



**Graduate Handbook for Students and
Faculty
Department of Civil Engineering**

June 2022

1. DEGREES AVAILABLE

1.1 Master's Degree Programs

The Department of Civil Engineering has three Master's Degree options:

Master of Science (M.S.) in Civil Engineering requires coursework and the completion of original research in one or more of the subdisciplines of civil engineering. Typical research areas include geotechnical, structural, transportation, water resources and hydraulics.

Master of Science (M.S.) in Environmental Engineering requires coursework and completion of original research in one or more subdisciplines of environmental engineering. Typical research areas include environmental biotechnologies, and soil, air and water treatment. (Both the Civil or Chemical and Biological Engineering Departments offer M.S. in Environmental Engineering depending on the student's background and professional focus).

Master of Engineering (M.Eng.) (Fall 2022) requires only coursework and is offered through the College of Engineering with an option in Civil or Environmental Engineering.

Students without an accredited bachelor's degree in civil or environmental engineering, or a closely related field, may require leveling courses. Leveling courses are intended to provide students without an accredited bachelor's degree in civil or environmental engineering, or a closely related field, with sufficient background in civil or environmental engineering to be eligible for the Fundamentals of Engineering exam and ultimately professional registration. Leveling courses are also pre-requisites for graduate level courses. Students with a BS degree in Civil or Environmental Engineering would typically be exempt from taking leveling courses. Students with a different accredited engineering bachelor's degree typically have fewer levelling course requirements than students without an engineering background.

1.2. Doctor of Philosophy Degree Programs

The NACOE offers a Doctor of Philosophy (Ph.D.) in Engineering degree. The Department of Civil Engineering offers the following options:

Ph.D. in Engineering - Civil Engineering Option requires coursework and the completion of original research dissertation in one or more of the disciplines of civil engineering. Typical research areas include geotechnical, structural, transportation, water resources and hydraulics.

Ph.D. in Engineering - Applied Mechanics Option requires coursework and the completion of original research dissertation in one or more of the disciplines of applied mechanics. Typical research areas include ice & snow mechanics, glacier mechanics, thermal mechanics, geo-mechanics, and structures.

Ph.D. in Engineering - Environmental Option requires coursework and completion of original research in one or more disciplines of environmental engineering. Typical research areas include environmental biotechnologies, and soil, air and water treatment.

Typically, qualified candidates for the Ph.D. degree will have satisfactorily completed a Master of Science degree in civil or environmental engineering, applied mechanics or a closely related field. Students from other engineering or science curricula are eligible for admission. Qualified students can also be admitted the Ph.D. degree program without a Master of Science degree (i.e., Bachelor of Science only).

Students without an accredited bachelor's degree in civil or environmental engineering (or a closely related field) and students admitted directly into the Ph.D. program may require leveling courses. Leveling are intended to provide students without an accredited bachelor's degree in civil or environmental engineering (or a closely related field) with sufficient background in civil or environmental engineering to be eligible for the Fundamentals of Engineering exam and ultimately professional registration. Levelling coursework also may address other deficiencies in the academic preparation including science and mathematics. Levelling courses do not count toward degree requirements. Basic guidelines for levelling coursework are provided in Appendix A. All graduate students will work with their assigned advisor to develop a program plan that identifies degree coursework and any required levelling coursework. Program plan are approved by the student's Graduate Committee and approved by the Department Head and submitted to the Graduate School.

Students in the Department's Master's programs who wish to remain and pursue a Ph.D. degree must to apply for admission to the Ph.D. program. Department students should provide a statement of purpose and a letter from a faculty member in their program area who supports their application with the required forms. Once a decision is reached regarding the student's application, the student will be notified whether he or she will be allowed to enter the Ph.D. degree program. In most cases, the student must complete the M.S. degree program before they are fully accepted as Ph.D. students.

MASTER'S DEGREE PROGRAM

2.1 Degree Requirements

2.1.1. M.S. (Thesis Option or Plan A Option)

The M.S. degree requires a minimum of 30 credit hours or coursework, of which ten (10) credit hours must be Research or Thesis work (ECIV 575/EENV 575). The Department also requires a one (1) credit of seminar (ECIV 594). A maximum of nine (9) credits hours of 400 level classes may be allowed to count toward meeting degree requirements. The remaining coursework must be at the 500 level and higher to complete requirements. M.S. students must complete an oral defense of the thesis and a comprehensive exam on graduate coursework.

