



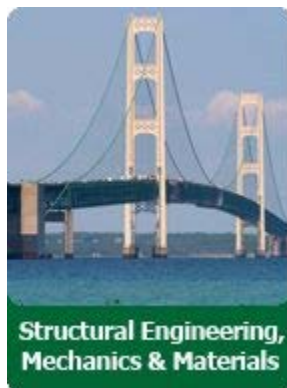
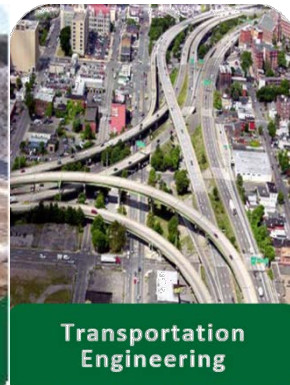
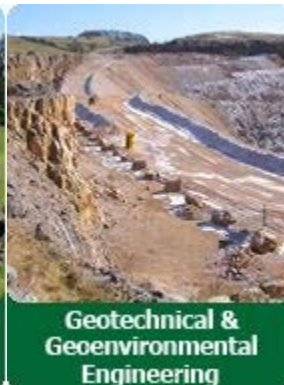
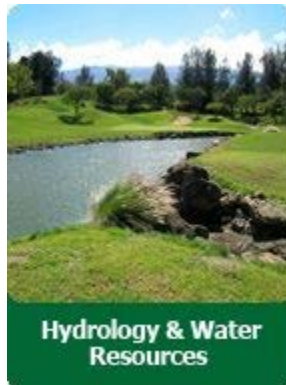
MICHIGAN STATE UNIVERSITY
Civil and Environmental Engineering

Advancing Knowledge. Transforming Lives

Graduate Student Handbook

2021-2022

M.S. and Ph.D. Programs in Civil Engineering



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TABLE OF CONTENTS

TABLE OF CONTENTS	3
WELCOME	7
Advantages of a graduate degree in Civil Engineering	7
The Civil Engineering Graduate Program at Michigan State University	7
Student participation	8
For further information	8
PART I – MASTER OF SCIENCE IN CIVIL ENGINEERING	9
1. PROGRAM OVERVIEW	9
1.1 The M.S. Degree and the Practice of Civil Engineering	9
1.2 Dual Bachelor's-Master's Degree in Civil Engineering	9
1.3 Dual Enrollment in Graduate Courses by Undergraduates	9
1.4 A road map to your degree	10
2. PROGRAM COMPONENTS	11
2.1 Master's Plan A (Thesis)	11
2.2 Master's Plan B1 (Project)	12
2.3 Master's Plan B (Coursework)	12
3. DEGREE REQUIREMENTS	12
3.1 Meeting Provisional Admission Requirements	12
3.2 Requirements for M.S. CE Plan A	13
3.3 Requirements for M.S. CE Plan B1	15
3.4 Requirements for M.S. CE Plan B	15
4. THE GRADUATE ADVISOR	15
4.1 Advisor Assignment and Selection Process	16
4.2 Time Line for Selection of a Permanent Faculty Advisor	16
4.3 Roles and Responsibilities of the Thesis Advisor	16
4.4 Roles and Responsibilities of the Student	17
4.5 Roles and Responsibility of the Department	18
5. FORMATION OF THE GUIDANCE COMMITTEE	18
6. THESIS/PROJECT FINAL ORAL EXAMINATION	19
6.1 Nature and Scope of the Thesis	19
6.2 Examination Regulations and Format	19
6.3 M.S. Degree Examining Committee	20
7. AREA-SPECIFIC MS PROGRAM REQUIREMENTS	20
7.1 MS CE –Geotechnical and Pavement Engineering (GEOPAVE)	20

7.2 MS CE – Structural Engineering, Mechanics and Materials (SEMM)	21
7.3 MS CE – Water Resources	23
7.4 MS CE – Transportation Engineering	24
7.5 MS CE – Energy/Sustainability	25
PART II – DOCTOR OF PHILOSOPHY PROGRAM IN CIVIL ENGINEERING (PH.D. CE)	27
8. PROGRAM OVERVIEW	27
8.1 The Ph.D. Degree and the practice of Civil Engineering	27
8.2 A road map to your degree	27
8.3 Student participation	28
9. PROGRAM COMPONENTS	29
9.1 The Doctor of Philosophy Degree	29
9.2 CONCURRENT M.S./PH.D.	29
10. DEGREE REQUIREMENTS	29
10.1 Meeting Provisional Admission Requirements	29
10.2 Overview of Ph.D. Degree Requirements	30
10.3 Prescribed Course Work	32
10.4 The Ph.D. Qualifying Examination	33
10.5 Doctoral Comprehensive Examination	35
10.6 Doctoral research	36
10.7 Doctoral dissertation	37
10.8 Research publications	37
10.9 Final examination – Dissertation defense	37
11. THE GRADUATE ADVISOR	37
11.1 Advisor Assignment and Selection Process	37
11.2 Time Line for Selection of a Permanent Faculty Advisor	38
11.3 Roles and Responsibilities of the Advisor	38
11.4 Roles and responsibilities of the student	39
11.5 Roles and responsibility of the department	39
12. AREA-SPECIFIC PH.D. QUALIFYING EXAM STANDARDS AND GUIDELINES	40
12.1 Pavement Engineering	40
12.2 Structural Engineering, Mechanics and Materials	41
12.3 Transportation Engineering	43
12.4 Water Resources	45
12.5 Energy/Sustainability	45
13. FORMATION OF THE GUIDANCE COMMITTEE	46

14 DISSERTATION DEFENSE AND FINAL ORAL EXAMINATION	47
14.1 Nature and Scope of the Dissertation	47
14.2 Examination regulations and format	47
14.3 Doctor of Philosophy Degree Examining Committee	48
PART III – DEPARTMENT, COLLEGE AND UNIVERSITY POLICIES	49
15. ACADEMIC PERFORMANCE	49
15.1 Academic Standards for the M.S. Program	49
15.2 Academic standards for the Ph.D. Program	50
15.3 Graduate Student Evaluation	51
15.4 Academic Grievance Hearing Procedures	51
15.5 Student Records	52
15.6 Student Awards	52
16. INTEGRITY AND SAFETY IN RESEARCH AND CREATIVE ACTIVITIES	53
16.1 The MSU perspective	53
16.2 Key Principles	54
16.3 Required Training in Responsible Conduct of Research (RCR)	56
16.4 Misconduct in Research and Creative Activities	56
16.5 Research involving human subjects	57
16.6 Research involving animals	57
16.7 Office of Radiation Chemical and Biological Safety (ORCBS)	58
17. STUDENT CONDUCT AND CONFLICT RESOLUTION	59
17.1 Student Conduct	59
17.2 Conflict Resolution	60
18. WORK RELATED POLICIES	60
18.1 Overview	60
18.2 Teaching Assistantship Selection Criteria	61
18.3 Research Assistantship Selection Criteria	62
18.4 The Graduate Employees Union (GEU)	62
18.5 University Graduate Assistantship Policies	62
18.6 Graduate Assistants Covered by the GEU	63
18.7 Graduate Assistants not covered by the GEU	63
18.8 Teaching Assistant Evaluation-	63
18.9 Graduate Student Evaluation	63
18.10 Safety Compliance	64
18.11 Use of Department facilities and supplies	65
18.12 Fees and Rates	65
18.13 Outside work for pay	65
18.14 Traveling Abroad	65
19 TRAVEL FUNDING REQUESTS	66

	6
APPENDIX I – NEW STUDENT CHECK LIST	67
APPENDIX II – DESIGNING YOUR M.S. PROGRAM	68
APPENDIX III – DESIGNING YOUR PH.D. PROGRAM	69
APPENDIX IV - FLOWCHARTS ILLUSTRATING WARNING AND PROBATION TRIGGERS	70
Warning and Probation Flowchart-Master’s Program A & B	70
Warning and Probation Flowchart-PhD Program	71
APPENDIX V – SAMPLE LETTERS FOR WARNING AND DISMISSAL	72
APPENDIX VI – SOURCES OF ADDITIONAL INFORMATION	75
APPENDIX-VII - NEW COURSES FOR INTERNATIONAL TEACHING ASSISTANTS (AAE 451, 452, AND 453)	76
APPENDIX VIII - REMINDER OF CURRENT POLICY FOR ISSUING I-20S FOR PROVISIONAL ADMISSION	77
APPENDIX – IX: DUAL MAJOR DOCTORAL DEGREES	78
CE GRADUATE PROGRAM REQUIREMENTS – SUMMARY	79

WELCOME

Advantages of a graduate degree in Civil Engineering

A graduate degree in Civil Engineering opens doors that are not otherwise accessible. These opportunities include research positions at corporations and national laboratories as well as teaching and research positions in academia. A career at this level brings the satisfaction of being able to explore your own ideas and fully utilize your creativity. A graduate degree will allow you to expand your knowledge and acquire new skills in analysis and problem solving, creating challenging opportunities for a full, rewarding career.

First and foremost among the talents required to succeed in a graduate program is a desire to learn, coupled with a natural curiosity and a desire to advance the state-of-the-art. Graduate students are motivated by the enhanced independence that an advanced degree brings and the challenge of placing oneself at the forefront of technology.

We have designed this Handbook to help prospective and current graduate students select an appropriate graduate program and provide information about the educational, research and work opportunities available in the Department. We thank you for considering our graduate program. All the best in your engineering career!

The Civil Engineering Graduate Program at Michigan State University

The Department of Civil & Environmental Engineering offers graduate programs leading to the Master of Science and Doctor of Philosophy graduate degrees in Civil Engineering and Environmental Engineering. The program requirements for these two programs are handled separately. This handbook provides information concerning the graduate program in Civil Engineering. Graduate study in Civil Engineering is organized into the following areas of specialization:

- Geotechnical and Pavement Engineering
- Structural Engineering, Mechanics and Materials
- Water Resources
- Transportation Engineering

In spite of the areas defined above, an interdisciplinary approach marks many of the research projects that faculty share with graduate students

Our graduate program is built on the quality of our faculty, our graduate students, and the quality of their collaborative research. We believe that the background and interests of our faculty, the research facilities, and the academic excellence of our students make our

Department an attractive environment for graduate study. As a Department, we look ahead to the future knowing that change and growth are important aspects of and inevitable in our discipline. A graduate degree at MSU will enable you to develop the intellectual skills you need to compete among the best engineers in the world and you will receive world-class training preparing you for a fulfilling career in industry, research, or teaching.

Student participation

The Department's graduate degree programs have certain course requirements as outlined in detail in this handbook. However, graduate students in the Department quickly discover that their education is advanced in a number of ways beyond traditional coursework. One of the major opportunities is the chance to work side by side with faculty members who are deeply interested in finding answers to research problems. Most M.S. students are expected to be involved in thesis work and all doctoral students are involved in dissertation research. Doctoral students demonstrate mastery of the subject matter at various levels by passing a qualifying exam and a comprehensive exam. They also develop a dissertation proposal and present the results of their research in a dissertation defense. Students are encouraged to participate in professional society meetings and to publish their research results in society journals, transactions, and conference proceedings. Graduate students also have the opportunity to participate in academic governance at the College and University level.

For further information

If you have any questions or concerns relating to your graduate experience, requirements, or policies, you are encouraged to discuss them with:

1. Your graduate advisor
2. Ms. Laura Post, CEE Graduate Secretary
3. Prof. Peter Savolainen, CEE Graduate Director
4. Prof. Neeraj Buch, CEE Department Chairperson

In addition to this handbook, the relevant publications and resources are available on-line and provided in Appendix V of this handbook.

PART I – MASTER OF SCIENCE IN CIVIL ENGINEERING

1. PROGRAM OVERVIEW

1.1 The M.S. Degree and the Practice of Civil Engineering

The practice of Civil Engineering at high levels of performance is increasingly conducted in specific areas. The M.S. degree in Civil Engineering is intended to provide training depth in specific areas of expertise beyond the Bachelor's degree. Such training can accelerate the career development and increase opportunities. The M.S. training is also intended to provide a deeper technical background on the selected specialty so as to prepare for further academic training. The program is therefore structured to provide students with fundamental core training in the expertise of choice with enough freedom to direct the advanced training towards the student's career goals.

The M.S. degree is being increasingly thought of as the first professional degree for Civil Engineering practice. As such, the program requires students to perform at high levels of technical competency and demonstrate the ability to perform independent work. Both theoretical and applied elements are emphasized and reinforced through a combination of core and elective courses as well as independent research options.

1.2 Dual Bachelor's-Master's Degree in Civil Engineering

Undergraduates at MSU with a grade-point average of 3.0 or greater can be considered for an accelerated program for the completion of a M.S. degree. The Dual Bachelor's-Master's program allows the application of up to 9 credits toward the master's program for qualifying 400-level and above course work taken at the undergraduate level at Michigan State University or an external accredited institution. Applications must be made during the prior spring semester for an anticipated spring graduation or the prior fall semester for an anticipated fall graduation to allow admission before the final semester as a Civil Engineering undergraduate. For additional information on this program, contact the Graduate Director.

1.3 Dual Enrollment in Graduate Courses by Undergraduates

Dual enrollment provides an opportunity for academically talented undergraduate students to enroll in graduate courses and conduct research towards a graduate degree while completing the last two years of their bachelor's degree(s) programs.

To be considered for dual enrollment, the student must first file an Application for Admission to Graduate Study, and be admitted into the CE graduate program. Subsequent to admission to the CE graduate program, in regular status, the student must

complete a Request for Dual Enrollment Status form, available from the Office of the Registrar.

Within the first semester of dual enrollment, the student's graduate degree program adviser must be identified and the appropriate graduate degree guidance committee established. The adviser and committee assist the student in developing a program of study for the graduate degree. Admission to graduate study must be approved before work to apply toward a graduate degree program is undertaken. Credits completed prior to admission to graduate study *cannot* be applied toward a graduate degree program.

A student will be classified as an undergraduate until the minimum number of credits required for a first bachelor's degree is completed. When the student is classified as a graduate student, eligibility begins for graduate assistantships, other forms of graduate student financial aid, or those services and prerogatives normally reserved for graduate students. If approved by the graduate program, a maximum of nine credits, at the 400-level or higher, from the undergraduate degree program can be applied toward the requirements for the graduate degree program for credits completed after admission to graduate study.

1.4 A road map to your degree

Students pursuing the M.S. Degree in Civil Engineering can follow the thesis, project option or coursework option. Students funded on departmental funds, including fellowships and research assistantships, are expected to complete the thesis option. The typical path towards a M.S. Degree in Civil Engineering is as follows:

- Gain admission to the program.
- You will be assigned an advisor upon admission. Once you arrive you should meet with that academic advisor to plan your first semester schedule. If you find that you wish to change advisors, you are free to do so unless your advisor is providing you with a research assistantship on a specific project. If you are supported as a R.A., but there are extenuating situations that necessitate changing advisors, you should meet with your current advisor as soon as you decide this is necessary. As part of this meeting, you should plan to discuss how you will fulfill the obligations of your research assistantship. After meeting with your advisor, you should also meet with the graduate coordinator and your perspective advisor as soon as possible and complete the Change of Advisor form.
- Design a Program of Study with your advisor. This includes coursework and research credits necessary to graduate.
- Submit the Program of Study for signatures.
- Complete the required coursework and your thesis or research project (if you choose the latter two options). Most master's degree students in our program finish within two years.
- Additional details are provided in Chapter 3.

2. PROGRAM COMPONENTS

During the first semester of graduate study, the student is expected to work with the advisor to develop a Program Plan that meets the academic needs and interests of the student and complies with the M.S. CE Program requirements. The Program Plan specifies the courses and optional project or thesis that the student will complete. The initial consideration for most students is whether to satisfy the degree requirements through a coursework-only program, or by completing a M.S. project or thesis.

All M.S. programs require that students complete 30 credit hours, including a specified set of required courses, and elective courses chosen in consultation with the advisor. Credits that are under the thesis or project option are counted toward the 30 credit requirement. The thesis is generally a more in-depth and more formal product than a project, and is recognized as an important accomplishment for students who wish to pursue research careers.

Students receiving fellowships, teaching assistantships or research assistantships as financial assistance for a M.S. degree are required to conduct research with a faculty member in the CEE Department and produce a thesis from their work under Plan A.

2.1 Master's Plan A (Thesis)

The thesis option is designed for students with a strong interest in research, and who participate in a research project throughout their M.S. program. It is strongly recommended for those who wish to continue their graduate education at the Ph.D. level, and is required for those receiving fellowships, teaching assistantships or research assistantships.

The Master's Plan A program consists of (1) prescribed course work, (2) research, (3) a master's thesis, and (4) an oral defense of the master's thesis. For more information about the prescribed course work, please see Chapter 7. The oral defense is described in Chapter 6.

The M.S. thesis is based on original research conducted under the guidance of a faculty committee. A written thesis is prepared according to a set of guidelines established by the graduate school, and an oral defense of the work is presented to the guidance committee. The guidance committee must approve both the written product and oral defense as meeting the standard of high quality research. It is also generally expected that the M.S. thesis will provide the basis for at least one publication in a scientific or technical journal.

