, and they typically present the results of their final project in a seminar. Students should consult their advisor and /or Ph.D. option coordinator for details on exam structure and expectations.

5.0 Financial Support

Acceptance into a graduate program does not imply that there will be financial assistance. However, most Plan A M.S. students and Ph.D. students are accepted with the understanding that the faculty member identified to act as the student's advisor has resources available to help support the student. Financial assistance may cover any of the following: tuition, fees, health insurance and stipend. The student should confirm what components of these will be provided. The amount of the stipend varies between departments and degree programs within departments.

Ph.D. students and Plan A M.S. students will typically receive assistance in the form of research assistantships (RAs) from their department or advisor. Students are typically chosen by an individual faculty with support coming from research grants. This faculty member most often serves as the student's advisor and committee chair. Funding may not be continuous because the student may change advisors, the advisor's proposal for renewed funding may be denied, the student is not making satisfactory progress, or other circumstances. However, faculty and departments will make every effort to ensure that funding is available if the student is making adequate progress towards completion of the degree.

A limited number of teaching assistantships (TAs) are available from departments to support graduate students who teach classes, grade homework, supervise laboratory sections, or otherwise support the academic mission of the College. Although there are exceptions, TA appointments are typically short-term; the majority of a student's funding will usually come from research funds.

Students from outside of Montana who are U.S. citizens can substantially reduce their tuition expenses by establishing in-state residency. Obtaining in-state residency will considerably reduce the burden placed on the funding source used to support the student. Policies for establishing residency can be found at <http://www.montana.edu/wwwcat/academic/acad1.html>

Departments also have a limited number of scholarships or fellowships available to support students.

Plan B M.S. students will often be responsible for covering the entire cost of their education. In some departments, TA funding may be available to fund Plan B students.

6.0 Faculty Responsibilities

Faculty who mentor graduate students have an obligation to provide students with the support they need to be successful. These responsibilities include:

- Providing guidance on the specific requirements for achieving the chosen degree, including advice on courses for the program of study, selection of appropriate research topics, evaluation of research progress, and expectations on the amount of time spent on research.
- Arranging with the student and maintaining a mutually agreeable schedule to discuss coursework and research progress. The advisor should then be available during these times to meet with the student.
- Ensuring that the objectives related to the student's program of study and research are attainable if the student exhibits due diligence. The typical M.S. Plan A student should expect to graduate within seven semesters (including summer semester), and a Plan B student within six semesters (including summer semester). A Ph.D. student with an M.S. degree in an engineering discipline can expect to graduate within 12 semesters (4 years). A Ph.D. student with a B.S. degree will typically take 5 years to graduate. Individual time-to-degree goals may vary due to the nature of research, and the time spans noted here should serve as a guideline under which the major professor and the student can work together toward timely completion of the degree requirements.
- Participating in regular committee meetings to ensure that the student is obtaining appropriate guidance and making progress towards the degree.
- Informing the graduate student if extramural funding for the student's research project is in jeopardy.
- If at all possible, providing the student with professional development opportunities including attending conferences, participating in workshops, obtaining teaching experience, etc.
- Some departments /degree programs have formalized the requirement for annual reviews between faculty and graduate students. In departments/programs where this is not required, faculty are strongly encouraged to have annual reviews with graduate students.

7.0 Student Responsibilities

Students are expected to apply due diligence toward completion of their degree. This includes progress on research projects (Plan A M.S. students and Ph.D. students) in addition to coursework. It is a matter of courtesy to discuss with the advisor when the student wishes to have time away from campus.

In general, students are limited to funding from University sources not to exceed a total of 20 hours per week. However, in certain special cases, students can receive an exception so that more than 20 hours per week can be funded. Students must then have permission from their advisor and the DGE.

When students take thesis, dissertation, or research paper credits, there are additional expectations as set by Montana's Commissioner of Higher Education in 1977:

1. One semester credit hour for each 15 hours of classroom contact plus 30 hours of outside preparation or the equivalent; or
2. One semester credit hour for each 30 hours of laboratory work plus necessary outside preparation or its equivalent, normally expected to be 15 hours; or
3. One semester credit hour for not less than 45 hours of shop instruction (contact hours) or the equivalent.

Forty-five hours per credit per semester translates to approximately three hours per week per credit.

A student with a research assistantship is expected to spend 20 hours per week on project work and 20 hours per week on courses and his/her thesis/dissertation. In most cases, the project work will be the same as that used for the thesis/dissertation, but there is no requirement that this be the case. The typical student will spend considerably more time than described above doing work relevant to their thesis or dissertation to ensure that they will graduate in a timely manner. Students who are supported with a research assistantship should work approximately half time on their research when taking courses, and full time when only thesis/dissertation credits are taken and during the summers. Students should discuss time expectations with their advisor.

Other employment and time consuming activities can cause conflict of commitment issues for students. Full-time students (6 credits/semester for domestic students, 9 credits/semester for foreign students, and any students with full GRA stipend support) are discouraged from seeking other employment to ensure that they have enough time to adequately complete their degree. It is within the rights of individual departments or faculty advisors to forbid students to be otherwise employed, or to require notification of the advisor and/or person providing the funding source before the student considers outside employment. In all cases, students are required to consult departmental guidelines before taking on any additional work.

Graduate students are responsible for ensuring that their advisors and graduate committee members are kept up to date with their progress. Students should schedule a meeting

with their entire committee (with the potential exception of the graduate representative) at least annually. Ph.D. students must schedule their formal examinations and ensure that their entire committee is present. The graduate representative must be present at the comprehensive examination and dissertation defense.

The student should also ensure that they are meeting all departmental, programmatic, and DGE requirements for the degree. This includes coursework, scheduling of the required examinations, and completion of the thesis or dissertation by the required dates. Students are also expected to participate in required seminars.

The collected data and products of analysis of research projects is the property of Montana State University, and will be stored in accordance with university regulations. Students are obligated to provide their advisor with laboratory notebooks, computer files, and other materials as requested. This is a requirement of funding agencies, and MSU is held accountable for data from funded projects.

If the research has been implemented as planned and has potential for publication, the student has the option to jointly write up the study with the advisor for submission for publication. It is in the best interest of students to complete drafts of manuscripts for publication prior to completion of their degree. If this is not possible, the student should discuss with the advisor the timeframe in which the first draft of the manuscript should be completed. If completed before the student leaves or within this timeframe, in most cases, the student will be assigned first authorship. After that date, the advisor retains the option to prepare the article for publication with authorship order at his or her discretion. In either case, other collaborators will be included as co-authors depending on their contribution. To be listed as an author, a person must have made a direct, substantial academic contribution to at least **two** of the four main components of a typical scientific project or paper: (i) conception or design, (ii) data collection and processing, (iii) analysis and interpretation of data, (iv) writing sections of the paper. Anyone listed as an author should critically review successive drafts of the paper and approve the final version. Anyone listed as author should be able to defend the paper as a whole (although not necessarily all the technical details).

8.0 Problems and Appeals

8.1 Plagiarism

It is absolutely critical that students accurately and honestly document any sources of information used in their dissertations and manuscripts. If students have any questions about what constitutes plagiarism, they should consult their advisor. Plagiarism is an extremely serious offense and is grounds for immediate dismissal from the graduate program.

8.2 Other Problems

Students should always first try to resolve problems at the instructor/advisor level. If this is unsuccessful, students should then consult their department head. Students may also confer with the Associate Dean for Research and Graduate Studies about any issues of concern. Some problems may be referred to the Division of Graduate Education for final resolution.