2.1.2 M.S. (Non-Thesis Option or Plan B Option)

The Plan B option substitutes a submitted journal paper or conference presentation approved by the graduate committee along with up to 6 credits ECIV575 or EENV575 and additional coursework in lieu of the 10 thesis credits. The Department also requires a one (1) credit of seminar (ECIV 594). This option is reserved for students in route to a Ph.D only. For the non-thesis options the comprehensive exam is the PhD qualifying exam.

2.1.3 M.Eng. (Non-Thesis Option, coursework only)

The M.Eng. degree requires a minimum of 30 credit hours or coursework. The majority of the credits for the degree must be in engineering and math. Up to (6) credits can be special topics courses directly supervised by an individual faculty within the Department. The Department also requires one (1) credit of seminar (ECIV 594). A maximum of nine (9) credits hours of 400 level classes may be allowed to count toward meeting degree requirements. The remaining coursework must be at the 500 level and higher to complete requirements.

2.2 Major Advisor and Graduate Committees

All Department graduate students seeking the M.S. or M.Eng. degrees will be assigned a major advisor. The major advisor is typically a faculty member within the student's area of study who will provide guidance on course selection and general academic advice on the degree program. For students pursuing the M.S. degree, the major advisor will also serve as the chair of the student's graduate committee and be primarily responsible for the oversight of research work. No graduate committee is required for students pursuing the M.Eng. degree.

After beginning the graduate study program, but before completion of 12 semester credit hours of graduate coursework, the M.S. students must formalize the selection of a graduate committee. An M.S. student's advisory committee will consist of their major advisor serving as the committee chair (in some cases a co-chair may also be appropriate) and a minimum of two other committee members. In the case of a committee consisting of two co-chairs, only one other committee member is required. Faculty who agree to serve on a student's advisory committee are expected to review and approve the student's coursework requirements (Program of Study), provide advice, regularly assess the student's progress and accomplishments, and conduct required final and comprehensive examinations for the master's degree.

The committee must consist of a minimum of three members. A tenured or tenure-track faculty member serves as the chair of the student's graduate committee and acts as a channel of communication within the degree-granting department. The chair must hold a master's or doctoral degree and sufficient expertise to supervise student work.

In the event that the student does not select a chair of their graduate committee within the first (1st) term of attendance as a master's student, the department head will appoint a temporary advisor. This advisor will advise the student until a tenured or tenure-track faculty member is selected as the graduate committee chair.

The remaining committee members should be selected in the best interest of the student. For a research master's (i.e. those with a thesis or a research paper) a master's committee is composed of a minimum of three (3) members. The majority of the committee and the committee chair should be from the degree-granting academic. The chair must hold a master's or doctoral degree and sufficient expertise to supervise student work.

For a professional master's (i.e. those with a professional paper or course-based) the graduate committee can be one faculty member from the degree-granting academic unit and upon matriculation each student should be assigned at least one faculty advisor. The graduate committee chair and the academic unit head recommend the committee composition to The Graduate School. Final approval of committee composition rests with The Graduate School.

Committee members may be faculty, including professors of practice and research professors, full-time non-Department faculty, Department emeriti faculty, or non-MSU personnel approved by the Graduate School. The creation of and approval for the committee begins when the student identifies the committee members on the Program of Study and submits the plan to the department with committee signatures. Once the signed Program of Study has been submitted to the Department Head, the graduate committee must be approved and then the program is filed with the Graduate School.

2.3 Program of Study

The student, in consultation with the major advisor and the graduate committee (M.S. degrees) or major advisor (M.Eng. degrees), formulates a Program of Study. The Program of Study is an official document that outlines the individual student's specific requirements for degree completion. Submission of a Program of Study must be made prior to the completion of the second semester in the program, or completion of 15 credits of coursework.

The Program of Study includes graduate courses required for degree, including thesis/research credits or special topics courses, and all required leveling courses. The Program of Study is submitted to the Department Head once it has been signed by the major advisor (M.Eng. degrees) all members of the Graduate Committee (M.S. degrees). Students failing to submit a program of study will not be allowed to register for classes. Any subsequent changes to the Program of Study require that appropriate forms be filed with the Graduate School and all graduate committee members must approve such changes.