2.2 Master's Plan B1 (Project)

The project option is designed for students with an interest in research, or in conducting an independent project with a focus on innovative analysis or design. In practice, it can be essentially the same as a thesis, but allows for greater flexibility and may be less intensive than a thesis. Students pursuing this option may participate in research projects over only a discrete portion of their graduate program.

The Master's Plan B1 program consists of (1) prescribed course work as described in Chapter 7, (2) a special project involving either research or a design and (3) an oral defense of the project. The oral defense is described in Chapter 6.

Preparation the project report is based on work conducted under the guidance of a faculty committee. There is no specific format for the report. The guidance committee must approve both the written product and oral defense as meeting the standard of competent research, analysis or design. It is also generally expected that the M.S. project will provide the basis for at least one report in a suitable publication.

2.3 Master's Plan B (Coursework)

The coursework option is designed for students who are primarily interested in gaining specialty knowledge and skills beyond that offered at the B.S. level through advanced coursework. Requirements are met by completion of approved core and elective courses.

The Master's plan B consists of 30 credits of approved coursework. There is no requirement for a thesis, project or creative component.

3. DEGREE REQUIREMENTS

3.1 Meeting Provisional Admission Requirements

International students who are admitted provisionally with a requirement for additional English language testing must address this before the start of their first semester. The English Language Center will administer the tests and provide requirements to your advisor for any language courses you will need as well as guidance on an appropriate first-semester academic load.

3.2 Requirements for M.S. CE Plan A

The Plan A master's degree consists of prescribed course work, research, thesis, and a final oral examination.

Master's credit requirements. The student must complete at least 30 credits at the 400 level or higher. At least 20 of these credits, including the thesis credits, must be at the 800 level or higher. In addition, credit requirements for core-courses, supporting courses, and the master's thesis must be met. Courses below the 400 level may not be counted toward the requirements of the degree. Please see Appendix 2 for guidelines to help plan your course of study for the M.S. in Civil Engineering.

Master's thesis credit requirements. At least 4 credits and no more than 6 credits of CE 899 are required.

Master's transfer credits. Graduate course credits from another institution cannot be transferred to MSU if the credits were previously used to obtain a degree. If graduate course credits were taken at another institution, but the degree was not completed, they may be transferred to MSU. The final decision on transferring credits shall be made by the Chair in consultation with the academic advisor. If applicable, up to 9 semester credits of graduate course work (excluding research and thesis credits) may be transferred into a 30 credit master's degree program from other accredited institutions, international institutions of similar quality, or MSU's Lifelong learning program, if they are appropriate to a student's program and provided they were completed within the time limits for the degree. Please see the *MSU Academic Programs* publication for additional information. If you wish to transfer credits, please see the graduate secretary at the beginning of the program so that an MSU Credit Evaluation form can be initiated. You will need to provide the title, name, catalog description and syllabus of the course(s) wanted to be transferred (in English), identify the MSU equivalent course, and identify the appropriate number of credits. The transferred credits should be consistent and cohesive with the requirements of an area-specific M.S. degree as outlined in Section 7. The request requires the review and approval of the Program Graduate Director.

Master's Degree Program Plan filing. Each student admitted to the Master's program must define and file a Degree Program. *The student's program of study must be approved before the student completes 6 credits of graduate work in order for the student to continue to enroll in the master's degree program.* The subject material and the instructor must be specified for any independent study or selected topics course that is included in the student's approved program of study. The academic adviser will assist the student in planning a program satisfactory to the needs of the student. Changes in program plans may be made only with the approval of the adviser, the Graduate Director, and the Associate Dean for Research and Graduate Studies. Please see Appendix 2 for guidance on planning a program in various specialty areas of graduate study in civil & environmental engineering. When you are ready to file your program, go to the on-line

graduate tracking system at <https://www.egr.msu.edu/grs/> to complete your program. After the graduate secretary pre-approves your program you will have to print it out and collect signatures of your committee members. Once the signatures from the committee members have been obtained you must return the form to the graduate secretary, who will obtain the additional signatures needed.

Modifications to the master's program. None of the following types of changes will be allowed in the student's approved program of study:

1. Adding or deleting a course for which a grade has already been assigned under any of the three grading systems (numerical, Pass–No Grade, or Credit–No Credit).
2. Adding or deleting a course for which grading was postponed by the use of the DF–Deferred marker.
3. Adding or deleting a course which the student dropped after the middle of the semester and for which "W" or "N" or "0.0" was designated.
4. Adding or deleting a course during the final semester of enrollment in the master's degree program.

Residency requirement for the Master's degree. At least 9 credits must be taken in residence at MSU.

Full time status. Full time status for master's students is defined as a minimum of 6 credits. All students defending their thesis in the summer need to be registered for at least one credit during that Summer, regardless of their being enrolled in the preceding Spring semester. A waiver for this requirement may be requested, with proper justification, to the graduate program coordinator. The request should be done before the end of the preceding Spring semester.

Time limit for the Master's degree. The time limit for the completion of the requirements for the master's degree is five calendar years from the date of enrollment in the first course included for degree certification.

Grade point average for graduation. The Engineering College requires a minimum GPA of 3.0 for courses on the approved Master's degree program. The University requires a minimum total GPA of 3.0. The total GPA may be different than the program GPA if classes are taken that were not listed on the program.

Master's degree examinations. The student is required to pass an oral examination in defense of the thesis or project. Section 6 of the handbook describes this examination.

Thesis submission. The thesis and associated materials must be prepared, approved and submitted according to the requirements of The Graduate School, which can be found at <http://grad.msu.edu/etd/>.

Final semester. The student must complete the diploma card when registering for the final semester. All deferred grades should be cleared at least two weeks before the end of the final semester, but must be cleared by the Friday of finals week.

DF-Deferred grades: The required work must be completed and a grade reported within 6 months with the option of a single six-month extension. If the required work is not completed within the time limit, the DF will become U-Unfinished and will be changed to DF/U under the numerical and Pass-No Grade (P-N) grading systems, and to DF/NC under the Credit-No Credit (CR-NC) system. This rule does not apply to graduate thesis or dissertation work.

3.3 Requirements for M.S. CE Plan B1

The Plan B1 master's degree consists of prescribed course work, a special project, and a final oral defense of the project. All requirements from Plan A apply to plan B1 except:

- (1) a minimum of 18 credits must be in courses at the 800-900 level;
- (2) those requirements specifically related to the thesis do not apply; and
- (3) the student must complete a research project or a design project by enrolling in at least 1, but not more than 3, credits of CE 892 (Research Project Option) The final report must be approved by the guidance committee and defended in an oral defense.

3.4 Requirements for M.S. CE Plan B

The Master's plan B consists of 30 credits of approved coursework, at least 18 credits must be at the 800-900 level. There is no requirement for a thesis, project or creative component.

4. THE GRADUATE ADVISOR

Graduate education, research, and creative activities take place within a community of scholars where constructive relationships between graduate students and their advisors and mentors are essential for the promotion of excellence in graduate education and for adherence to the highest standards of scholarship, ethics, and professional integrity. Initiation and successful completion of independent research requires early and continued advice and oversight by a faculty advisor.

For students in the civil engineering master's graduate program, Plan A, the faculty advisor is the student's academic advisor and thesis advisor. For Plan B1 master's students, the

faculty advisor is the academic advisor. Faculty advisors must be members of the civil and environmental engineering faculty, appointed at the level of Assistant Professor or higher.

4.1 Advisor Assignment and Selection Process

At the time of admission into the program, all students are assigned an advisor. Students who are admitted to the graduate program with a research assistantship that is provided by a particular faculty member will be assigned to that faculty member as their academic advisor and thesis/dissertation advisor. Other students may be admitted with a graduate assistantship or fellowship that is from general funds or third-party funds and not explicitly tied to a particular faculty member. In those cases, the selection of an advisor is based on mutual research interests, but the student is free to change advisors, if the student and advisor mutually agree that the change would be beneficial. A common reason to switch advisors is that the student is more interested in the research done by another faculty member than that of the advisor to which he/she was assigned.

The Department's policy is to establish that there is interest from at least one faculty member in advising the applicant prior to sending a letter of admission. When more than one faculty member has expressed interest in serving as academic advisor to a student who was admitted with an assistantship or fellowship from general funds or third parties, the student should select an advisor within the time frame described in the previous section. A listing of faculty is provided in Appendix I. Current research projects are described on the Departmental webpage – <https://www.egr.msu.edu/cee/>

4.2 Time Line for Selection of a Permanent Faculty Advisor

All students in the civil engineering graduate program must have a faculty advisor. Master's degree students should have selected a permanent advisor prior to the completion of 6 credits in their master's degree program (See Section 1.3).

4.3 Roles and Responsibilities of the Thesis Advisor

The role of the advisor includes the following:

- Ensuring that graduate students receive information about requirements and policies of the graduate program.
- Advising graduate students on developing a program plan, including appropriate course work, research or creative activity, and on available resources.
- Advising graduate students on the selection of a thesis or project topic with realistic prospects for successful completion within an appropriate time frame and on the formation of a guidance committee.
- Providing training and oversight in creative activities, research rigor, theoretical and technical aspects of the thesis or project work, and in professional integrity.

- Encouraging graduate students to stay abreast of the literature and cutting-edge ideas in the field.
- Helping graduate students to develop professional skills in writing reports and papers, making professional presentations, establishing professional networks, interviewing, and evaluating manuscripts and papers.
- Providing regular feedback on the progress of graduate students toward degree completion, including feedback on research or creative activities, course work, and teaching, and constructive criticism if the progress does not meet expectations.
- Helping graduate students develop into successful professionals and colleagues, including encouraging students to participate and disseminate results of research or creative activities in the appropriate scholarly or public forums.
- Facilitating career development, including advising graduate students on appropriate job and career options, as well as on the preparation of application materials for appropriate fellowship, scholarship, and other relevant opportunities.
- Writing letters of reference for appropriate fellowship, scholarship, award, and job opportunities.
- Providing for supervision and advising of graduate students when the faculty advisor is on leave or extended absence.

4.4 Roles and Responsibilities of the Student

The student also has responsibilities in the advisor/student relationship. These include the following.

- Learning and adhering to University and academic unit rules, procedures, and policies applicable to graduate study and research or creative activities, including those outlined in the publications *Academic Programs*, *Graduate Student Rights and Responsibilities*, and *Academic Freedom for Students at MSU*.
- Meeting University and academic unit requirements for degree completion.
- Forming a guidance committee that meets University requirements as well as requirements that are outlined in the Graduate Handbook of the academic unit.
- Following disciplinary and scholarly codes of ethics in course work, thesis or project work, and in creative activities.
- Practicing uncompromising honesty and integrity according to University and federal guidelines in collecting and maintaining data
- Seeking regulatory approval for research in the early stages of thesis or project work where applicable.
- Keeping the faculty advisor and guidance committee apprised on a regular basis of the progress toward completion of the thesis or project

4.5 Roles and Responsibility of the Department

Once a permanent thesis/dissertation advisor is selected, it is unusual to change advisors. However, if a situation arises where a change seems imperative, the student should consult with the Department's graduate coordinator who will facilitate changes of faculty advisor. The procedures for changing M.S. and Ph.D. advisors are described in Sections 1.3 and 8.2, respectively.

Should the student's advisor leave MSU, it is the department chair's responsibility to facilitate arrangements that allow the student to successfully complete his/her degree program.

5. FORMATION OF THE GUIDANCE COMMITTEE

Graduate students selecting the Project or Thesis options have the responsibility to form a guidance committee with the approval and assistance of the student's advisor, and approval of the Graduate Program Coordinator. The guidance committee will consist of at least three Michigan State University regular faculty members, at least two of whom must be on the faculty of the Department of Civil and Environmental Engineering, and must include the student's advisor, who normally serves as the committee chairperson. Please see the *MSU Academic Programs* publication for additional information regarding definition of regular faculty.

The responsibilities of the guidance committee include the following:

- Advising graduate students on course work, research, or creative activities.
- Providing, at least annually, feedback and guidance concerning progress toward the degree.
- Reviewing the thesis or dissertation in a timely, constructive and critical manner.
- Committee chairpersons on leave shall provide for the necessary guidance of their advisees during their absence.

The responsibilities of the student include the following:

- Identifying, in consultation with the advisor, faculty members with the expertise and interest in supervising the proposed research, and meeting with them to discuss their willingness to serve in this capacity.
- Meeting with the guidance committee before the research plan is finalized to review the proposed work, and modify as appropriate.
- Keeping the committee informed on the progress of the research and soliciting their input to address unforeseen issues or to improve quality.
- Scheduling the final examination and providing the committee with a copy of the final written product at least two weeks before the examination.

6. THESIS/PROJECT FINAL ORAL EXAMINATION

6.1 Nature and Scope of the Thesis

The final master's examination is the culmination of a student's graduate education and training and reflects not only the accomplishments of the graduate student but also on the quality of the graduate program. An approved thesis that is accepted by the graduate school becomes a single-author publication and contributes to the body of knowledge of the civil engineering discipline.

6.2 Examination Regulations and Format

The graduate student will present the results of the thesis/project in a seminar open to the community. The student should arrange a suitable examination date after consulting with the thesis advisor and members of the examination committee. The student should also arrange for a suitable room in which to hold the seminar by consulting with the office staff of the Civil & Environmental Engineering Department. This should be done in communication with the Department graduate secretary, who will arrange for announcement of the upcoming defense. The student should also ensure that all necessary computer equipment, such as a laptop and data projector, is available.

The following regulations apply.

- The final oral examination must be scheduled for a date not earlier than two weeks after the dissertation and abstract have been submitted to the chairperson of the guidance committee, other guidance committee members, and any appointed examiner.
- The student must be registered during the semester in which the final oral examination is taken.
- The thesis/project and the student's performance on the final oral examination must be approved by a positive vote of at least three-fourths of the voting examiners and with not more than one dissenting vote from among the Michigan State University regular faculty members of the guidance committee.

For both the thesis option master's degree candidate, the following format is typical. The examining committee members may or may not choose to meet before the exam to discuss the procedure. The candidate presents the results in seminar fashion and responds to questions and comments from those in attendance. After the general audience has had opportunity to raise questions and comments, they are excused from the room and the defense continues with only the examining committee. At the end of the examination, the student is asked to step out of the room, and the examining committee members each indicate in writing a pass or fail grade. The student is then asked to reenter the room to

receive the result of the final examination. A summary report of the examination result is submitted to the Dean of Engineering and the Chairperson of the Department.

6.3 M.S. Degree Examining Committee

The M.S. degree examination committee consists of at least three Michigan State University regular faculty members, at least two of whom must be on the faculty of the Department of Civil & Environmental Engineering. The committee is selected by the thesis/project advisor and student with the approval of the Department's graduate coordinator. One member of the committee must be the thesis/project advisor. Other interested faculty members may attend the examination without vote.

7. AREA-SPECIFIC MS PROGRAM REQUIREMENTS

7.1 MS CE –Geotechnical and Pavement Engineering (GEOPAVE)

All students wishing to receive an MS degree in civil engineering with emphasis in geotechnical and pavement engineering must satisfy the college and university requirements, and the requirements outlined below.

Undergraduate Core Courses

Students who do not have a BS in civil engineering will normally be required to complete those undergraduate courses that provide appropriate background. Typical remedial courses may be required in calculus and differential equations, soil mechanics, statistics, and civil engineering materials. To compensate for deficiencies in the areas noted above, students may be required to complete a limited number of collateral courses in these areas for the MS degree. These credits will not count towards the MS degree. The requirement for remedial courses will be determined on a case by case basis by the student's adviser.

MS Core Courses (6 credits)

Basic/core courses (6credits) provide exposure to the various aspects of pavement and geotechnical engineering. Students must either take minimum 6 credits among the classes below or show that they have taken equivalent courses in their undergraduate program or in another graduate program.

CE 418	Geotechnical Engineering
CE 431	Pavement Analysis and Design
CE 432	Pavement Rehabilitation

Required 800-Level Core Courses (15 credits)

In addition to the required courses above, MS students are also required to take at least fifteen (15) credits from the following list of courses. Minimum six (6) of these credits should be from Geotechnical engineering, and minimum six (6) of these credits should be from Pavement engineering.

Geotechnical Engineering Courses

CE 815-1	Selected Topics in Geotechnical Engineering (Slope Stability and Stabilization Techniques)
CE 815-2	Selected Topics in Geotechnical Engineering (Dynamic analysis of geotechnical and pavement systems)
CE 818	Advanced Geotechnical Design

Pavement Engineering Courses

CE 831	Advanced Concrete Pavement Analysis and Design
CE 832	Advanced Asphalt Pavement Analysis and Design
CE 837	Advanced Concrete Materials
CE 838	Bituminous Materials

Exemption from Fulfilling Core Course Requirement

An exemption from the core course requirement may be granted to a thesis student with particular professional needs. However, the student's faculty advisor, the MS committee, and the Graduate Director must approve the MS program for such students.