In the event that a student has completed graduate-level coursework at another institution or reserved credits while finishing their B.S. degree, the Graduate School limits the transfer/reserved credit hours to a maximum of nine (9) and the student must have received a B or better in each. For transfer students from other institutions, all transferred course credits must have been earned while enrolled as a graduate student in good standing and be acceptable for graduate degree credit at the "home" institution where the courses were taken.

Leveling courses are intended to provide students without a bachelor's degree in civil or environmental engineering, or a closely related field, with sufficient background in civil or environmental engineering to be eligible for the Fundamentals of Engineering exam and professional registration. Leveling courses are also pre-requisites for graduate level courses. Students with a BS degree in civil or environmental engineering would typically be exempt from taking leveling courses. Students with a different engineering bachelor's degree typically have fewer leveling course requirements than students without an engineering background.)

The following table lists the leveling courses that will typically need to have been completed in the applicant's undergraduate degree or taken at MSU as part of the Master's program of study. A program of study should include any required leveling courses and be developed in consultation with your graduate committee after admission to the Master's program. Questions on levelling courses prior to application should be directed to Dr. Katey Plymesser (kathryn.plymesser@montana.edu) or individual faculty in each research area.

Civil Engineering

Required Leveling Courses (or equivalent)

Calculus I	M 171Q
Calculus II	M 172Q
Multivariable Calculus	M 273Q
Intro to Differential Equations	M 274
Statistics	EGEN 350
College Chemistry I	CHMY 141
General and Modern Physics I	PHSX 220
Statics	EGEN 201
Mechanics of Materials	EGEN 205
CE Fluid Mechanics	EGEN 337

Take Any 5 of the Following

Structures I	ECIV 312
Structures II	ECIV 315
Water Resources Engineering (Hydraulics and Hydrology)	ECIV 333
Principles of Environmental Engineering	EENV 340
Geotechnical Engineering	ECIV 320
Transportation Engineering	ECIV 350
Construction Practice	ECIV 308

Environmental Engineering

Required Leveling Courses (or equivalent)

Calculus I	M 171Q
Calculus II	M 172Q
Multivariable Calculus	M 273Q
Intro to Differential Equations	M 274
Statistics	EGEN 350
College Chemistry I	CHMY 141
College Chemistry II	CHMY 143
General and Modern Physics I	PHSX 220
Statics	EGEN 201
Mechanics of Materials	EGEN 205
CE Fluid Mechanics	EGEN 337

College-Level Biology	BIOB 160 or BIOB 170
Chemistry for Environmental Engineers	EENV 240
Water Resources Engineering (Hydraulics and Hydrology)	ECIV 333
Physical Chemical Treatment Processes	EENV 341
Environmental Laws and Regulations	EENV 387

2.4 Graduate Committee Meetings

M.S. students are required to have a graduate committee and students are responsible for keeping the committee informed on progress toward their degree. While no documented graduate committee meetings are required, students should regularly inform their committee of research progress and provide opportunities for committee input. At a minimum, M.S. degree candidates (with guidance from their committee chair) should formally meet with their graduate committee prior to the final defense of the thesis. The student should inform the committee of the scope of the research and the experimental and/or analytical methods being utilized and present a summary of progress to date.

2.5 Defense of Thesis and Comprehensive Exam

M.S. students must complete an oral defense of the thesis and a comprehensive exam on graduate coursework. The exact format of the final exam will be determined by the graduate committee but contain, at a minimum, the following elements:

- An oral presentation of the student's thesis that is open to the public with the opportunity for questions from the attending audience
- An oral defense of the student's thesis in a closed session limited to the graduate committee where committee members can ask questions related to the student's research.
- A comprehensive exam where the graduate committee can ask questions relevant to the student's coursework to assess the student's depth and breadth of knowledge in the study area. Typically, the comprehensive exam is combined with the closed session thesis defense. However, the graduate committee may schedule the comprehensive exam at a separate time from the thesis defense. The graduate committee may also require a written exam on program coursework as part of comprehensive exam.

The graduate committee will specify the format of the oral defense and comprehensive exam at least one month in advance of the defense/exam date. The student must be registered during the semester of the final exam.

To pass the oral defense of the thesis and the comprehensive exam, the student must have a favorable vote from a majority of the members of the graduate committee. The electronic form "Report on Comprehensive Exam/Thesis Defense" must then be submitted to the Graduate School. If a student fails the final exam, there must be a two-months before rescheduling the exam. The student is allowed no more than two opportunities to pass the final exam.

For M.Eng. degrees, no comprehensive exam is required. Students must meet the academic performance standards required by the Graduate School and maintain a Program of Study GPA 3.0. or greater. Students must also receive a C or better for each course in the program of study. If a course receives a grade lower than a "C," a student must retake the course and earn a "C" or better.

A student may be placed on University Probation for either of the following reasons:

- The cumulative GPA or Program of Study GPA has fallen below 3.00.
- The Graduate School or academic department provisions of admission have not been met.

A student may be suspended from a degree program for any of the following reasons:

- Cumulative or program GPA falls below a 3.00 after being placed in University Probation status.
- Provisions of admission not satisfied.
- Unsatisfactory progress in a degree program.
- Cumulative or program GPA falls below 3.00 for any two (2) terms.

2.6 Preparation of Thesis

Thesis documents are submitted electronically to the Graduate School. Formatting and content information is available on the Graduate School website. The thesis is a complete document that describes the student's work on a research topic. Chapters generally consist of an introduction, literature review, research methods and materials, results, discussion, conclusions, and recommendations. An alternative thesis format is the “journal manuscript” format in which the student prepares a journal article, or possibly several, as the main body of the thesis document. In this case, the student must include specific supporting sections.

A draft of the thesis document should be submitted to the advisory committee at least two weeks prior to the final examination. The draft will be reviewed and approved by the Major Advisor prior to distribution to the advisory committee. Electronic thesis submission (the final version) should be completed following the final exam/defense which incorporates any revisions required by the committee during the final examination or thesis defense. The student is responsible for obtaining the signatures of the advisory committee and then meeting the deadline to submit his/her thesis to the Graduate School through the online system, accompanied by the “Certificate of Approval Form”.

2.8 Steps to the Master's Degree

Note: It is the student’s responsibility to ensure timely completion of each one of these steps. Graduate School forms and deadlines can be found on the Graduate School website. It is the student’s responsibility to complete and submit all forms and understand the deadlines.

2.9.1 M.S. Thesis Option

- 1) Selection of major advisor and research topic.
- 2) Student must enroll in one (1) credit of Seminar (ECIV 594) their first semester.
- 3) Selection of a graduate committee.
- 4) Development of Program of Study (prior to completion of 15 credits of coursework).
- 5) Intermediate meetings with major advisor and advisory committee to discuss research goals and progress.
- 6) At the beginning of the final semester, the “Graduation Application” form must be completed.
- 7) Final defense of thesis, followed by comprehensive exam. The electronic form “Report on Comprehensive Exam/Thesis Defense” must then be submitted to the Graduate School.
- 8) After the final defense, students must then meet the deadline to submit their thesis to the Graduate School through the online system, accompanied by the “Certificate of Approval Form”.

2.9.2 M.S. Non-thesis or Plan B Option (reserved for students en-route to a Ph.D only)

- 1) Selection of major advisor and research topic.
- 2) Student must enroll in one (1) credit of Seminar (ECIV 594) their first semester.
- 3) Selection of a graduate committee.
- 4) Development of Program of Study (prior to completion of 15 credits of coursework).
- 5) Intermediate meetings with major advisor and advisory committee to discuss research goals and progress.
- 6) Submission of a journal paper or conference presentation approved by the graduate committee.
- 7) Completion of the PhD qualifying exam.
- 8) Completion and submission of the “Graduation Application” form.

2.9.3 M.Eng. Coursework-Only Non-Thesis Option

- 1) Selection of major advisor (no advisory committee required).
- 2) Student must enroll in one (1) credit of Seminar (ECIV 594) their first semester.
- 3) Development of Program of Study (prior to completion of 15 credits of coursework).
- 4) Students must maintain
- 5) At the beginning of the final semester, the “Graduation Application” form must be completed.

3. THE Ph.D. PROGRAM

3.1 Degree Requirements

To satisfy the requirements for the Ph.D. degrees, the student will take a minimum of 60 credits beyond the bachelor's degree.