Elective Courses

Each student can also choose electives that provide depth in his/her chosen area of specialization within pavement and geotechnical engineering. These courses are to be selected in conjunction with and approved by the graduate advisor.

7.2 MS CE – Structural Engineering, Mechanics and Materials (SEMM)

All students wishing to receive an MS degree in civil engineering with emphasis in the structural engineering, mechanics, and materials (SEMM) area must satisfy the college and university requirements, and the requirements outlined below.

Undergraduate Core Courses

Students who do not have a BS in civil engineering will normally be required to complete those undergraduate courses that provide the required background for an MS degree emphasizing SEMM. Typically, remedial courses may be required in computing, calculus

and differential equations, introductory structural analysis, soil mechanics and/or civil engineering materials. To compensate for deficiencies in the areas noted above, students may be required to complete a limited number of collateral courses in these areas for the MS degree. The requirement for remedial courses will be determined on a case by case basis by the student's adviser.

MS Core Courses

If a student chooses an emphasis in structural engineering, mechanics and materials, and does not have the required background as explained above, the following courses must be completed as collateral:

Collateral Courses		
CE 305	Structural Analysis and Design	3 cr
CE 312	Soil Mechanics	4 cr
CE 337	Civil Engineering Materials	4 cr

Students must complete at least one course in each of the following core areas as part of the degree program:

Approved Courses in Core Areas		
Core Area	Approved Courses	Credits
Structural Analysis	CE 400	3
Finite Element Analysis	CE 804 or CE/ME 872	3
Structural Dynamics	CE 802 & CE 803	3
Structural Design	CE 805 or CE 806 or CE 808	3
Structural Materials	CE 809 or CE407	3
Statistics and Probability	STT 421 or STT 422	3

Courses not listed above may be used to fulfill the core course requirement with the consent of the student's advisor and the graduate program coordinator.

In addition to fulfilling core course requirements, all SEMM graduate students are expected to regularly attend the CE Seminar Series while enrolled as a graduate student.

Exemption from Fulfilling Core Course Requirement

An exemption from the core course requirement may be granted to a thesis student with particular professional needs. However, the student's faculty adviser, the MS committee, and the Graduate Director must approve the MS program for such students.

Elective Courses

Each student must also choose electives that provide depth in his/her chosen area of specialization within SEMM areas and/or appropriate breadth. These courses are to be selected in conjunction with and approved by the graduate advisor. The number of

electives is reduced if the student elects (or is required) to take the project or thesis option for the MS.

7.3 MS CE – Water Resources

All students wishing to receive an MS degree in civil engineering with emphasis in water resources must satisfy the college and university requirements, and the requirements outlined below.

Undergraduate Core Courses

Students who do not have a BS in civil engineering will normally be required to complete those undergraduate courses which provide the required background for an MS degree emphasizing the water resources area. Remedial courses may be required in computing, calculus and differential equations, engineering hydrology (CE421) or applied hydraulics (CE422). The requirement for remedial courses will be determined on a case-by-case basis by the student's adviser.

MS Core Courses

With the consent of the faculty advisor and the MS committee, the student must develop a coherent, individualized program. The program must expose the student to the core courses in the areas of groundwater and surface water hydrology and related areas as shown in the list below.

Approved Core Courses		
Number	Title	Credits
ENE 801	Dynamics of Environmental Systems	3
CE 829	Mixing and Transport in Surface Waters	3
CE 821	Groundwater Hydraulics	3
CE 822	Groundwater Modeling	3

Exemption from Fulfilling Core Course Requirement

An exemption from the core course requirement may be granted to a thesis student with particular professional needs. However, the student's faculty adviser, the MS committee, and the Graduate Director must approve the MS program for such students.

Elective Courses

Each student must also choose electives that provide depth in his/her chosen area of specialization within pavement and transportation engineering and/or appropriate breadth. These courses are to be selected in conjunction with and approved by the graduate advisor. The number of electives is reduced if the student elects (or is required) to take the project or thesis option for the MS. Recommended electives include:

CE 891 Advanced Hydrologic Modeling

7.4 MS CE – Transportation Engineering

All students wishing to receive an MS degree in civil engineering with emphasis in transportation engineering must satisfy the college and university requirements, and the requirements outlined below.

Undergraduate Core Courses

Students who do not have a BS in civil engineering will normally be required to complete those undergraduate courses that provide appropriate background, specifically “Introduction to Transportation Engineering” (CE 341). The requirement for additional collateral courses will be determined on a case by case basis by the student’s adviser.

MS Core Courses (9 credits)

The following basic/core courses (each 3 credits) provide exposure to the various aspects of Transportation Engineering. Students must either take the classes or show that they have taken equivalent courses in their undergraduate program or in another graduate program. Students who have already taken such courses have an increased number of electives that they can take as part of their program.

CE 444 – Principles of Traffic Engineering
 CE 448 – Transportation Planning
 CE 449 – Highway Design

Required 800-Level Core Courses (15 credits)

In addition to the required courses above, MS students are also required to take fifteen (15) credits from the following list of courses (each 3 credits).

CE 841 – Traffic Flow Theory
 CE 844 – Highway and Traffic Safety
 CE 847 – Traffic Analysis and Control
 CE 849 – Transportation Research Methods
 CE 850 – Intelligent Transportation Systems
 CE 851 – Transportation and the Environment

While (any) five of the above courses are required, the sixth may also be taken as an elective. Courses not listed above may be used to fulfill the core course requirement with the consent of the student’s advisor and the graduate program coordinator.

Elective Courses

Elective courses allow the student to obtain formal training in areas of interest and also strengthen the student’s skills for performing the MS thesis or project. Elective courses that may be appropriate for the student’s program plan and/or are required to complete

the program minimum of 30 credits should be selected in coordination (and with approval) of the graduate advisor.

7.5 MS CE – Energy/Sustainability

All students wishing to receive an MS degree in civil engineering with emphasis in energy and sustainability must satisfy the college and university requirements, and the requirements outlined below.

Undergraduate Core Courses

Students who do not have a BS in civil or environmental engineering will normally be required to complete those undergraduate courses that provide appropriate background. Typical remedial courses may be required in calculus and differential equations. To compensate for deficiencies in the areas noted above, students may be required to complete a limited number of collateral courses in these areas for the MS degree. These credits will not count towards the MS degree. The requirement for remedial courses will be determined on a case by case basis by the student's adviser.

MS Core Courses (12 credits)

Basic/core courses provide exposure to the various aspects of energy and sustainability. Students must take a minimum of 12 credits among the classes below or show that they have taken equivalent courses in their undergraduate program or in another graduate program.

- CE 473/891 Smart and Sustainable Building Design and Operation
- CE 485 Landfill Design
- CE 851 Transportation and the Environment
- CE/UP 878 Autonomous Futures: Self-driving Vehicles, Domotics, and Artificial Intelligence in Smart Cities
- CE 891 Soil Remediation
- CE 891 Sustainable Building Envelope Systems
- ENE 472 Life Cycle Assessment of Energy Technologies
- ENE 489 Air Pollution: Science and Engineering
- ENE 805 Contaminated Site Remediation
- CMP 801 Construction, Building, and Energy Systems
- CMP 845 Advanced Green and Energy Efficient Building Construction
- MSE 810 Materials for Energy Applications

Exemption from Fulfilling Core Course Requirement

An exemption from the core course requirement may be granted to a thesis student with particular professional needs. However, the student's faculty advisor, the MS committee, and the Graduate Director must approve the MS program for such students.

Elective Courses

Each student can also choose electives that provide depth in their chosen area of specialization within energy/sustainability. These courses are to be selected in conjunction with and approved by the graduate advisor.

PART II – DOCTOR OF PHILOSOPHY PROGRAM IN CIVIL ENGINEERING (Ph.D. CE)

8. PROGRAM OVERVIEW

8.1 The Ph.D. Degree and the practice of Civil Engineering

A Ph.D. degree in Civil Engineering opens doors that are not otherwise accessible. These opportunities include research positions at corporations and national laboratories as well as teaching and research positions in academia. A career at this level brings the satisfaction of being able to explore your own ideas and fully utilize your creativity. A graduate degree will allow you to expand your knowledge and acquire new skills in analysis and problem solving, creating challenging opportunities for a full, rewarding career.

First and foremost among the talents required to succeed in a graduate program is a desire to learn, coupled with a natural curiosity and a desire to advance the state-of-the-art. Graduate students are motivated by the enhanced independence that an advanced degree brings and the challenge of placing oneself at the forefront of technology.

8.2 A road map to your degree

The typical path toward a doctorate degree in Civil Engineering at Michigan State University is as follows:

- Gain admission to the program. For most of our admitted students, financial aid is provided in the form of a graduate assistantship.
- You will be assigned an academic advisor based on your interests. If you receive a R.A., then your academic advisor will be the faculty member providing your R.A. support. Your advisor will be a member of the Department faculty and will serve as the chairperson of your doctoral guidance committee. If you find that you wish to change advisors, you are free to do so unless your advisor is providing you with a research assistantship on a specific project. If you are supported as a R.A., but there are extenuating situations that necessitate changing advisors, you should meet with your current advisor as soon as you decide this is necessary. As part of this meeting, you should plan to discuss how you will fulfill the obligations of your research assistantship. After meeting with your advisor, you should also meet with the graduate coordinator and your perspective advisor as soon as possible and complete the Change of Advisor form.
- Pass the doctoral qualifying examination at the beginning of the second semester in the program. Current master's students transferring to the Ph.D. should take the qualifying examination prior to starting the Ph.D. or during the first semester in the Ph.D. Details about the qualifying examination can be found in Section 9.5. and Chapter 11.

- Choose your committee after passing the Qualifying Examination.
- Design a program of coursework with your guidance committee. The Program of Study should be submitted before the end of your second semester, if you passed the Qualifying Examination in your second semester. If you require an extra semester to pass the Qualifying Examination, you have until the end of the semester in which you pass your Qualifying Exam to submit the Program of Study, but no later than the end of your third semester. (Summer semesters do not count).
- Pass the comprehensive examinations, including a successful presentation of a dissertation proposal. This is done when coursework is finished, or substantially finished.
- Complete your research, write your dissertation, and defend it in an oral examination. Historically, the civil and environmental engineering doctoral programs at MSU require an average of approximately three to four years (beyond the M.S. degree) to finish.

8.3 Student participation

The Department's graduate degree programs have certain course requirements as outlined in section 10 of this handbook. However, graduate students in the Department quickly discover that their education is advanced in a number of ways beyond traditional coursework. One of the major opportunities is the chance to work side by side with faculty members who are deeply interested in finding answers to research problems. All doctoral students are involved in dissertation research and are expected to demonstrate mastery of the subject matter at various levels by passing a qualifying exam and a comprehensive exam. They also develop a dissertation proposal and present the results of their research in a dissertation defense. Students are encouraged to participate in professional society meetings and to publish their research results in society journals, transactions, and conference proceedings.

Graduate students also have the opportunity to participate in academic governance at the College, and University level. At the College level, graduate students have representation on the Engineering College Advisory Council and on the Engineering Research and Graduate Studies Committee. At the University level, graduate students are selected and have voting membership on the University Graduate Council, Academic Council, and other such committees as specified by the University Bylaws for Academic governance.

9. PROGRAM COMPONENTS

9.1 The Doctor of Philosophy Degree

The Doctor of Philosophy degree consists of (1) prescribed course work, (2) a qualifying examination, (3) a comprehensive examination, (4) research, (5) a dissertation, (6) research publications, and (7) a final oral examination. While these components are the same for all students, the specific requirements are developed for each student by the advisor and guidance committee in dialog with the student. The rationale and details of each element are presented together in Section 10 below.

It should be emphasized that the Ph.D. is a research degree, and the primary objective is to train students to be competent independent researchers. The research experience is the heart of the Ph.D. program, and the stated requirements should be considered primarily as elements supporting this primary objective. Because each student will have individual research interests and objectives, we attempt to design each student's program to best address their needs. As a result there are no formally designated components or tracks within the Ph.D.

9.2 Concurrent M.S./Ph.D.

Students who do not hold a M.S. degree in Civil Engineering (or related discipline) may pursue a M.S. degree as a part of their doctoral program. These students are expected to complete the requirements of both degrees, although up to 4 credits of doctoral research may be used to satisfy the M.S. project requirement (subject to approval by the department chair).

Students who hold a M.S. degree from an accredited or recognized equivalent institution of higher learning may pursue a M.S. degree from MSU as part of their doctoral program. These students are expected to complete the requirements of both degrees.

10. DEGREE REQUIREMENTS

10.1 Meeting Provisional Admission Requirements

International students who are admitted provisionally with a requirement for additional English language testing must address this before the start of their first semester. The English Language Center will administer the tests and provide requirements to your advisor for any language courses you will need as well as guidance on an appropriate first-semester academic load.

10.2 Overview of Ph.D. Degree Requirements

The Doctor of Philosophy degree consists of prescribed course work, a qualifying examination, a comprehensive examination, research, journal paper submission, a dissertation, and a final oral examination. Each student working toward a Doctor of Philosophy must conduct research upon which a dissertation that makes a significant contribution to knowledge is prepared and published. The research is to be under the direction of and acceptable to the doctoral guidance committee.

Doctoral guidance committee. Each graduate student admitted to the doctoral program must form a guidance committee in consultation with the adviser. The CE Graduate Director must approve the guidance committee. Section 13 of the handbook provides additional information regarding the guidance committee.

Course credit requirements. The doctoral program must a minimum of twenty-four (24) and a maximum of thirty-six (36) dissertation credits (CE 999) and at least 12 credits of formal coursework in addition to any coursework taken to satisfy a MS degree. The courses and ultimate number of coursework credits to be taken are determined by the lead advisor and the guidance committee.

Students holding a MS degree in Civil Engineering, or related discipline, which meets similar standards to those of Michigan State University, will normally complete a minimum of 12 credits of formal doctoral coursework. Students who are lacking in traditional MS-level training in civil engineering will generally be required to complete the MS core courses which they have not previously completed, in addition to doctoral coursework addressing the criteria outlined above.

Transfer credits. The guidance committee may, in addressing the department doctoral course credit requirements, consider courses taken in graduate programs at other institutions of similar quality if they are appropriate to the student's program and provided they were completed within the time limits approved for earning the degree. It is not necessary to formally transfer such credits and they are not listed on the Program Plan. Instead, such courses are listed on the department's Supplement to the Report of the Guidance Committee.

Doctoral program filing. The student's plan of degree requirements, including the course work, shall be submitted as a *Guidance Committee Report* for approval by the committee, the Graduate Director and the Associate Dean of Graduate Studies by no later than the end of the student's fourth semester of enrollment in the doctoral program, and subsequent to passing the qualifying examination. If the student did not pass the qualifying examination on the first attempt, an extra semester is allotted for completion of the qualifying examination and submission of the Program of Study.

The *Guidance Committee Report* is completed using GradPlan (<https://gradplan.msu.edu>) which is a web-interactive system for Ph.D. students to create and store their Ph.D. degree plans and subsequent graduate program activities. If the on-line system does not allow something you have agreed to with your advisor, please see the Graduate Secretary about to handle this. Note that subject material and the instructor must be specified for any independent study or selected topics courses that are included. When you have completed and submitted your *Guidance Committee Report*, it will be reviewed by the Graduate Secretary, and if acceptable, it will be routed for approval. If it does not meet Program requirements, you will be contacted.

On approval, the *Guidance Committee Report* constitutes a formal agreement between MSU and the student covering the specific requirements for the student to earn the Ph.D. degree. If the student successfully completes the plan, including the associated requirements regarding acceptable grades, thesis/project defense, etc., it is the basis upon which graduation is reviewed and approved. In other words, in order to graduate, you must either follow your approved Program Plan, or modify it as discussed below, such that it is identical to the courses and project/thesis you complete.

Modifications to the *Guidance Committee Report*. It is not uncommon for students to modify their Program Plans as a result of changes in their interests or changes in course offerings. To do this, the student should discuss the proposed change with their advisor and the guidance committee and submit a modified *Guidance Committee Report*. Changes in program plans will be subject to the approval of the adviser, the guidance committee, the Program Director, and the Associate Dean for Research and Graduate Studies, depending on the nature of the change. The new *Guidance Committee Report*, as revised, must meet either the standards in effect when the student first enrolled in the Ph.D. program or those currently in effect at the time of filing.

Students should note that none of the following types of modifications will be allowed:

1. Adding or deleting a course for which a grade has already been assigned under any of the three grading systems (numerical, Pass–No Grade, or Credit–No Credit).
2. Adding or deleting a course for which grading was postponed by the use of the DF–Deferred marker.
3. Adding or deleting a course which the student dropped after the middle of the semester and for which “W” or “N” or “0.0” was designated.
4. Adding or deleting a course during the final semester of enrollment in the master's degree program.

Full time status. Full time status for doctoral students is defined as a minimum of 1 credit for those students who:

- a. Have successfully completed all comprehensive examinations and are actively engaged in dissertation research: or

- b. Are doing department-approved off-campus fieldwork related to preparation of their dissertation.