In addition to the general requirements specified by the Graduate School, the NACOE and the Department of Civil Engineering has the following requirements for Ph.D. students:

- For students entering with a Master's degree, up to 24 graded credits may be applied (see below). However, the Seminar ([ENGR 694](#)) and Research & Methods in Engineering ([ENGR 610](#)) requirements and a minimum of 13 additional graded course credits must still be taken at Montana State University. Depending on option requirements, students may have the option (with approval of the committee) of using some of their M.S. credits toward the advanced mathematics and numerical methods requirements.

ENGR 610	Research Methods in Engineering	3
ENGR 694 (comprehensive exam preparation)	Seminar	2
Advanced Mathematics - see declared option coursework *		3
Numerical Methods - see declared option coursework *		3
Other Graded Courses - see declared option coursework		24
Dissertation		18
Additional Dissertation or Course credits		7
* Course content must be above and beyond that typically required for an undergraduate degree in the student's Ph.D. option area.		
** ENGR 694 should be taken the semester prior to scheduling the comprehensive exams as this seminar class helps the student to prepare the written proposal for their comprehensive.		
Total Credits		60

- Credits applied from a prior Master's degree must:
 - be graded course credits (e.g., not M.S. thesis or independent study credits),
 - have a grade of B or higher (or equivalent), and
 - be approved by the student's graduate committee.
- A maximum of nine (9) credits hours of 400 level classes may be allowed to count toward meeting degree requirements. The remaining coursework must be at the 500 level and higher to complete requirements.
- Transfer of coursework credit is subject to Graduate School limits and must be approved by the student's advisory committee.

3.2 Major Advisor and Graduate Committee

The Graduate Committee: A tenured or tenure-track faculty member serves as the chair of the student's graduate committee and acts as a channel of communication within the degree-granting department.

A co-chair is not required. If a student elects to have a co-chair serve on their committee, they may choose one of the following committee compositions:

1. Chair, co-chair, and members.
2. Co-chair, co-chair, and members. If there are two co-chairs, at least one must be tenured/tenure-track faculty. For information regarding non-tenure track committee members, see section below.

Doctoral committees should be formed in the best interest of the student. A research doctoral committee is composed of a minimum of four members. For all doctoral committees, the majority of the committee and the committee chair should be from the degree-granting academic unit or be affiliated with the academic unit. The chair must hold a doctoral degree. The graduate committee chair and the academic unit head recommend the committee composition to The Graduate School. Final approval of committee composition rests with The Graduate School.

A student and committee can elect to add a graduate representative to the student's graduate committee. See [Optional Graduate Representative](#).

For committee members not holding tenure or tenure-track faculty status at MSU, including people from outside MSU, the Department Head must submit a letter of recommendation to The Graduate School. A current CV must also be submitted to the Graduate School. In some cases, these committee members may act as co-chair of a student's committee.

Students seeking approval of committee members from outside MSU should make the request along with a signed program of study.

The expected roles of the committee chair are to

- Ensure that all graduate program and Graduate School standards and requirements relative to the graduate degree are met, and that any conditions set by the committee are fulfilled.

The expected roles of committee members are to

- Provide diverse opinions and advice on the student's scholarship
 - Members should have expertise in the subject area as defined by the direction of the student's scholarship.
 - Each committee member should be available to serve as a resource for the student, independent of the chair. Every committee member should be able to provide valuable insight and advice to students on their scholarship.
- Express their independent evaluation of the scholarship
 - On a committee where there exists a potential for a lack of independent evaluation the academic unit head should request a graduate representative to join the

committee. The role of the graduate representative is to monitor that the work of the committee adheres to graduate school policy, but not necessarily to provide expertise in the subject area.

- If the student believes that there exists a potential for a lack of independent evaluation, the student may ask the academic unit head to request a graduate representative for their committee.

Major Advisor/Committee Chair/Co-chairs: A single major advisor may advise a student and chair the advisory committee, or two faculty members may jointly co-advise a student and co-chair their advisory committee. In the latter case at least one of the co-advisors must be either a full-time CE faculty member or another member of the MSU faculty approved to serve as primary chair by the CE Department. The second co-chair may be a CE faculty, CE affiliate faculty, CE adjunct faculty, CE emeritus/emeraita faculty, or a full-time member of the MSU faculty from another department. The major advisor (committee chair) is responsible for overseeing the dissertation work that will be completed as part of the doctoral program. The major advisor of each Ph.D. student is typically determined in advance of enrollment. The major advisor may be either a full-time tenure/tenure-track CE faculty member or another member of the Montana State University faculty approved to serve as primary chair by the CE Department. CE faculty, including CE affiliate faculty, are listed on the departmental webpage (www.montana.edu/ce/). The major advisor will advise the student on the composition of their Advisory Committee.

The creation of and approval for the advisory committee begins when the student identifies the committee members on the program of study and submits the program of study to the department with committee signatures. The graduate committee must be approved first by the Department Head and then filed with the Graduate School. ***The student is responsible to submit the approved form to the Graduate School.*** Once a student's graduate committee has been constituted and approved by the Graduate School, it may be only be revised using the Graduate Committee Revision form, approved by the Department Head and submitted to the Graduate School.

3.3 Program of Study

After the establishment of the Ph.D. Graduate Committee, and prior to completion of 15 credits of coursework, the Ph.D. student should file a program of study using the “Graduate Program of Study and Committee” form found on the Graduate School website. https://www.montana.edu/gradschool/forms.html#forms_pos. The program of study is an official document that outlines the individual student’s specific requirements for degree. The plan is prepared carefully to suit the needs of the student, including his or her research work. The program of study includes graduate courses required for degree, including dissertation research hours, and all remedial background courses required by their program area. The program of study is submitted to the MSU Graduate School once it has been signed by all members of the advisory committee.

Students failing to submit a program of study will not be allowed to register for classes. Any subsequent changes to the Program of Study require that appropriate forms be filed with the Graduate School and all graduate committee members must approve such changes.

All courses on the program of study must be taken on a letter grade/normal grade mode (A-F) basis except for those courses offered solely on a Pass/Fail basis. Examples include, but are not limited to, thesis research (590), graduate seminar (594), and dissertation research (690).

Registration

- Registration for Pass/Fail only courses is the same as traditional graded courses.
- For courses the student desires to change to a Pass/Fail basis, the student must complete the [Request for Pass/Fail Grade](#) form provided by the [Registrar's Office](#). The form must be submitted prior to the tenth (10th) day of university instruction of the term.

Grading

- For Pass/Fail only courses, grades of “P” or “F” are given.
- "P" grades on the student's transcript are not computed in the GPA.
- "F" grades are computed in the GPA.
- "N" grades can be given for [thesis research \(590\)](#) and [dissertation research \(690\)](#).

Credit Limitations

- Up to a maximum of three (3) Pass/Fail credits may be included on a [Graduate Program of Study & Committee](#) form, excluding 575/590/675/690 credits.

Transfer of Credits

- Pass/Fail and other non-traditional graded courses may not be transferred from another academic institution.

Up to 9 credits of coursework transferred from another institution, taken as a non-degree seeking graduate or reserved as an undergraduate can be applied to the program of study. No coursework receiving less than a B grade will be applied to the program of study. Up to nine (9) credits at the 4xx-level are allowed program of study provided they were taken as a graduate student, or they were reserved for graduate credit as a bachelor degree-seeking student.

The age of courses at time of graduation may not exceed ten (10) years. Courses aged up to one year beyond the Age of Courses limit at the time of graduation can be appealed for use toward a degree by submitting a policy appeal which includes a rationale and support from the student's chair and department head (known as an “appeal packet;” see [Policy Appeals](#) for specific appeal information).

A program of study should include any required leveling courses and be developed in consultation with your graduate committee after admission to the Doctoral program (see section 2.3 for leveling course requirements). Leveling courses below the 400-level do not count toward degree requirements. Up to 9 credits of 400-level leveling courses may be applied toward the degree.

3.4 Ph.D. Examination Requirements

Ph.D. candidates within the Civil Engineering Department at Montana State University must pass a qualifying examination, a comprehensive examination, and a defense of dissertation. General

information about forms required for completion of examinations can be found on The Graduate School's website at <http://www.montana.edu/gradschool/current-grad.html>.