All students defending their thesis or dissertations in the Summer need to be registered for at least one credit during that Summer, regardless of their being enrolled in the preceding Spring semester. A waiver for this requirement may be requested, with proper justification, to the graduate program coordinator. The request should be done before the end of the preceding Spring semester.

Residency requirement for the Ph.D. degree. One year of residence, made up of two consecutive semesters and involving the completion of at least six credits of graduate work each semester, on the campus after first enrollment is required.

DF-Deferred grades: The required work must be completed and a grade reported within 6 months with the option of a single six-month extension. If the required work is not completed within the time limit, the DF will become U-Unfinished and will be changed to DF/U under the numerical and Pass-No Grade (P-N) grading systems, and to DF/NC under the Credit-No Credit (CR-NC) system. This rule does not apply to graduate thesis or dissertation work.

Receipt of externally funded fellowships by students who have written their own grant applications and worth at least \$20,000 (direct costs) now makes the students eligible for in-state tuition rate. The in-state tuition rate applies only to the semesters during which the student is supported by the fellowship. This policy applies only to grants funded through a competitive process by a US institution/agency/foundation. Funds obtained through non-competitive processes (e.g., need-based fellowships) or from international sources do not qualify the students for in-state tuition rates. For more information contact Melissa Del Rio (mdelrio@msu.edu) in 110 Linton Hall.

10.3 Prescribed Course Work

Required First-year Course. All Civil Engineering doctoral students are required to take the seminar course CE 900 – Research Strategies and Methods for Civil Engineering during their first year of study. This course is only offered during the Spring semester.

Program Plan. A set of courses for a student's doctoral plan are proposed by the student and the advisor and presented to the student's guidance committee for discussion and approval, normally at the first meeting of the committee (see Section 13 on forming the guidance committee). A student will normally have completed one or more semesters of coursework prior to this meeting, so it is important for the student and advisor to draft a plan early that is well thought out and likely to gain committee approval without major modification. The student should also provide the committee with a complete listing of

college or university level courses taken previously, and a brief description of their research focus. The committee reviews the Program Plan using the following criteria.

- 1) When completed, will the entirety of the student's coursework include the essential elements necessary for a graduate degree credential in one of the civil engineering specialty areas (e.g., structural engineering, pavement engineering, water resources engineering, transportation engineering etc.)?
- 2) When completed, will the entirety of the student's coursework provide a comprehensive knowledge of a major research field and related subjects?
- 2) When completed, will the entirety of the student's coursework include most of the knowledge and skills available in courses at MSU to support the proposed research?
- 3) Are there any other additional courses the student should take because of their individual circumstances including previous preparation or career considerations?

Students holding a MS degree in Civil Engineering, or related discipline, which meets similar standards to those of Michigan State University, will normally complete a minimum of 12 credits of formal doctoral coursework. Students who are lacking in traditional MS-level training in civil engineering will generally be required to complete the MS core courses, which they have not previously completed, in addition to doctoral coursework addressing the criteria outlined above.

The courses prescribed by the student's guidance committee should be listed on the student's *Guidance Committee Report*. Students may not include courses on their Doctoral Program Plan that have been counted toward the M.S. degree.

10.4 The Ph.D. Qualifying Examination

The intent of the Ph.D. qualifying examination (the exam) is to assess a student's potential for successfully completing doctoral-level studies and research in the Department.

The Departmental Qualifying Examination is the first of three examinations that the Ph.D. student is required to pass. The Qualifying Examination is usually taken at the beginning of the second semester in the program. Current MS students transferring to the Ph.D. should take the qualifying examination prior to starting the Ph.D. or during the first semester in their Ph.D. program.

The exam is administered by an Examining Committee composed of least three faculty members from the student's research area. Since the student's advisor must approve the examination areas, students are advised to seek such approval well before their expected examination date, preferably while planning their graduate studies. Students must

complete an application to take the qualifying exam at least one month prior to taking the exam.

Although students are not required to take particular courses in preparation for the qualifying examination, the scope of the scholastic examination is associated with a set of MSU graduate courses. It is the candidate's responsibility to review syllabi, and/or discuss course content with faculty experienced in teaching courses in the areas selected for examination, in order to develop an understanding of the level of knowledge expected in the examination. See Chapter 11 for specific requirements concerning the qualifying exam in each area.

Passing the qualifying examination shall require:

- a. Satisfactory performance on the written examination
- b. Satisfactory performance on the oral examination

Evaluation of the qualifying examination. The Committee will consider all of the information available, including an interview with the student to clarify unresolved issues, and render one of the following decisions:

- a. The student passes the exam and, except for identified deficiencies for which the Committee will prescribe a remedy, the student is encouraged to finish all remaining requirements at the earliest possible time.
- b. The student fails the exam but is given permission to repeat a portion or all of it after certain conditions are met.
- c. The student fails the exam and is asked to withdraw from the program.

Repeats of qualifying examination. At the discretion of the Examining Committee, a student may be permitted to repeat the examination once.

Communicating the outcome of the exam. Results of the exam will be communicated to students by their lead advisor. When multiple students take the exam during the same period, results will be communicated at the end of the examination period.

Appeals of the evaluation. A student may appeal the Examining Committee's decision. Such an appeal must be made in writing to the Graduate Director. The written appeal must contain explicit reasons for requesting that the review be conducted. The appeal must be filed within two weeks from the date the student is notified of the Examining Committee's decision.

Time limit. If a student leaves the graduate program after passing the qualifying examination and then wishes to reenter the doctoral program at a later date, a pass is considered valid for up to 5 years from the time the examination is taken.

10.5 Doctoral Comprehensive Examination

The objectives of the Ph.D. comprehensive examinations are to: (a) identify the student's proposed areas of doctoral research; (b) assess the adequacy of the student's general preparation for the proposed research area and related fields and possibly recommend areas for additional study; and (c) review and evaluate the content and style of the thesis proposal and the student's ability to present the ideas orally.

The general guidelines for the Ph.D. comprehensive exam are listed below.

Schedule of the comprehensive examination. When the prescribed course work is substantially complete as defined by the Guidance Committee, the doctoral student is eligible to take the comprehensive examination. **A student must be registered during the semester that the comprehensive exam is administered.** A waiver for this requirement may be requested, with proper justification, to the graduate program coordinator. The request should be done before the end of the preceding Spring semester. **The comprehensive examination must be taken at least six months before the Ph.D. dissertation is defended. The comprehensive examination must be passed within five years from the time the first class that is used to fulfill the degree requirements for the doctoral program of study was taken.**

The written portion (research proposal) of the comprehensive examination must be submitted to the faculty advisor by the date agreed upon by the faculty advisor and the student. Failure to submit the proposal in a timely manner will result in the student failing the comprehensive examination.

Once the faculty advisor approves the proposal, the student must submit copies of the proposal to the examiners for evaluation at least two weeks prior to the scheduled exam.

On the scheduled exam date the student will present his/her proposal orally to the examining committee. A decision of whether the student passes or fails the comprehensive exam will be made at the end of the questioning period that follows the presentation.

Passing the comprehensive examination shall require:

- a. Satisfactory performance on the oral thesis proposal presentation.
- b. A satisfactory written thesis proposal.

Evaluation criteria for the comprehensive examination. The Committee will consider all of the information available, including an interview with the student to clarify unresolved issues, and render one of the following decisions:

- a. The student passes the exam and is encouraged to finish all remaining requirements at the earliest possible time.
- b. The student passes the exam and, except for identified deficiencies for which the Committee will prescribe a remedy. The student is encouraged to finish all remaining requirements at the earliest possible time.
- c. The student fails the exam but is given permission to repeat a portion or the entire exam after certain conditions are met.
- d. The student fails the exam and is asked to withdraw from the program.

Passing the comprehensive examination requires approval of at least two thirds of the student's guidance committee. A written evaluation must be provided.

Appeals of the comprehensive examination evaluation: A student may appeal the Guidance Committee's decision. Such an appeal must be made in writing and directed to the Department Chairperson. The written appeal must contain explicit reasons for requesting that the review be conducted. The appeal must be filed within two weeks from the date the student is notified of the Guidance Committee's decision.

Once the comprehensive examination is completed, the faculty advisor should submit the **Record of the Comprehensive Examinations for Doctoral Degree** to the examiners for their signature and further processing.

Should the degree requirements not be completed within the eight-year time limitation, the comprehensive examination must be retaken.

After having successfully completed the comprehensive written and oral exams, the minimum enrollment for doctoral students is one credit and the student is considered a Ph.D. Candidate.

For students who were enrolled in the Spring semester and are taking their comprehensive exams during the immediate Summer semester, the department can request a waiver of the requirement that the student be enrolled for at least one credit the semester of the comprehensive exam. These requests are to be directed to the Graduate School and must be endorsed by the student's department and college.

10.6 Doctoral research

Each student working toward a Doctor of Philosophy must conduct research upon which a dissertation that makes a significant contribution to knowledge is prepared and published. The research is to be under the direction of and acceptable to the doctoral guidance committee. The research is to be under the direction of and acceptable to the doctoral guidance committee. The doctoral program must include a minimum of twenty-four (24) and a maximum of thirty-six (36) dissertation research credits (CE 999).

10.7 Doctoral dissertation

An approved thesis/dissertation that is accepted by the graduate school becomes a single-author publication and contributes to the body of knowledge of civil and environmental engineering. Again, for more information, please see section 6 of this handbook.

10.8 Research publications

All Ph.D. students are expected to publish multiple peer-reviewed papers in high-quality journals. Students must have submitted at least one paper to a peer-review scholarly journal as a condition for graduation. A paper that has not been published or accepted for publication must be reviewed and approved by the student's dissertation committee.

10.9 Final examination – Dissertation defense

The graduate student will present the results of the dissertation research in a seminar open to the community. The guidance committee evaluates the seminar and defense of the thesis. For more information, see section 6 of this handbook. The student should arrange the examination time and place with the graduate secretary at least two weeks in advance, and provide her with the dissertation title and abstract. The Graduate Secretary will publicize the defense at least one week in advance of the examination date.

11. THE GRADUATE ADVISOR

Graduate education, research, and creative activities take place within a community of scholars where constructive relationships between graduate students and their advisors and mentors are essential for the promotion of excellence in graduate education and for adherence to the highest standards of scholarship, ethics, and professional integrity. Initiation and successful completion of independent research requires early and continued advice and oversight by a faculty advisor.

For students in the civil engineering doctoral graduate program, the faculty advisor is the guidance committee chairperson as well as the academic advisor. That faculty member is the 'major professor' for the student. Faculty advisors must be members of the civil & environmental engineering faculty, appointed at the level of Assistant Professor or higher.

11.1 Advisor Assignment and Selection Process

At the time of admission into the program, all students are assigned an advisor. Doctoral Students who are admitted to the civil engineering graduate program with a research

assistantship that is provided by a particular faculty member will be assigned to that faculty member as their academic advisor and thesis/dissertation advisor. Other students may be admitted with a graduate assistantship or fellowship that is from general funds or third-party funds and not explicitly tied to a particular faculty member. In those cases, the selection of an advisor is based on mutual research interests, but the student is free to change advisors, if the student and advisor mutually agree that the change would be beneficial. A common reason to switch advisors is that the student is more interested in the research done by another faculty member than that of the advisor to which he/she was assigned.

The Department's policy is to establish that there is interest from at least one faculty member in advising the applicant prior to sending a letter of admission. When more than one faculty member has expressed interest in serving as academic advisor to a student who was admitted with an assistantship or fellowship from general funds or third parties, the student should select an advisor within the time frame described in the previous section. A listing of faculty is provided in Appendix I. Current research projects are described on the Departmental webpage <https://www.egr.msu.edu/cee/>

11.2 Time Line for Selection of a Permanent Faculty Advisor

All students in the civil engineering graduate program must have a faculty advisor. Doctoral students must select a permanent advisor prior to the completion of two semesters (See Section 8.2).

11.3 Roles and Responsibilities of the Advisor

The role of the advisor includes the following:

- Ensuring that graduate students receive information about requirements and policies of the graduate program.
- Advising graduate students on developing a program plan, including appropriate course work, research or creative activity, and on available resources.
- Advising graduate students on the selection of a thesis or dissertation topic with realistic prospects for successful completion within an appropriate time frame and on the formation of a guidance committee.
- Providing training and oversight in creative activities, research rigor, theoretical and technical aspects of the thesis or dissertation research, and in professional integrity.
- Encouraging graduate students to stay abreast of the literature and cutting-edge ideas in the field.
- Helping graduate students to develop professional skills in writing reports, papers, and grant proposals, making professional presentations, establishing professional networks, interviewing, and evaluating manuscripts and papers.

- Providing regular feedback on the progress of graduate students toward degree completion, including feedback on research or creative activities, course work, and teaching, and constructive criticism if the progress does not meet expectations.
- Helping graduate students develop into successful professionals and colleagues, including encouraging students to participate and disseminate results of research or creative activities in the appropriate scholarly or public forums.
- Facilitating career development, including advising graduate students on appropriate job and career options, as well as on the preparation of application materials for appropriate fellowship, scholarship, and other relevant opportunities.
- Writing letters of reference for appropriate fellowship, scholarship, award, and job opportunities.
- Providing for supervision and advising of graduate students when the faculty advisor is on leave or extended absence.

11.4 Roles and responsibilities of the student

The student also has responsibilities in the advisor/student relationship. These include the following:

- Learning and adhering to University and academic unit rules, procedures, and policies applicable to graduate study and research or creative activities, including those outlined in the publications *Academic Programs*, *Graduate Student Rights and Responsibilities*, and *Academic Freedom for Students at MSU*.
- Meeting University and academic unit requirements for degree completion.
- Forming a guidance committee that meets University requirements as well as requirements that are outlined in the Graduate Handbook of the academic unit.
- Following disciplinary and scholarly codes of ethics in course work, thesis or dissertation research, and in creative activities.
- Practicing uncompromising honesty and integrity according to University and federal guidelines in collecting and maintaining data
- Seeking regulatory approval for research in the early stages of thesis or dissertation work where applicable.
- Keeping the faculty advisor and guidance committee apprised on a regular basis of the progress toward completion of the thesis or dissertation

11.5 Roles and responsibility of the department

Once a permanent thesis/dissertation advisor is selected, it is unusual to change advisors. However, if a situation arises where a change seems imperative, the student should consult with the Department's graduate coordinator who will facilitate changes of faculty advisor. The procedures for changing M.S. and Ph.D. advisors are described in Sections 1.4.1 and 1.4.2, respectively.

Should the student's advisor leave MSU, it is the department chair's responsibility to facilitate arrangements that allow the student to successfully complete his/her degree program.

12. AREA-SPECIFIC Ph.D. QUALIFYING EXAM STANDARDS AND GUIDELINES

12.1 Pavement Engineering

All students interested in pursuing a Ph.D. degree within the pavement engineering area must take and pass the qualifying examination as described herein. The examining committee is to be composed of four faculty members, three of whom must be faculty members of the CEE Department pavement engineering group.

The guidelines for the two parts of the examination are as follows:

Scholastic Evaluation Component

- The student must satisfy a breadth of knowledge pertaining to two of the areas of (a) materials, (b) analysis and (c) design, by identifying and being examined on four approved graduate courses in these areas with at least one course from each of the selected areas.
- The student's advisor and the qualifying examination coordinator for the pavement engineering group must approve the selected courses; therefore students are advised to seek such approval well before their expected examination date, preferably while planning their graduate studies.
- Although students are not required to take particular courses in preparation for the departmental examination, the scope of the examination is associated with MSU graduate courses or their equivalents.
- Example courses for each focus area are:
 - Materials
 - CE 837 – Advanced Concrete Materials
 - CE 838 – Bituminous Materials
 - Analysis
 - CE 802 – Soil Dynamics
 - CE 804 – Advanced Mechanics for Civil Infrastructure
 - CE 831 – Advanced Concrete Pavement Analysis and Design
 - CE 832 – Advanced Asphalt Pavement Analysis and Design
 - ME 872 – Finite Element Method
 - CE 838 – Bituminous Materials
 - Design
 - CE 818 – Advanced Geotechnical Design
 - CE 831 – Advanced Concrete Pavement Analysis and Design

- CE 832 – Advanced Asphalt Pavement Analysis and Design
- A candidate who plans to be examined without taking the selected focus area graduate courses can develop a sense of the level of knowledge expected to be demonstrated during the examination by studying the appropriate syllabi and/or discussing the course content with faculty experienced in teaching the courses involved.

Research Potential Component

- The student must demonstrate independent research ability through the preparation of a short research paper on two areas.
- Two research topic questions will be prepared by two faculty members in the committee (different than the student's graduate advisor) and provided to the student 3 weeks prior to the oral examination date (scholastic evaluation component)
- The student should provide a copy of the research papers to each of the committee members at least one week before the examination date (scholastic evaluation component).
- All members in the committee will evaluate the research paper.
- The student will be examined on this part by review of the submitted paper and by oral examination during the scholastic evaluation component exam at the discretion of the committee.

At the discretion of the committee, the student may be allowed to retake the qualifying examination once at a date specified by the committee.

12.2 Structural Engineering, Mechanics and Materials

All students interested in pursuing a Ph.D. degree within the Structural Engineering, Mechanics and Materials (SEMM) area must take and pass the qualifying examination as described herein. The Examining Committee will be composed of four faculty members, three of whom must be faculty members in the CEE Department SEMM group.

The guidelines for the two parts of the examination are described below.

Scholastic Evaluation Component

- The student must satisfy a breadth of knowledge pertaining to two focus areas within the student's field of research by identifying and being examined on four approved graduate courses in these areas, with at least one course from each of the selected areas.
- The student's advisor and the qualifying examination coordinator for the SEMM area must approve the selected courses. Therefore students are advised to seek such

approval *well before* their expected examination date, preferably while planning their graduate studies.

- Although students are not required to take particular courses in preparation for the examination, the scope of the examination is associated with MSU graduate courses or their equivalents. *The student is responsible* for becoming acquainted with the courses they have chosen for examination by consulting with MSU faculty on the content and/or syllabi for those courses.
- *Example* courses for SEMM traditional focus areas are:
 - Materials
 - CE 809 – Advanced Composite Materials and Structures
 - CE 837 – Advanced Concrete Materials
 - ME 426 – Introduction to Composite Materials
 - ME 826 – Laminated Composite Materials
 - Mechanics
 - ME 820 – Continuum Mechanics
 - ME 821 – Linear Elasticity
 - ME 823 – Fracture Mechanics and Fatigue
 - ME 824 – Plasticity
 - ME 825 – Experimental Mechanics
 - ME 828 – Advanced Strength of Materials
 - Analysis
 - CE 400 – Structural Mechanics
 - CE 802 – Structural Dynamics
 - CE 804 – Advanced Mechanics for Civil Infrastructure
 - ME 872 – Finite Element Method
 - ME 828 – Advanced Strength of Materials
 - Design
 - CE 805 – Advanced Steel Design
 - CE 808 – Structural Fire Engineering
- A student may also define, take, and be examined on a course sequence in an *emerging* area, such as advanced materials, sensing technology, nanotechnology, etc. Course sequences in emerging areas need to be defined by the student in consultation with the advisor.
- A candidate who plans to be examined without taking the selected graduate courses at MSU should review syllabi, and/or discuss course content with faculty experienced

in teaching the courses, in order to develop an understanding of the level of knowledge expected in the examination.

Research Potential Component

- The student must demonstrate the ability for critical thinking by reviewing a research paper and answering questions posed by the Examination Committee.
- The topic research paper and associated questions must be prepared by one or two members of the Examination Committee, but different than the student's graduate advisor.
- The student should provide a copy of the written response to each member of the Examination Committee members.
- All members in the Examination Committee will evaluate the written response.
- The student may be examined orally on this part during the scholastic evaluation component exam at the discretion of the committee.

At the discretion of the Examination Committee, the student may be allowed to retake the qualifying examination once at a date specified by the committee.

12.3 Transportation Engineering

All students interested in pursuing a Ph.D. degree within the transportation engineering area must take and pass the qualifying examination as described herein. The examining committee is to be composed of at least three faculty members from within the CEE Department transportation engineering group.

The guidelines for the two parts of the examination are as follows:

Scholastic Evaluation Component

- The student must satisfy a breadth of knowledge pertaining to two focus areas within the student's field of research by identifying and being examined on four approved graduate courses in these areas, with at least one course from each of the selected areas.
- The student's advisor and the qualifying examination coordinator for the transportation engineering area must approve the selected courses; therefore students are advised to seek such approval well before their expected examination date, preferably while planning their graduate studies.
- Although students are not required to take particular courses in preparation for the departmental examination, the scope of the examination is associated with MSU graduate courses or their equivalents.
- Example courses for each focus area are:
 - Analysis/Operations
 - CE 444 – Principles of Transportation Engineering
 - CE 841 – Traffic Flow Theory

- CE 844 – Highway and Traffic Safety
- CE 847 – Traffic Analysis and Control
- CE 849 – Transportation Research Methods
- CE 850 – Intelligent Transportation Systems
- Planning/Design
 - CE 448 – Transportation Planning
 - CE 449 – Highway Design
 - CE 844 – Highway and Traffic Safety
 - CE 849 – Transportation Research Methods
 - CE 850 – Intelligent Transportation Systems
 - CE 851 – Transportation and the Environment
- A student may also define, take, and be examined on a course sequence in an emerging area or from the suggested transportation MS elective courses listed in Section 7. Such course sequences need to be defined by the student in consultation with the advisor.
- A candidate who plans to be examined without taking the selected graduate courses at MSU should review syllabi, and/or discuss course content with faculty experienced in teaching the courses, in order to develop an understanding of the level of knowledge expected in the examination

Research Potential Component

- The student must demonstrate independent research ability through the following:
 - Review a research paper and prepare written answers to questions prepared by members of the Examination Committee, exclusive of the student's graduate advisor.
 - Prepare a 6-8 page short research paper or proposal on the subject of his/her choosing.
- The student should submit a printed copy of the above to each of the Examination Committee members in advance of the oral component of the qualifying examination.
- All members of the Examination Committee will evaluate the submissions.
- The student may be examined orally on this part during the scholastic evaluation component exam at the discretion of the Examination Committee.

At the discretion of the committee, the student may be allowed to retake the qualifying examination once at a date specified by the committee.

12.4 Water Resources

All students admitted to the Ph.D. program in Environmental Hydrology must take and pass the qualifying examination as described herein. The objective of qualifying exam is to assess the student's scholastic aptitude and his/her ability to conduct independent research.

The examining committee must be set up and the exam must be administered in the first year of a student's Ph.D. program. The committee must consist of at least three tenure-stream faculty members, all of whom will normally be faculty in the Department of Civil and Environmental Engineering. Examination topics are drawn from areas in environmental hydrology (e.g., groundwater and surface water hydrology, applied hydraulics, computational methods, conceptual modeling etc.).

The qualifying exam will be focused on critical thinking skills associated with the student's research interests. The examination will be individually formulated and may include an assessment of the student's ability to critique a research paper or proposal, analyze data, and/or formulate a hypothesis and design an experiment to test that hypothesis. Each examiner, in collaboration with the student's advisor, will write and submit one or more questions to the student's advisor. The student's advisor, serving as examination coordinator, will compile the questions and administer the exam to the student. The student must complete the exam within three weeks after receipt from his/her major advisor. The student will provide a sufficient number of copies of the completed examination to his/her advisor for distribution to the committee. Within two weeks after completing the exam, the student will meet with his/her examining committee for an oral exam, which will focus on, but not be limited to, the written questions and answers. To pass the exam, the committee must unanimously agree that the student has both the scholastic aptitude and ability to conduct independent research at the doctoral level. The results of the exam will be determined in a meeting without the student present immediately following the oral exam.

At the discretion of the committee, the student may retake the qualifying exam once, but not in the same semester and before completion of the student's third semester in the program.

12.5 Energy/Sustainability

All students interested in pursuing a Ph.D. degree within the energy/sustainability area must take and pass the qualifying examination as described herein. The examining committee is to be composed of at least three faculty members from within the CEE Department.

The qualifying exam will be focused on critical thinking skills associated with the student's research interests. The examination will be individually formulated and may include an assessment of the student's ability to critique a research paper or proposal, analyze data, and/or formulate a hypothesis and design an experiment to test that hypothesis. Each examiner, in collaboration with the student's advisor, will write and submit one or more questions to the student's advisor. The student's advisor, serving as examination coordinator, will compile the questions and administer the exam to the student.

The student must complete the exam within one week after receipt from his/her major advisor. The student will provide electronic copies of the completed examination to his/her advisor for distribution to the committee. Within two weeks after completing the exam, the student will meet with his/her examining committee for an oral exam, which will focus on, but not be limited to, the written questions and answers. To pass the exam, the committee must unanimously agree that the student has both the scholastic aptitude and ability to conduct independent research at the doctoral level. The results of the exam will be determined in a meeting without the student present immediately following the oral exam.

13. FORMATION OF THE GUIDANCE COMMITTEE

Each graduate student admitted to the doctoral program has the responsibility to form a guidance committee with the approval and the assistance of the student's advisor, and the approval of the Department chairperson. The guidance committee should consist of at least four Michigan State University regular faculty members, including the committee chairperson. The committee chairperson is also the student's academic advisor. At least two members of the guidance committee shall be from the Civil & Environmental Engineering Department and a least one member shall be from a different academic Department at Michigan State University. Please see the *MSU Academic Programs* publication for additional information regarding definition of regular faculty.

Persons who are not MSU regular faculty may serve as an additional committee member (e.g., a fifth member) provided that the number of such persons does not exceed the number of regular faculty. An exception may be granted by the dean of the graduate school to allow a non-tenure stream faculty member or an academic specialist to serve on your doctoral guidance or dissertation committee as one of the four required faculty members or as the chairperson of your doctoral guidance or dissertation committee.

An emeritus faculty member may serve as one of the four MSU regular faculty members on your doctoral guidance committee, with the approval of the department chairperson. In addition, an emeritus faculty member may continue to serve as chairperson of your doctoral guidance committee.

The responsibilities of the guidance committee include the following:

- Advising graduate students on course work, research, or creative activities.
- Providing, at least annually, feedback and guidance concerning progress toward the degree.
- Administering the comprehensive exams and the final oral defense in a fair and professional manner.
- Reviewing the thesis or dissertation in a timely, constructive and critical manner.
- Committee chairpersons on leave shall provide for the necessary guidance of their advisees during their absence.

14 DISSERTATION DEFENSE AND FINAL ORAL EXAMINATION

14.1 Nature and Scope of the Dissertation

The final doctoral examination is the culmination of a student's graduate education and training and reflects not only the accomplishments of the graduate student but also on the quality of the graduate program. An approved dissertation that is accepted by the graduate school becomes a single-author publication and contributes to the body of knowledge of the civil engineering discipline.

14.2 Examination regulations and format

The graduate student will present the results of the dissertation in a seminar open to the community. The student should arrange a suitable examination date after consulting with the thesis advisor and members of the examination committee. The student should also arrange for a suitable room in which to hold the seminar by consulting with the office staff of the Civil & Environmental Engineering Department. This should be done in communication with the Department graduate secretary, who will arrange for announcement of the upcoming defense. The student should also ensure that all necessary computer equipment, such as a laptop and data projector, are available.

The following regulations apply:

- The final oral examination must be scheduled for a date not earlier than two weeks after the dissertation and abstract have been submitted to the chairperson of the guidance committee, other guidance committee members, and any appointed examiner.
- The student must be registered during the semester in which the final oral examination is taken.
- The dissertation and the student's performance on the final oral examinations must be approved by a positive vote of at least three-fourths of the voting examiners and with not more than one dissenting vote from among the Michigan State University regular faculty members of the guidance committee.

The following format is typical of the final oral examination. The examining committee members may or may not choose to meet before the exam to discuss the procedure. The candidate presents the results in seminar fashion and responds to questions and comments from those in attendance. After the general audience has had opportunity to raise questions and comments, they are excused from the room and the defense continues with only the examining committee. At the end of the examination, the student is asked to step out of the room, and the examining committee members each indicate in writing a pass or fail grade. The student is then asked to reenter the room to receive the result of the final examination. A summary report of the examination result is submitted to the Dean of Engineering and the Chairperson of the Department.

14.3 Doctor of Philosophy Degree Examining Committee

The doctoral final oral examination committee consists of the student's guidance committee. According to University policy, at the discretion of the Dean of Engineering, the guidance committee may be augmented by one appointed faculty member. Other interested faculty members may attend the examination without vote.

PART III – DEPARTMENT, COLLEGE AND UNIVERSITY POLICIES

15. ACADEMIC PERFORMANCE

Students are expected to maintain satisfactory academic performance throughout the course of study. If a student failed to satisfy the prescribed requirements as measured through grades in each course or cumulative grade point average, notice will be issued as outlined in Appendix V¹ and Appendix VI. Full details on academic performance requirements for MS and PhD students are outlined below.

15.1 Academic Standards for the M.S. Program

Grades. The student must earn a grade of 2.0 or higher in each course in the approved program of study. The student must repeat any course for which the grade earned was below 2.0.

Cumulative Grade-Point Average. The student must maintain a cumulative grade–point average of at least 3.0 in the courses in the approved program of study.

Probationary Status. A student is placed on probationary status if the student's cumulative grade–point average for the courses in the approved program of study is below 3.0. A student in probationary status is not allowed to carry more than 7 credits per semester or to enroll in any course for which the primary focus is independent study. Unfunded international M.S. students who are placed on probationary status will be required to petition the Graduate School, with permission from their advisor, the department, and their College, for approval to enroll in an additional two credits, for a total of nine credits to meet visa requirements set by the Department of Homeland Security.

Retention and Dismissal from the Master's Program.

- Should a student's cumulative grade–point average fall below 3.0, the student may be enrolled in probationary status in the master's degree program for one additional semester. If at the end of the additional semester the student's cumulative grade–point average is 3.0 or higher, the student may continue to enroll in the master's degree program. If at the end of the additional semester the student's cumulative grade–point average is still below 3.0, the student will be dismissed from the program.
- Each student's academic progress and professional potential are evaluated by March 15 of each year. A student who in the judgment of the faculty is making satisfactory academic progress and has professional potential may continue to enroll in the master's degree program, provided the grade point average is within the acceptable range as previously described. A student who in the judgment of the faculty is not

¹ Flowchart do not cover the situations where students may not be making adequate research progress

making satisfactory academic progress or lacks professional potential will be notified in writing by his/her faculty advisor, that he/she will be placed on a six-month probationary period. Unless deficiencies are corrected within this six-month period, the student will be dismissed from the program.

15.2 Academic standards for the Ph.D. Program

Grades. The student must earn a grade of 2.0 or higher in each course in the approved guidance committee report, including collateral courses and courses accepted in transfer or used as part of the minimal number of doctoral credits. The student must repeat any course for which the grade earned was below 2.0.

Cumulative Grade-Point Average. The student must maintain a cumulative grade-point average of at least 3.0 in the courses in the approved guidance committee.

Probationary Status. A student is placed on probationary status if the student's cumulative grade-point average for the courses in the approved program of study is below 3.0.

Retention and Dismissal from the Doctoral Program.

- Should a student's cumulative grade-point average fall below 3.0 after having completed 2 semesters or 9 course credits (excluding research/project credits) whichever is earlier, the student may be enrolled in probationary status in the doctoral degree program for one additional semester. If at the end of the additional semester the student's cumulative grade-point average is 3.0 or higher, the student may continue to enroll in the doctoral degree program. If at the end of the additional semester the student's cumulative grade-point average is still below 3.0, the student will be dismissed from the program.
- Should a student accumulate more than 3 deferred grades in courses other than those courses the primary focus of which is independent study, the student may be enrolled on probationary status in the doctoral program for one additional semester. If at the end of the additional semester the student has no more than 3 deferred grades, the student may continue to enroll in the doctoral degree program. If at the end of the additional semester, the student still has more than 3 deferred grades, the student will be dismissed from the program.
- Each student's academic progress and professional potential are evaluated by March 15 of each year. A student who in the judgment of the faculty is making satisfactory academic progress and has professional potential may continue to enroll in the doctoral degree program, provided the grade point average and number of courses with deferred grades is within the acceptable range as previously described. A student who in the judgment of the faculty is not making satisfactory academic progress or lacks professional potential will be notified in writing by his/her faculty advisor, that he/she will be placed on a six-month probationary period. Unless deficiencies are corrected within this six-month period, the student will be dismissed from the

program.

Note that the grading procedure for the qualifying examinations and the comprehensive examinations, and the policy for repeats of this examination are described in section 2 of this handbook.

15.3 Graduate Student Evaluation

Annual graduate student evaluations are conducted to provide feedback to the students and also used by the department to assess the student's progress. The evaluation is done by the faculty advisor and reviewed by the Graduate Director. Part of the evaluation includes a self-assessment from the student. The evaluation can be a valuable mechanism for the student to get feedback on his/her progress from the advisor and can also serve as an opportunity for the student to discuss career goals and the steps being taken to reach them. It is therefore important that the student takes this opportunity to provide an honest and evaluative assessment and detailed comments of their progress and status and have a discussion of their self-evaluation with their advisor.

The following points are elements that will be considered in the evaluation by the advisor:

- **Progress:** An assessment of the student's progress in his or her courses, and progress on research, if appropriate. The advisor will comment on strengths and areas needing improvement. Comments on the student's progress towards key examinations, graduation and on the funding strategy for the next academic year are also expected.
- **Professional Potential:** The advisor is expected to comment on the professional development plan (e.g., professional practice, academia, research laboratory, etc.) developed with the student and their progress in this plan. An assessment of the student's potential to work in their profession of choice will be made. Comments on strengths and areas needing improvement for professional competence are also expected.