3.4.1 Ph.D. Qualifying Examination

The qualifying examination is a requirement for all Ph.D. students in the Department. The purpose of the qualifying examination is to determine whether the student has sufficiently mastered the core topics within their chosen area of study. The exam will be an evaluation of undergraduate and graduate engineering topics relevant to the student's chosen Ph.D. option area and administered by that student's graduate committee.

The diversity of backgrounds of students pursuing the Ph.D. option requires that the qualifying examination format and subject be responsive to individual backgrounds. The qualifying exam will adhere to the following general guidelines.

- The qualifying exam will be administered during an time period of mutual agreement between the student, advisor and graduate committee.
- The exam may be an oral exam, a written exam or a combination exam with both oral and written components. The format of the exam will be defined by the advisor and the graduate committee at least four weeks prior to the qualifying exam date. Exam format will be communicated to the candidate in writing and approved by the Department Head.
- The topic areas included on the exam will be defined by the advisor and the graduate committee at least four weeks prior to the qualifying exam date. Exam content will be communicated to the candidate in writing and approved by the Department Head.

The qualifying examination will be completed when between 24 and 36 credit hours of graduate work have been completed. The qualifying exam must be completed no more than 4 semesters after admission into the Ph.D. program. Failure to take the examination in that time period may result in suspension from the Ph.D. program.

There must be a minimum of one semester between the qualifying and comprehensive exams. The student must be registered when the qualifying examination is taken. Upon successful completion of the qualifying examination, the student officially becomes a candidate for the Ph.D. degree.

The student will only have two opportunities to pass the qualifying examination. If failure occurs at the first attempt, at least one semester must elapse before the second examination takes place. Failure of the second exam will result in suspension from the program.

Students may apply for a Ph.D. qualifying exam waiver if they have completed a Master of Science comprehensive exam in a similar discipline to the focus area of the proposed Ph.D. program of study.

3.4.2 Ph.D. Comprehensive Examination (Dissertation Proposal)

The purpose of the Ph.D. comprehensive examination is to determine whether the student is ready for independent research in their chosen area of study. The comprehensive examination is administered by the student's graduate committee (including the Graduate Representative assigned by The Graduate School if applicable) and must be completed within two years after passing the qualifying examination. It is also recommended that the student has taken 2/3 of their graded coursework. In addition, students should have completed [ENGR 694](#) prior to taking the exam; the course is designed to assist the student in preparing their proposal.

The Ph.D. comprehensive examination is comprised of:

- A written proposal for the student's Ph.D. dissertation (not more than 15 pages) in a format specified by the Graduate Committee, and
- An oral presentation of the proposal and oral examination.

The purpose of this written and oral presentation is to determine the feasibility and originality of the proposed research, to examine the student's familiarity with the literature and background materials involved, and to offer suggestions to the student regarding the proposed research. A successful proposal will include a literature review, preliminary research to date, and the research proposed to complete the Ph.D.

The written proposal will be presented to the student's graduate committee in advance of the oral presentation, at least two weeks before the date requested. The student will then present the dissertation proposal as a public research seminar that has been advertised to the College of Engineering. This will be followed by a closed-session oral examination by the student's graduate committee on:

- the candidate's current and proposed research;
- the candidate's graduate level understanding of option specific engineering principles; and
- additional topics relevant to the proposed research, including fundamentals of other disciplines drawn upon in the research.

The student's graduate committee will inform the student of the results of the comprehensive examination immediately following the oral examination and committee deliberation, and will document the results on the appropriate form filed with The Graduate School. A student not passing the comprehensive will have one opportunity to retake the comprehensive after a span of six months has passed. Failure to pass the examination on the second attempt will result in dismissal from the Ph.D. program. There may be additional requirements for these exams specified in the option requirements. <https://www.montana.edu/gradschool/policy/dates-deadlines.html>.

There must be a minimum of six (6) months between the comprehensive exam and dissertation defense (final examination). The committee must approve the proposal before the student can submit the dissertation to their committee or schedule the final exam.

3.4.3 Dissertation Defense (Final Examination)

All Ph.D. students must defend their dissertation. This final examination is given by the graduate committee and consists of two parts:

- an open seminar presenting the research results and
- a closed session with the student's graduate committee and the graduate representative (if applicable).