15.4 Academic Grievance Hearing Procedures

Students are encouraged to address problems relating their academic performance by first speaking informally with their advisor. This may be followed by presenting the issue to the CE Graduate Program Director, the Department Chairperson, and the Associate Dean for Graduate Studies, generally in this order. If the problem cannot be resolved informally, students' rights and responsibilities, including grievance procedures are detailed in the Academic Freedom for Students at Michigan State University (AFR). Procedures more specifically designed for graduate students may be found in the publication Graduate Student Rights and Responsibilities (GSRR). In accordance with the AFR and the GSRR the Hearing Board procedures for adjudicating academic grievances

and complaints, can be found at <https://ombud.msu.edu/Academic%20Grievance-procedures/index.html>.

15.5 Student Records

The Department maintains an academic record for student's that is kept on file until 5 years after graduation. Graduate students have the right to inspect any of their own educational records, barring confidential letters of recommendation, including their official transcript. Students also shall have the right to inspect reports and evaluations of his or her academic performance.

Students can challenge the accuracy of their student file. To do so, they must write a memo stating their perspective, which will be inserted into their file.

A typical inventory of the Department record is as follows.

- College of Engineering Master's Plans and Doctoral Plans.
- Guidance Committee reports.
- Results of qualifying examinations, comprehensive examinations, and final oral examinations.
- Grade reports from the Office of the Registrar.
- Annual evaluation forms.
- Other forms filed by the student or on behalf of the student.
- Items from the student's application for admission, including transcripts, test scores, and reference letters.

The Department maintains a separate personnel file for teaching assistants, as prescribed by the GEU/MSU contract (<https://hr.msu.edu/contracts/documents/GEU2015-2019.pdf>).

15.6 Student Awards

There are a number of awards given to graduate students at MSU, including two departmental awards – the Outstanding CE and Outstanding ENE Graduate Student Awards. Students majoring in Civil Engineering degree programs (M.S. and Ph.D.) are eligible for the Outstanding CE Award. Students enrolled in Environmental Engineering degree programs (M.S. and Ph.D.) are eligible for the Outstanding ENE Award. A student can receive this award only once in his/her career at MSU.

The criteria for this award are 1) manuscripts published or accepted in journals, 2) manuscripts published in proceedings, 3) manuscripts submitted to journals, 4) GPA (in order of importance). If all else is equal, the Graduate Studies Committee will evaluate the

broader impact of the student on the department. This includes participation in student groups and assisting other students.

Nominations for these awards are made by a faculty member and submitted in mid-January to the Department Chair. The nomination packet consists of a letter of endorsement from the student's faculty advisor and the student's curriculum vitae.

16. INTEGRITY AND SAFETY IN RESEARCH AND CREATIVE ACTIVITIES

16.1 The MSU perspective

Each graduate student shall have the document *Guidelines for Integrity in Research and Creative Ideas* <https://grad.msu.edu/sites/default/files/content/researchintegrity/guidelines.pdf>. The conduct of research and creative activities by faculty, staff, and students is central to the mission of Michigan State University and is an institutional priority. Faculty, staff, and students work in a rich and competitive environment for the common purpose of learning, creating new knowledge, and disseminating information and ideas for the benefit of their peers and the general public. The stature and reputation of MSU as a research university are based on the commitment of its faculty, staff, and students to excellence in scholarly and creative activities and to the highest standards of professional integrity.

As a partner in scholarly endeavors, MSU is committed to creating an environment that promotes ethical conduct and integrity in research and creative activities. Innovative ideas and advances in research and creative activities have the potential to generate professional and public recognition and, in some instances, commercial interest and financial gain. In rare cases, such benefits may become motivating factors to violate professional ethics. Pressures to publish, to obtain research grants, or to complete academic requirements may also lead to an erosion of professional integrity.

Breaches in professional ethics range from questionable research practices to misconduct. The primary responsibility for adhering to professional standards lies with the individual scholar. It is, however, also the responsibility of advisors and of the disciplinary community at large. Passive acceptance of improper practices lowers inhibitions to violate professional ethics.

Integrity in research and creative activities is based not only on sound disciplinary practice but also on a commitment to basic personal values such as fairness, equity, honesty, and respect. These guidelines are intended to promote high professional standards by everyone — faculty, staff, and students alike.

16.2 Key Principles

Integrity in research and creative activities embodies a range of practices that includes:

- Honesty in proposing, performing, and reporting research
- Recognition of prior work
- Confidentiality in peer review
- Disclosure of potential conflicts of interest
- Compliance with institutional and sponsor requirements
- Protection of human subjects and humane care of animals in the conduct of research.
- Collegiality in scholarly interactions and sharing
- Adherence to fair and open relationships between senior scholars and their coworkers

Honesty in proposing, performing, and reporting research. The foundation underlying all research is uncompromising honesty in presenting one's own ideas in research proposals, in performing one's research, and in reporting one's data. Detailed and accurate records of primary data must be kept as unalterable documentation of one's research and must be available for scrutiny and critique. It is expected that researchers will always be truthful and explicit in disclosing what was done, how it was done, and what results were obtained. To this end, research aims, methods, and outcomes must be described in sufficient detail such that others can judge the quality of what is reported and can reproduce the data. Results from valid observations and tests that run counter to expectations must be reported along with supportive data.

Recognition of prior work. Research proposals, original research, and creative endeavors often build on one's own work and also on the work of others. Both published and unpublished work must always be properly credited. Reporting the work of others as if it were one's own is plagiarism. Graduate advisors and members of guidance committees have a unique role in guiding the independent research and creative activities of students. Information learned through private discussions or committee meetings should be respected as proprietary and accorded the same protection granted to information obtained in any peer review process.

Confidentiality in peer review. Critical and impartial review by respected disciplinary peers is the foundation for important decisions in the evaluation of internal and external funding requests, allocation of resources, publication of research results, granting of awards, and in other scholarly decisions. The peer-review process involves the sharing of information for scholarly assessment on behalf of the larger disciplinary community. The integrity of this process depends on confidentiality until the information is released to the public. Therefore, the contents of research proposals, of manuscripts submitted for publication, and of other scholarly documents under review should be considered privileged information not to be shared with others, including students and staff, without explicit permission by the authority requesting the review. Ideas and results learned

through the peer-review process should not be made use of prior to their presentation in a public forum or their release through publication.

Disclosure of potential conflicts of interest. There is real or perceived conflict of interest when a researcher has material or personal interest that could compromise the integrity of the scholarship. It is, therefore, imperative that potential conflicts of interest be considered and acted upon appropriately by the researcher. Some federal sponsors require the University to implement formal conflict of interest policies. It is the responsibility of all researchers to be aware of and comply with such requirements.

Compliance with institutional and sponsor requirements. Investigators are granted broad freedoms in making decisions concerning their research. These decisions are, however, still guided, and in some cases limited, by the laws, regulations, and procedures that have been established by the University and sponsors of research to protect the integrity of the research process and the uses of the information developed for the common good. Although the legal agreement underlying the funding of a sponsored project is a matter between the sponsor and the University, the primary responsibility for management of a sponsored project rests with the principal investigator and his or her academic unit.

Protection of human subjects and humane care of animals in the conduct of research. Research techniques must not violate established professional ethics or federal and state requirements pertaining to the health, safety, privacy, and protection of human beings, or to the welfare of animal subjects. Whereas it is the responsibility of faculty to assist students and staff in complying with such requirements, it is the responsibility of all researchers to be aware of and to comply with such requirements.

Collegiality in scholarly interactions and sharing of resources. Collegiality in scholarly interactions, including open communications and sharing of resources, facilitates progress in research and creative activities for the good of the community. At the same time, it has to be understood that scholars who first report important findings are both recognized for their discovery and afforded intellectual property rights that permit discretion in the use and sharing of their discoveries and inventions. Balancing openness and protecting the intellectual property rights of individuals and the institution will always be a challenge for the community. Once the results of research or creative activities have been published or otherwise communicated to the public, scholars are expected to share materials and information on methodologies with their colleagues according to the tradition of their discipline.

Faculty advisors have a particular responsibility to respect and protect the intellectual property rights of their advisees. A clear understanding must be reached during the course of the project on who will be entitled to continue what part of the overall research program after the advisee leaves for an independent position. Faculty advisors should also strive to protect junior scholars from abuses by others who have gained knowledge of the junior scholar's results during the mentoring process, for example, as members of

guidance committees.

Adherence to fair and open relationships between senior scholars and their coworkers.

The relationship between senior scholars and their coworkers should be based on mutual respect, trust, honesty, fairness in the assignment of effort and credit, open communications, and accountability. The principles that will be used to establish authorship and ordering of authors on presentations of results must be communicated early and clearly to all coworkers. These principles should be determined objectively according to the standards of the discipline, with the understanding that such standards may not be the same as those used to assign credit for contributions to intellectual property. It is the responsibility of the faculty to protect the freedom to publish results of research and creative activities. The University has affirmed the right of its scholars for first publication except for "exigencies of national defense". It is also the responsibility of the faculty to recognize and balance their dual roles as investigators and advisors in interacting with graduate students of their group, especially when a student's efforts do not contribute directly to the completion of his or her degree requirements.

16.3 Required Training in Responsible Conduct of Research (RCR)

All students involved in research must complete a minimum of 5 hours of training in Responsible Conduct of Research (RCR) in their first year of research, and 3 hours every year thereafter. In the first year this must include a one-hour introductory briefing offered by the College of Engineering, and every year it must at least one hour in which the student meets with his/her advisor. The remaining training can be satisfied by completing appropriate on-line training courses, training sessions offered by other units, or participation in CE/ENE 900. The minimum requirement for training hours must be satisfied during the period beginning August 15 for any year the student is involved in research using an on-line tracking tool found at <https://www.egr.msu.edu/secureresearchcourses/>

When the required number of hours has been completed, the form "Responsible conduct of Research Data Courses Report" must be printed from this site, signed by the student's advisor, and submitted to the Graduate Secretary by August 15 for the previous year's requirement. Failure to complete the required training will result in a loss of research privileges.

16.4 Misconduct in Research and Creative Activities

Federal and University policies define misconduct to include *fabrication* (making up data and recording or reporting them), *falsification* (manipulating research materials, equipment or processes, or changing or omitting data such that the research is not accurately represented in the record), and *plagiarism* (appropriation of another person's ideas, processes, results, or words without giving appropriate credit). Serious or continuing non-compliance with government regulations pertaining to research may

constitute misconduct as well. University policy also defines retaliation against whistle blowers as misconduct. Misconduct does not include honest errors or honest differences of opinion in the interpretation or judgment of data.

The University views misconduct to be the most egregious violation of standards of integrity and as grounds for disciplinary action, including the termination of employment of faculty and staff, dismissal of students, and revocation of degrees. It is the responsibility of faculty, staff, and students alike to understand the University's policy on misconduct in research and creative activities, to report perceived acts of misconduct of which they have direct knowledge to the University Intellectual Integrity Officer, and to protect the rights and privacy of individuals making such reports in good faith.

16.5 Research involving human subjects

The University Committee on Research Involving Human Subjects (UCRIHS) is an Institutional Review Board (IRB). Federal regulations and University policy require that all research projects involving human subjects and materials of human origin be reviewed and approved by an IRB before initiation. *Research* is defined as "a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge". The "generalizable knowledge" criteria may include developing publications/papers, theses/dissertations, making public presentations, etc. A *human subject* of research is a) a living individual from whom an investigator obtains data by interaction or intervention or b) identifiable private information.

All research involving human subjects and/or data collected from living human subjects (including preexisting data) is subject to UCRIHS review and all information can be found at <https://education.msu.edu/cepse/mqm/handbook/research-human-subjects.asp> .

16.6 Research involving animals

The use of vertebrate animals in research, teaching, and outreach activities is subject to state and federal laws and guidelines. University policy specifies that: all vertebrate animals under University care (that is, involved in projects under the aegis or sponsorship of the University) will be treated humanely; prior to their inception, all vertebrate animal projects receive approval by the All University Committee on Animal Use and Care (AUCAUC); Michigan State University (MSU) will comply with state and federal regulations regarding vertebrate animal use and care.

Responsibility for assuring compliance with state and federal regulations belongs to the Vice President for Research and Graduate Studies. The Vice President has designated the Assistant Vice President for Research and Graduate Studies to be the "Institutional Official" as defined in federal regulations.

The AUCAUC works closely with the Institutional Official, and has responsibility and authority under federal law for specific actions.

University Laboratory Animal Resources (ULAR), which reports to the Vice President for Research and Graduate Studies, provides a comprehensive program of animal care for all laboratory animal colonies, as well as training for researchers. ULAR also participates in developing institutional policies designed to insure humane treatment of vertebrate animals and to assist investigators in maintaining high quality care of animals used in MSU projects.

An animal use form (AUF) must be submitted to the AUCAUC for review prior to the start of the project, regardless of the source of funding for the project. The AUF can be obtained from the AUCAUC office; the completed form will include descriptions of experimental protocols, plans for animal care, available facilities, and any other matters relevant to the project. Some granting agencies require review and approval of the AUF before a grant application will be processed. An agency-approved grant will not be accepted by the Board of Trustees, nor will an account number be assigned, unless the AUF has been approved by the AUCAUC. For an animal use application form contact: Candy Flynn at 432-4151, email flynnc@msu.edu.

16.7 Office of Radiation Chemical and Biological Safety (ORCBS)

The use of hazardous materials in research, teaching, and outreach activities is subject to state and federal laws and guidelines. The Vice President for Research and Graduate Studies has been assigned responsibility to see that appropriate practices are followed where hazardous materials are involved, to maintain a safe environment for campus personnel, to protect the surrounding community, and to assure that MSU meets its obligations under the law.

Oversight of activities involving hazardous substances is provided by the ORCBS. ORCBS is assisted by faculty committees in the areas of radiation safety, chemical safety, and biological safety. The Radiation Safety Committee has responsibility and authority under federal law for specific actions.

It is University policy that faculty members and principal investigators (PIs) are responsible for the day-to-day safety and well-being of all personnel engaged in activities under their aegis. Administrative officers, and ORCBS, are responsible for making available to faculty information needed to maintain a safe working environment, for providing safety training, for keeping project directors informed about changes in regulations, and for assaying laboratories and work areas for radiation, chemical, or biological hazards.

All individuals who work with hazardous substances must accept shared responsibility for operating in a safe manner once they have been informed (a) about the extent of risk

and (b) about safe procedures that should be followed.

The ORCBS provides live and on-line training classes throughout the year to educate the employees and students of Michigan State University on safe work practices. Completion of these courses by MSU personnel ensures that the university is fulfilling local, state and federal requirements in radiation, chemical, biological, hazardous waste, and environmental safety.

Your training requirements will depend on your specific job duties. Some general guidelines are listed below:

- Required for **all laboratory employees** engaging in the use of hazardous chemicals (and supervisors of the employees): Chemical Hygiene and Laboratory Safety; Hazardous Waste Refresher (required annually after completion of Chemical Hygiene & Laboratory Safety course) and Security Awareness.
- Required for **all employees working with radiation**: Radiation Safety Initial; Radiation Safety Refresher (required annually following completion of the Radiation Safety Initial course).
- Required for **all employees with a reasonable anticipated risk of exposure to blood-borne pathogens/human blood/bodily fluids**: Blood-borne Pathogen Initial; Blood-borne Pathogen Refresher; (required annually following completion of the Blood-borne Pathogen Initial course)

If you would like assistance determining which courses you should complete, please contact the ORCBS at 355-0153.

17. STUDENT CONDUCT AND CONFLICT RESOLUTION

17.1 Student Conduct

The University expects student conduct and behavior to reflect qualities of good citizenship. The out-of-classroom activities of Michigan State University students should reflect favorably upon the institution and should indicate the personal integrity of the individual. *See Spartan Life: Student Handbook and Resource Guide* (<http://splife.studentlife.msu.edu/>) for specific policies, ordinances and regulations that define some of the relevant University expectations.

17.2 Conflict Resolution

Conflicts involving a graduate student may be handled informally or, at the request of a party or parties, formally. Student's rights and responsibilities, including grievance procedures, are detailed in the document: *Academic Freedom for Students at Michigan State University*. Procedures more specifically designed for graduate students are to be found in the publication *Graduate Student Rights and Responsibilities*. Grievance procedures outlined in these documents shall be followed and the CEE Advisory Committee shall be responsible for the interpretation and execution of these procedures in the College.

Setting Expectations and Resolving Conflicts – a program for graduate students and faculty to develop skills in conflict resolution, can be found at the following website:
<http://studentlife.msu.edu/sccr/conflict-resolution-services>.

18. WORK RELATED POLICIES

18.1 Overview

This section provides current and prospective graduate students in civil & environmental engineering with information regarding work related policies, information regarding financial support, and information regarding tuition and fees. Financial support for graduate students takes different forms and might include one or more of the following: a fellowship, a research assistantship, or a teaching assistantship. Specific awards change with time to reflect changes in tuition, fees, and the general cost of living. The Department of Civil & Environmental Engineering has a number of fellowships and assistantships available for qualified graduate students. Applicants for admission into either the M.S. (with thesis/project) or Ph.D. programs in civil & environmental engineering are automatically considered for financial support. Admission to the Ph.D. is linked to the availability of such support.

Sources of financial support include the University itself, the College of Engineering, the Department of Civil & Environmental Engineering, and off-campus organizations in both the public and private sector. Qualifications for receiving specific types of aid vary depending upon the funding source. Some financial aid packages place certain restrictions/responsibilities upon the recipient. For example, a half-time graduate assistantship would require the recipient to perform an average of twenty (20) hours per week of duties in service on the average to the University during the appointment period.

Many financial-support packages require that the student make satisfactory progress toward completing a degree of study. The Department's criteria for satisfactory academic progress includes: course credits completed per semester, the nature of these courses, the grades received, successful completion of required qualifying/comprehensive examinations, and

progress in completing M.S. or Ph.D. dissertation research. In addition to satisfactory progress toward completing the degree, continuation of graduate support would depend upon the following: the recipient has performed the assigned duties satisfactorily; past level of support and total number of semesters of support; the availability of funds to continue the current level of financial assistance; the needs of the Department for the particular services for which the recipient is qualified to perform. When resources for financial aid are limited and the demand of aid exceeds the amount of funds available, continuation of financial aid for an individual will depend upon merit relative to others requesting aid and the needs of the Department to fulfill its overall mission of teaching, research and outreach.

The in-state tuition rate applies only to the semesters during which the student is supported by a fellowship. This policy applies only to grants funded through a competitive process by a US institution/agency/foundation. Funds obtained through non-competitive processes (e.g., need-based fellowships) or from international sources do not qualify the students for in-state tuition rates.

18.2 Teaching Assistantship Selection Criteria

In considering the assignment of CEE Teaching Assistantships, the Graduate Admissions, Recruitment and Financial Aid Committee has adopted a set of criteria as a guideline for selecting applicants for TA positions. These are intended to support the Department's teaching mission and research mission. The ranked criteria for TA appointment decisions are:

1. Those students to whom the Department has a prior commitment to provide support, such as students who have received recruitment offers upon admission or who have received a multi-year support offer.
2. New Ph.D. students with outstanding research potential and current Ph.D. students actively involved in research who do not have a research assistantship, fellowship, or like support. This would be considered an unusual and time limited situation because the normal expectation is that a doctoral student would have a research assistantship or other non-TA support. Appointments would usually be limited to no more than a year unless there were extenuating circumstances.
3. M.S. students doing a thesis who do not have a research assistantship, fellowship, or like support.

Academic performance and qualifications to teach a particular course will also be considered in TA appointment decisions. For students for whom English is not the official language of their home country, a minimum score of 50 on the SPEAK/TSE test is required. Please note that ETS has been rapidly phasing out the Test of Spoken English (TSE). Although MSU still accepts TSE scores as an alternative to the SPEAK test, the score report cannot have been issued more than two years prior to the student's

appointment as a TA. Also note that the spoken section of TOEFL does not substitute for the SPEAK test.

18.3 Research Assistantship Selection Criteria

Research assistants are generally selected from among the graduate student body and from among qualified applicants by individual faculty members. Research assistants are often selected to work on a specific research project or projects for which the faculty member has funding. Often, but not necessarily always, the work is related to the thesis work of the student. Renewal of research assistantships is based on satisfactory performance and availability of funds.

18.4 The Graduate Employees Union (GEU)

Teaching assistants should be aware of their rights and responsibilities under the current version of the contract between MSU and the GEU. You may obtain the agreement, and other information about the GEU, at the web site <http://geuatmsu.org/> .

18.5 University Graduate Assistantship Policies

Graduate Assistants (including research assistants and teaching assistants) are available only to graduate students who are making satisfactory progress toward their degrees, including maintaining at least a 3.00 grade point average. Graduate assistants are appointed on a quarter-time, half-time, or three-quarter time basis. The academic year encompasses two appointment periods – August 16 – December 31 and January 1 – May 15. Summer appointments cover the period from May 16 – August 15. During each appointment period a graduate assistant's duties to the University require an average of:

- 10 hours per week for a quarter-time stipend.
- 20 hours per week for a half-time stipend.
- 30 hours per week for a three-quarter time stipend.

The student is expected to be available during the appointment period. Any absences, including for attendance of professional meetings, must be arranged with the supervising faculty member and the Department.

Graduate assistants must be registered each semester in which they hold assistantships. For quarter-time appointments, the minimum enrollment is 6 credits for master's degree students and 3 credits for doctoral students prior to completion of the comprehensive examination (including credits in 899 and 999) and the maximum enrollment is 16 credits (excluding credits in 899 or 999). For half-time appointments, the minimum enrollment is 6 credits for master's degree students and 3 credits for doctoral students prior to completion of the comprehensive examination (including credits in 899 and 999) and the

maximum enrollment is 12 credits (excluding credits in 899 or 999). For three-quarter time appointments, the minimum enrollment is 6 credits for master's degree students and 3 credits for doctoral students prior to completion of the comprehensive examination. (including credits in 899 and 999) and the maximum enrollment is 12 credits (excluding credits in 899 or 999). The minimum enrollment for doctoral students who have successfully completed all comprehensive examinations is 1 credit for all graduate assistantship levels.

International students should also be aware of minimum credit enrollments to satisfy visa requirements. The MSU Office of International Students and Scholars is an important resource of information in this regard.

18.6 Graduate Assistants Covered by the GEU

For GEU covered assistantships, please see the current MSU/GEU agreement for information regarding stipends, tuition and fee benefits, and health insurance coverage. Teaching Assistants will be provided with the required training that is specific to the assigned course at the start of Fall and Spring semesters, as well as throughout the semester as necessary.

18.7 Graduate Assistants not covered by the GEU

Please consult The Graduate School home page for the latest information on stipends, tuition and fee benefits, health insurance and other relevant information (<http://www.grad.msu.edu>).

18.8 Teaching Assistant Evaluation-

Teaching assistants are evaluated twice each semester the student serves as a TA by their faculty supervisor. The evaluations are considered for future re-appointment and TA award selections.

18.9 Graduate Student Evaluation

Annual graduate student evaluations are conducted to provide feedback to the students and also used by the department to assess the student's progress. The evaluation is done by the faculty advisor and reviewed by the graduate program director. Part of the evaluation includes a self-assessment from the student. The evaluation can be a valuable mechanism for the student to get feedback on his/her progress from the advisor and can also serve as an opportunity for the student to discuss career goals and the steps being taken to reach them. It is therefore important that the student takes this opportunity to

provide an honest and evaluative assessment and detailed comments of their progress and status and have a discussion of their self-evaluation with their advisor.

The following points are elements that will be considered in the evaluation by the advisor:

- **Progress:** An assessment of the student's progress in his or her courses, and progress on research, if appropriate. The advisor will comment on strengths and areas needing improvement. Comments on the student's progress towards key examinations, graduation and on the funding strategy for the next academic year are also expected.
- **Professional Potential:** The advisor is expected to comment on the professional development plan (e.g., professional practice, academia, research laboratory, etc.) developed with the student and their progress in this plan. An assessment of the student's potential to work in their profession of choice will be made. Comments on strengths and areas needing improvement for professional competence are also expected.

18.10 Safety Compliance

According to university policy, the CEE Department aims to ensure the safety of all its students by requiring knowledge and understanding of safety hazards and, if required, providing the appropriate training so that their work can be conducted safely.

The CEE department monitors compliance with safety requirements of all graduate students by requiring the completion of Safety Training Forms every semester. All graduate students will be provided with such a form and are expected to complete it with the help of their graduate advisor and return it to the CEE Graduate Secretary within the first 2 weeks of each semester. Failure to complete and submit the safety training form will result in an enrollment hold being placed on the student.

The safety training form should be completed even if the student is not actively working in a laboratory environment. In such cases, the advisor must note that no safety training is required. If this changes, the form must be updated.

Your training requirements will depend on your specific job duties and they may include University-wide or laboratory-specific training. Evidence of compliance with the safety training requirements identified in the Safety Training form must be provided to the graduate secretary as soon as they are completed so that they can be included in the student's safety record.

18.11 Use of Department facilities and supplies

Graduate students in the civil engineering programs are provided with a campus mailbox in the Engineering Building. Graduate students in the environmental and water-resources engineering programs are provided with a campus mailbox in the Research Complex-Engineering. All students have access to computer systems under the supervision of the Division of Engineering Computing Services (DECS), and server storage and email accounts, also via DECS. Most graduate students find it well worth their while to purchase their own personal computer, to supplement the services provided by DECS. Graduate assistants are provided with office space and telephone access for local and campus calls. Copy machines are available in the Engineering Library with a customary charge per page. Teaching assistants may have material copied that is required for their teaching duties by the office copying machine without charge, up to a per-semester allotment.

18.12 Fees and Rates

For current information regarding fees and rates associated with enrolling in the Graduate Programs in Civil & Environmental Engineering, please see the following website for tuition rates and housing fees -

www.ctrlr.msu.edu/COSTudentAccounts/Tuition_Fees_MainMenu.aspx .

18.13 Outside work for pay

The assistantship represents an obligation for the student to perform various duties of benefit to the department in return for financial assistance. It is assumed that these duties in combination with the normal course of studies will amount to a full-time load.

Outside work for graduate assistants is discouraged. Before beginning outside employment the assistant should discuss with the assistantship supervisor the outside employment and how the assistantship obligations will be fulfilled.

18.14 Traveling Abroad

Students traveling abroad should visit the "Travel Smart" website (<http://grad.msu.edu/travel/>) before their trip. When students appointed as TAs or RAs travel outside the U.S. to conduct required thesis or dissertation research or to collaborate with investigators conducting research abroad, the department or research grant supporting the work will pay for all needed vaccinations and or medications (e.g., anti-malarials) as determined by the MSU Travel Clinic. Students may include those costs in applications for

funds from the Research Enhancement or Travel Grant programs administered by the Graduate School.

19 TRAVEL FUNDING REQUESTS

The following general guidelines apply to funding requests for graduate student travel.

- M.S. students can apply for travel funding once during their degree program
- Ph.D. students can apply for travel funding once every year
- Faculty advisor is expected to contribute a minimum 25% of the total estimated cost of the travel
- Student applying for the funding needs to have a paper, presentation or a poster at the event
- Travel authorization form needs to be submitted at least one week before the event

APPENDIX I – NEW STUDENT CHECK LIST

- University Picture ID** – 150 Administration Building (Registrar's Office) 353-3300.
- University email account** – see <https://netid.msu.edu/> for instructions on how to set up your university email account. This must be done before your Engineering College computer accounts can be set up.
- Engineering College computer account and email** – Division of Engineering Computer Services, 1325 Engineering Building
- Apply for social security card** – Applications are available at the office for International Students & Scholars, 103 International Center, 353-1720.
- Complete I-9 Form (TA/RA graduate assistants ONLY)** – Forms are available online at <https://www.hr.msu.edu/ua/i9/index.html> . Students will fill out Section 1 then see the department Graduate Secretary to finish Section 2.
- Graduate Employees Union deduction/authorization form/membership card** – All teaching assistants, except for those teaching assistants specifically excluded by the MSU/GEU agreement, must fill out this card and check-off of the option of either union membership dues or representation fees
- Vehicle Registration** –Parking permits are available for graduate assistants from the Department of Police and Public Safety located at 87 Red Cedar Road (355-8440). Graduate assistants may apply for a parking permit on-line at www.dpps.msu.edu. Your appointment form must be finalized on the system before you will be allowed to purchase a parking permit.
- Housing** – 355-7457 (Student is responsible for housing arrangements)
- Contact Advisor**
 Name: _____ Room: _____
 Phone: _____ Email: _____
- Enroll for classes** – see <https://reg.msu.edu/roinfo/enrollment.aspx>

APPENDIX II – DESIGNING YOUR M.S. PROGRAM

This appendix is intended to provide assistance in designing your M.S. Program in Civil Engineering. The program is to be filed before 6 credits are finished.

1. After you and your advisor agree on a program of courses, go to the on-line graduate tracking system to complete your program
<https://www.egr.msu.edu/grs/>
2. The graduate secretary will pre-approve the program and generate the form for signature.
3. The secretary will contact you when the plan is ready for your signature. After you sign it, it is to be signed by your advisor, the graduate coordinator, and the Associate Dean of Engineering to indicate that they all approve it.

With reference to the student's approved program of study, none of the following types of changes will be approved:

1. Adding or deleting a course for which a grade has already been assigned under any of the three grading systems (numerical, Pass-No Grade, or Credit-No Credit).
2. Adding or deleting a course for which grading was postponed by the use of the DF-Deferred marker.
3. Adding or deleting a course which the student dropped after the middle of a semester and for which a 'W' or 'N' or '0.0' was designated.
4. Adding or deleting a course during the final semester of enrollment in the master's degree program.

See Appendix 3 Department Areas of Specialization for templates to assist you with planning your MS program in civil and environmental engineering at Michigan State University

Check to make sure your program meets the University, College, and Department requirements as listed in the ECE Graduate Student Handbook and the MSU publication Academic Programs. Some important check list items are:

- My advisor approves of these courses.
- I will have the necessary prerequisites.
- The courses are to be offered in the terms in which I plan to take them.
- The total number of credits is at least 30.
- All courses are at the 400 level or higher.
- If Plan A (with thesis), the number of CE 899 credits is between 4 and 8.
- If Plan A (with thesis), the number of 800 level credits is at least 20.
- If Plan B1 (project) or Plan B (coursework), the number of 800 level credits is at least 18.

APPENDIX III – DESIGNING YOUR Ph.D. PROGRAM

This document is intended to provide assistance in designing your Ph.D. Program in Civil Engineering. The program is to be filed within the first two semesters.

1. After you and your advisor agree on a program of courses, go to the on-line graduate tracking system to complete your program. - <https://www.egr.msu.edu/grs/>
2. The graduate secretary will pre-approve your program and generate the form for signatures.
3. The secretary will contact you when the plan is ready for your signature. After you sign it, it is to be signed by your advisor, the graduate coordinator, and the Associate Dean of Engineering to indicate that they all approve it.

With reference to the student's approved program of study, none of the following types of changes will be approved:

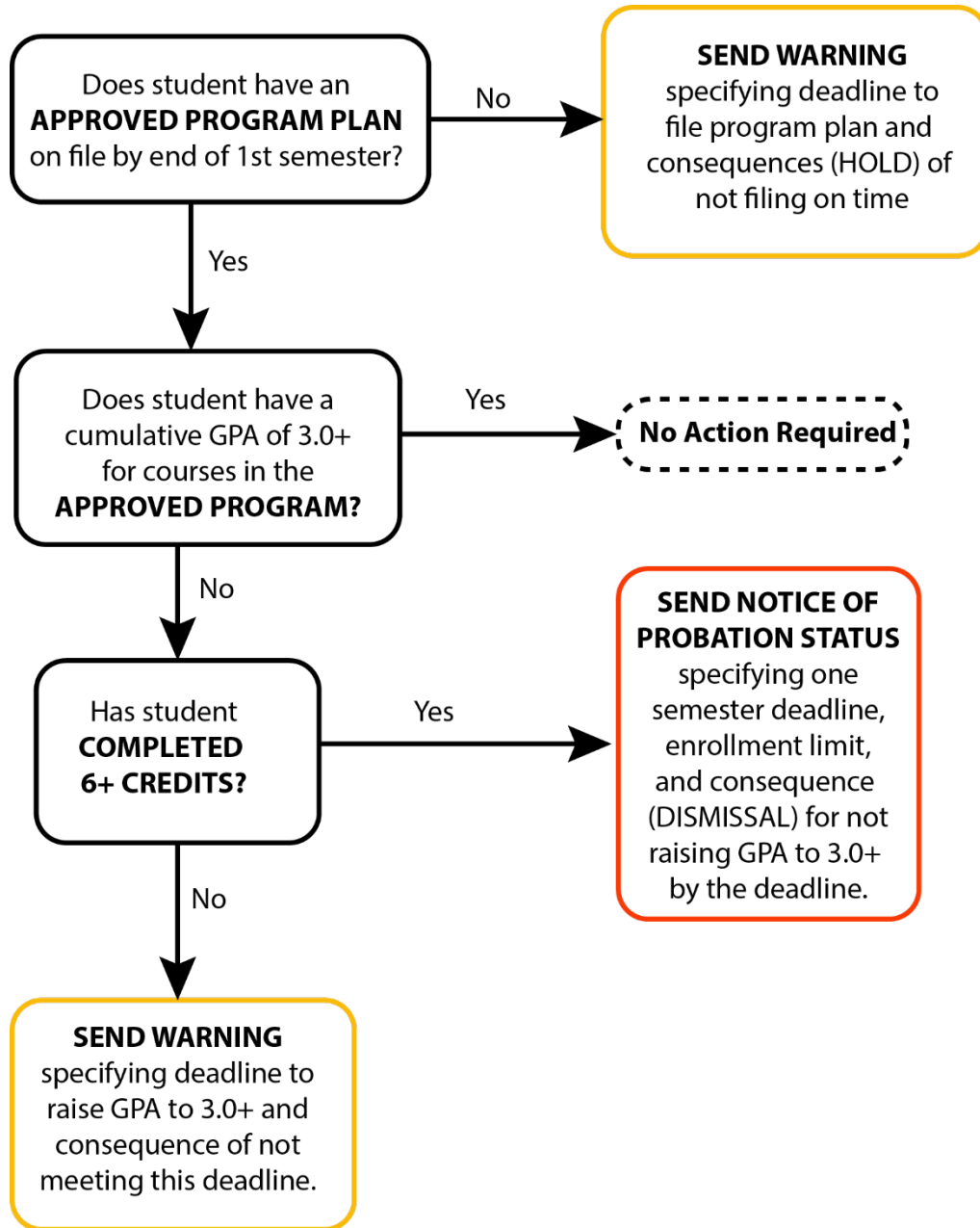
1. Adding or deleting a course for which a grade has already been assigned under any of the three grading systems (numerical, Pass-No Grade, or Credit-No Credit).
2. Adding or deleting a course for which grading was postponed by the use of the DF-Deferred marker.
3. Adding or deleting a course which the student dropped after the middle of a semester and for which a 'W' or 'N' or '0.0' was designated.
4. Adding or deleting a course during the final semester of enrollment in the master's degree program.