A draft of the dissertation should be submitted to the graduate committee at least two weeks prior to the final examination. The draft must first be completed, reviewed and approved by the major advisor prior to distribution to the committee. The exam cannot be scheduled until the dissertation has been approved by the major advisor. The committee members will read the dissertation before the final examination. At the examination, the student will present a review of the work and be prepared to defend it in response to questions from the committee.

The student's graduate committee will inform the student of the results of the final examination immediately following the oral examination and committee deliberation, and will document the results on the appropriate form filed with The Graduate School. A student not passing the final examination will have one opportunity to retake the final examination after a span of six, but no more than nine, months has passed. Failure to pass the examination on the second attempt will result in dismissal from the Ph.D. program.

The student must be registered when the final examination is taken. Written notification of the results within one week of the defense must be delivered to The Graduate School and the student. Committee members must approve the dissertation, along with the Department Head, and Dean of Graduate School. Students must complete revisions to the dissertation requested by the graduate committee prior to receiving committee approval. Deadline for the dissertation approval is 14 working days before the end of the term for a given semester. It is the responsibility of the student to verify that committee members have approved the final exam and delivered the result.

3.5 Ph.D. Dissertation

The dissertation should be an original contribution to the literature in option area being pursued. The dissertation should describe the execution and results of the research effort in detail. The style, organization, and standards of the dissertation should be equivalent to those for papers in scientific or engineering journals (e.g., journals published by the American Society of Civil Engineers).

In an effort to facilitate preparation of written scientific work and timely submittal of research findings for publication, Ph.D. students may consider the "journal manuscript" format. With this approach, the student prepares journal articles which serve as the main body of the dissertation document. The student must include specific supporting sections and follow the formatting required by the Graduate School. Students considering this option should consult their major advisor.

Dissertations are submitted to the Graduate School through the electronic final exam registration system. Information is available on the Internet at <https://www.montana.edu/etd> where ETD stands for Electronic Thesis and Dissertation. Electronic dissertation submission should be completed 14 working days before the end of the term for a given semester. More details about the dates can be found in <https://www.montana.edu/gradschool/policy/dates-deadlines.html>. The student is responsible for obtaining the signatures of the advisory committee. A delay in the submission of

the dissertation may cause a delay in awarding of the degree, and the student may incur fees for late submission.

3.6 Ph.D. Progress Reports (Optional)

The student must keep the graduate committee informed of progress toward completion of the dissertation. While no documented graduate committee meetings are required, students should regularly inform their committee of research progress and provide opportunity for committee input. At a minimum, students should consider submitting an annual progress report to their graduate committee and the Department Head which summarizes coursework, research activities and achievements over the past 12 months. Additionally, students should include plans for future progress in the report.

The advisor and graduate committee should provide direct feedback to the student. If required, the advisor and graduate committee should describe the specific performance concerns, any required remedial actions, and a timeline for the next progress review.

3.8 Steps to the Ph.D. Degree

Note: It is the student's responsibility to ensure timely completion of each one of these steps. Graduate School forms and deadlines can be found on the Graduate School website. It is the student's responsibility to complete and submit all forms and understand the deadlines.

- 1) Selection of major advisor and research topic.
- 2) Student must enroll in one (1) credit of Seminar (ECIV 594) their first semester.
- 3) Selection of graduate committee.
- 4) Development of Program of Study (prior to completion of 15 credits of coursework).
- 5) Provide annual progress reports summarizing progress towards and plans for completing the degree. Meet regularly major advisor and graduate committee to discuss research goals and progress.
- 6) When between 24 and 36 credit hours of graduate work have been completed, arrange with the graduate committee to take the Ph.D. qualifying exam covering the engineering knowledge relevant to the chosen field of research. The qualifying examination will be completed
- 7) Enroll and complete EGEN 694
- 8) At least 6 months after successful completion of the Ph.D. qualifying exam, arrange with the graduate committee to take the Ph.D., comprehensive exam (dissertation proposal defense).
- 9) At least 6 months after successful completion of the Ph.D. comprehensive exam (dissertation proposal defense) arrange with the graduate committee to take the Ph.D. dissertation defense (final exam).
- 10) Complete dissertation and submit using Electronic Thesis and Dissertation formats at least 14 working days before the end of the term for a given semester.