Check to make sure your program meets the University, College, and Department as listed in the CEE Graduate Student Handbook and the MSU publication Academic Programs. Some important check list items are:

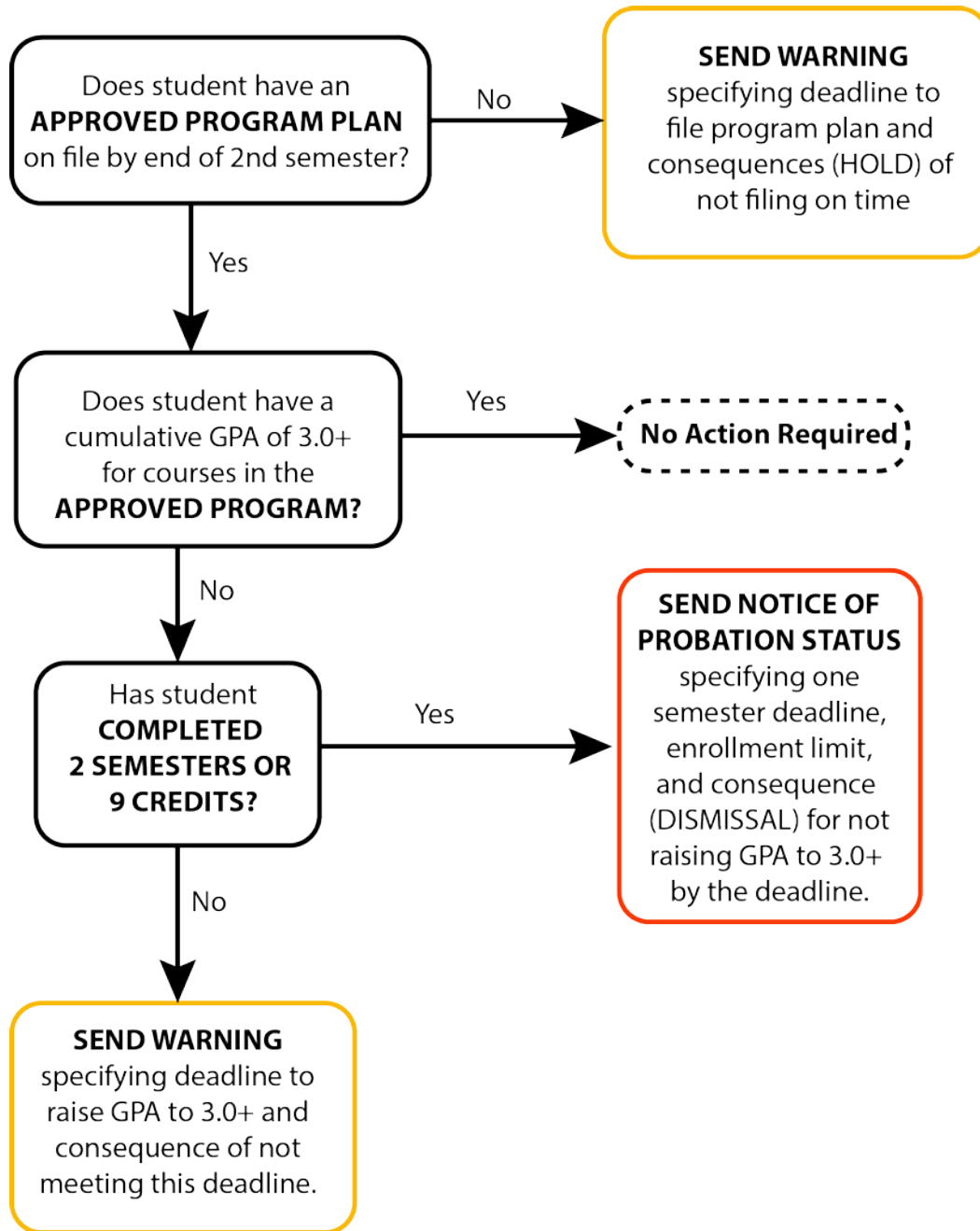
- My advisor and the other members of my guidance committee approve of these courses.
- I will have the necessary prerequisites.
- The courses are to be offered in the terms in which I plan to take them.

APPENDIX IV - FLOWCHARTS ILLUSTRATING WARNING AND PROBATION TRIGGERS

Warning and Probation Flowchart-Master's Program A & B



Warning and Probation Flowchart-PhD Program²



² Flowchart does not cover the situations where students may not be making adequate research progress

APPENDIX V – SAMPLE LETTERS FOR WARNING AND DISMISSAL

To: Student

From:

Date:

Re: Unsatisfactory grade in your graduate program

Your student record indicates that you have earned a grade below 2.0 in one or more classes in your approved program of study (If you have not yet filed a program of study, it is assumed that courses taken to date will be on the program).

In accordance with the Academic Standards of the Department of Civil and Environmental Engineering, you are required to repeat this course. Please note that, when a course is repeated, only the latter grade is used to calculate the GPA, but all grades show on the transcript.

Should you have any questions about this, please feel free to contact me.

To: Student

From:

Date:

Re: Academic warning and probation notice for cumulative GPA below 3.0, MS program

Your student record indicates that your cumulative GPA at the end of your first semester is below 3.0. In accordance with the Academic Standards of the Department of Civil and Environmental Engineering, you are being placed on Academic Probation for one semester. You will have one semester to raise your GPA above 3.0, or you will be dismissed from the program.

Students on probationary status are not permitted to carry more than seven credits per semester or enroll in any course for which the primary focus is independent study. Unfunded international MS students who are placed on probationary status will be required to petition the Graduate School, with permission from their advisor, the department and the college, for approval to enroll in an additional two credits, for a total of nine credits to meet visa requirements set by the US Department of Homeland Security.

Should you have any questions about this, please feel free to contact me to discuss.

To: Student

From:

Date:

Re: Academic warning for cumulative GPA below 3.0, PhD program, first semester

Your student record indicates that your cumulative GPA at the end of your first semester is below 3.0. Should you attain 9 completed credits in your approved

program of study or complete 2 semesters (whichever is earlier) and still have a GPA below 3.0, you will be placed on academic probation. Once placed on probation, you will have one semester to raise your GPA above 3.0, or you will be dismissed from the program.

Also, students on probationary status are not permitted to carry more than seven credits per semester or enroll in any course for which the primary focus is independent study. Unfunded international MS students who are placed on probationary status will be required to petition the Graduate School, with permission from their adviser, the department and the college, for approval to enroll in an additional two credits, for a total of nine credits to meet visa requirements set by the US Department of Homeland Security.

Should you have any questions about this, please feel free to contact me to discuss.

To: Student

From:

Date:

Re: Probation notice: cumulative GPA below 3.0, PhD program

Your student record indicates that you have either completed either 2 semesters or 9 course credits in your approved plan of study, and your cumulative GPA is below 3.0 for these courses. In accordance with the Academic Standards of the Department of Civil and Environmental Engineering, you are being placed on Academic Probation for one semester.

If at the end of the next semester your cumulative GPA is greater than 3.0, your probation will be removed and you may continue to enroll. If your GPA is still below 3.0, you will be dismissed from the program.

Students on probationary status are not permitted to carry more than seven credits per semester or enroll in any course for which the primary focus is independent study. Unfunded international MS students who are placed on probationary status will be required to petition the Graduate School, with permission from their adviser, the department and the college, for approval to enroll in an additional two credits, for a total of nine credits to meet visa requirements set by the US Department of Homeland Security.

In addition, **you are requested to meet with me to discuss your situation** as soon as possible, but no later than the fifth day of your next term in attendance.

To: Student

From:

Date:

Re: Notice of dismissal from your graduate program

You were previously sent a notice that you were on probationary status due to your unsatisfactory academic performance. Your student record indicates that you have not met the conditions in that letter related to removing your probation.

Accordingly, I regret to inform you that you are hereby dismissed from your graduate program.

Should you have any questions, please feel free to contact me.

To: Student

From:

Date:

Re: Requirement to complete an approved plan of study

The academic requirements of the Department of Civil and Environmental Engineering and the College of Engineering require that you complete a plan of study in consultation with your academic advisor and obtain the required approvals prior to completing six credits. Our records show that this has not yet been done.

Please take action to complete your plan as soon as possible. If you do not have an approved plan on file before the middle of the next semester, a hold will be placed on your future enrollment.

APPENDIX VI – SOURCES OF ADDITIONAL INFORMATION

1. Michigan State University Academic Programs
<https://reg.msu.edu/AcademicPrograms/Default.aspx>
2. Michigan State University Description of Courses Catalog
<https://reg.msu.edu/Courses/Search.aspx>
3. Michigan State University Schedule of Courses
<https://schedule.msu.edu/>
4. Graduate Students Rights and Responsibilities
<https://grad.msu.edu/sites/default/files/content/gsrr/GSRR.pdf>
5. Guidelines for Graduate Student Advising and Mentoring Relationships
<https://grad.msu.edu/sites/default/files/content/researchintegrity/guidelines.pdf>
6. Guidelines for Integrity in Research and Creative Activities
<https://grad.msu.edu/sites/default/files/content/researchintegrity/guidelines.pdf>
7. Responsible Conduct of Research
<http://grad.msu.edu/rcr>
8. MSU/Graduate Employees Union Contract
<https://hr.msu.edu/contracts/documents/GEU2015-2019.pdf>
9. Graduate Employees Union website
<http://www.geuatmsu.org/>
10. Spartan Life: Student Handbook and Resource Guide
<http://www.vps.msu.edu/SpLife/index.htm>
11. Academic Freedom for Students at Michigan State University
<http://www.vps.msu.edu/SPLife/acfree.htm>
12. Tuition, Fees, and Housing Calculator
<http://ctlr.msu.edu/COStudentAccounts/TuitionCalculatorFall.aspx>
13. The Graduate School
<http://www.grad.msu.edu/>
14. Council of Graduate Students (COGS)
<http://cogs.msu.edu/>
15. Office for International Students and Scholars at Michigan State University
<http://oiss.isp.msu.edu/>
16. Graduate Students Professional Development
<https://grad.msu.edu/prep>
17. Office of the Ombudsperson
<http://www.msu.edu/unit/ombud>
18. Fellowship Opportunities
<https://www.egr.msu.edu/graduate/funding-opportunities>

APPENDIX-VII - New Courses for International Teaching Assistants (AAE 451, 452, and 453)

- Enrollment in any of these courses requires approval of the English Language Center (ELC). Approval is granted by the Director of the ELC.
- Only students who have failed to achieve a passing score of 50 on the MSU Speaking Test or the ITAOI may enroll in 451 or 452. Students who score a 45 are eligible to enroll. A student with a 40 may be eligible with permission of the ITA Program Coordinator.
- Students need referrals from their departments to enroll in any of these courses.
- A student who has received a partial waiver on appeal may request enrollment in 451 or 452. A student with an unconditional waiver may not request enrollment in 451 or 452.
- AAE 453 is an in-service course. Any ITA with an appointment involving oral communication with undergraduates may request enrollment in 453.
- A student may take each course only once (unless he or she has received a grade of "N" in the course).
- There is no required sequence of courses for 451 and 452, but any ITA eligible for 453 is no longer eligible to take either 451 or 452.
- Receiving a grade of "P" in 451 or 452 (based on assignments, tests, and other measures) does not qualify a student to serve as a TA. A student must pass the ITAOI (administered separately by the ELC Testing Office) or receive a score of 50 on the MSU Speaking Test to be cleared for TA duties involving oral communication with undergraduate students.
- The decision about whether to place a student in 451 or 452 will be made by the ITA Program Coordinator in consultation with:
 - 1) the ELC's Head of Testing, as necessary;
 - 2) the student.

For further information about ITA courses, contact one of the ITA Program Coordinators--either Alissa Cohen or Laura Ramm (ITAprogram@elc.msu.edu). For further information about the MSU Speaking Test or the ITAOI, contact the ELC's Head of Testing, Dr. Daniel Reed (reeddan@msu.edu).

APPENDIX VIII - Reminder of Current Policy for Issuing I-20s for Provisional Admission

If international students are admitted on a provisional basis because of language proficiency requirements, they can be issued an I-20 for language studies only. This I-20 is limited to a maximum of 2 years. The student would need to be tested at the English Language Center upon arrival and begin studying in the English level determined by that test. Once the student meets the departmental requirements for language, the student may be issued a degree-seeking I-20. If the student has not met the stated language proficiency requirement for department/program admission at the end of two years, the student cannot continue to enroll for courses.

Provisional admission for international students can be granted ONLY for language deficiencies. Regulations will not allow the issuing of an I-20 for provisional admissions for academic reasons.

Appendix – IX: Dual Major Doctoral Degrees

The following information about dual major doctoral degrees is taken from the graduate school web page: <https://grad.msu.edu/interdisciplinaryprograms>

Interdisciplinary Programs

Dual Majors Doctoral Degrees

Michigan State University offers doctoral students the exceptional opportunity to work in conjunction with faculty mentors to develop a dual major doctoral program. Such a program will reflect the required courses and standards for both of the departments with a single dissertation. All dual major doctoral degrees must be approved by the Dean of the Graduate School. A request for the dual major degree must be submitted via **GradPlan** within one semester following its development and within the first two years of the student's enrollment at Michigan State University. In order to receive a dual major, the following conditions must be met:

- The intent to receive the degree in two areas must be outlined in the guidance committee report.
- The Ph.D. Degree Plan must reflect the required standards for both departments.
- The integrated course work must be satisfactory to both departments.
- The comprehensive examination must be passed to the satisfaction of both departments.
- A guidance committee including members from both departments must be satisfied that the dissertation represents a contribution meeting the usual standards in both areas.
- There must be a single dissertation that represents an integration of the disciplinary areas.
- Responsible Conduct of Research requirements will be as defined and approved by the guidance committee.

CE GRADUATE PROGRAM REQUIREMENTS – SUMMARY

M.S. CE

Plan A (Thesis)	Plan B1 (Project)	Plan B (Coursework)
<ul style="list-style-type: none"> • 30 credits • ≥ 20 credits at 800-level or higher • 4 to 6 research credits (CE 899) • Prepare and defend MS Thesis. 	<ul style="list-style-type: none"> • 30 credits • 1 to 4 research project credits (CE 892) • ≥ 18 credits at 800-level or higher • Prepare and defend Project Report. 	<ul style="list-style-type: none"> • 30 credits • ≥ 18 credits at 800-level or higher
<ul style="list-style-type: none"> • MS Program Plan must be filed before end of 1st semester. • Must maintain GPA ≥ 3.0 • Courses below 400-level may not be used • Up to 9 credits may be transferred (note: restrictions apply) 		

Ph.D. CE

<p>Prescribed Coursework</p> <ul style="list-style-type: none"> • ≥ 12 credits at 800-level or higher beyond MS degree. • Must maintain a GPA ≥ 3.0
<p>Research Requirements</p> <ul style="list-style-type: none"> • ≥ 24 dissertation credits (CE 999) • Must submit at least one paper to a peer-reviewed scholarly journal as a condition for graduation.
<p>Qualifying Examination</p> <ul style="list-style-type: none"> • Must be taken <u>no later</u> than end of 2nd semester. • Two parts: oral and written examinations (taken in same period).
<p>Comprehensive Examination</p> <ul style="list-style-type: none"> • Must be taken <u>at least</u> 6 months before dissertation defense. • Must pass before 5 years from the date of the first course in doctoral program • Must prepare and defend PhD proposal.
<p>Dissertation Defense</p> <ul style="list-style-type: none"> • Must prepare and defend PhD Dissertation. • Must take place not earlier than two weeks after the dissertation and abstract have been submitted to the guidance committee.
<p>General</p> <ul style="list-style-type: none"> • Ph.D. Guidance Committee must be formed before submission of PhD Program Plan. • Ph.D. Program Plan must be approved before end of 2nd semester. • Student must be registered during the semester that the qualifying, comprehensive and defense examinations are administered. • Courses below 400-level may not be used