

GRADUATE STUDENT HANDBOOK

Environmental Engineering Program
Department of Civil and Environmental Engineering
Michigan State University

2009 – 2010 Academic Year
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WELCOME!

Welcome to the Environmental Engineering (ENE) Program and the Department of Civil and Environmental Engineering (CEE) at Michigan State University (MSU).

This handbook is designed for students entering the M.S. or Ph.D. Programs in Environmental Engineering during the 2009 – 2010 academic year. It provides an overview of the program, specifies program requirements, and contains information about policies that relate to the graduate experience. In general, the policies in effect when a student enters the program remain applicable to that student through completion of their degree program. You should be aware of two key issues with respect to using this handbook. First, it covers the primary requirements established by the Program, Department, College and University, but there may be additional expectations established by your advisor or employment supervisor. It is essential that you communicate as soon as possible on arriving at MSU, and regularly throughout the year with your advisor/supervisor. You should ask them directly about their expectations of you regarding the frequency and approach to regular communication. Second, this handbook does not cover all of the applicable rules, especially those relating to special circumstances. If you have any questions or concerns relating to your graduate experience, requirements, or policies, you are encouraged to discuss them with:

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PART I – MASTER OF SCIENCE PROGRAM IN ENVIRONMENTAL ENGINEERING (M.S. ENE)

1 PROGRAM OVEVIEW

1.1 Relationship of M.S. graduate training to the practice of environmental engineering

“Environmental engineering is the application of scientific and engineering principles to assess, manage and design sustainable environmental systems for the protection of human and ecological health.” (www.aeesp.org)

Environmental engineering grew out of and shares a rich history with civil engineering as a result of the role of governmental organizations in environmental and public health protection. In the U.S., environmental engineering has long been considered a specialty area of civil engineering, but it has also evolved as a distinct discipline. Originally termed sanitary engineering, because of the focus on water supply, wastewater treatment and preventing the spread of infectious diseases, the name environmental engineering has been widely used since the 1960’s to describe a broader set of concerns that include all environmental media (air, water, soil, and biota) and protection of both human and ecological health.

Historically, the majority of engineering programs in the U.S., including MSU, have chosen to offer training in environmental engineering at the undergraduate level as a specialty area within a civil engineering degree program, but as a separate environmental engineering degree at the M.S. and Ph.D. levels. (There is a recent trend toward offering B.S. ENE programs.) Because of this, most ENE graduate programs admit students holding undergraduate degrees in a variety of engineering and science disciplines, but with specific requirements that students be prepared for graduate engineering coursework in ENE. (Specific requirements at MSU are shown in Section 3 below.)

The primary purpose of M.S. ENE degree program is to train students for professional practice as environmental engineers in consulting firms, corporations, and governmental organizations. It is not uncommon, however, for students to use their graduate degree training for other positions more generally related to the environment, and in organizations with broader missions such as international development, technology development, policy, public health and business. Thus, the M.S. program has a strong focus on the theoretical foundations of environmental science and on engineering technologies, design and problem solving, as we believe this is essential to train practitioners who can address new problems as the arise over the course of a career. It also provides a basis for students who are interested in careers in teaching and research to continue graduate study at the Ph.D. level.

1.2 A road map to your degree

There are three types of requirements that may affect the path you follow in completing a graduate degree: academic program requirements, requirements associated with any financial support you may receive, and requirements associated with your visa for international students. 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. Students receiving fellowships, teaching assistantships or research assistantships are expected to complete the thesis option. International students, and those on assistantships, are normally required to enroll in a specified minimum number of credits. The primary steps to completing the M.S. degree, following admission and arrival at MSU, are as follows:

- Check in with the Graduate Secretary and ENE Program Administrative Assistant (shown on page *i* of this handbook) to confirm your arrival, learn about the requirements and schedules for enrollment and orientation, and learn how to contact your advisor. It is important that you complete all of the necessary procedures and meet with your advisor prior to the first day of classes. A check list is provided as Appendix I.
- You will have been assigned an advisor upon admission, and this faculty member will help you plan your first semester. 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 (RA) on a specific project. If you are supported as a RA, 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 Program Director and your prospective advisor as soon as possible and complete the Change of Advisor form.
- During your first semester of study, you must design a Program of Study with your advisor. This form specifies which option you will follow (coursework, project, thesis), and the courses and research credits satisfying the degree requirements, that you will complete in order to graduate. Be sure to consider any provisions or collateral requirements that were included as a part of your admission. It is strongly recommended that, in discussing this with your advisor, you map out the schedule of courses, research and other activities by semester. The normal time required to complete the M.S. degree is 2 years, or 4 semesters.
- Project and thesis options require you to form a graduate committee, consisting of at least three faculty members. There is a form to be completed, and you should do this as soon as your project or thesis is defined.
- You are required to meet with your advisor at least once per semester after the first semester. You are encouraged to meet more frequently.
- At the beginning of the semester you intend to graduate, you should meet with your advisor to finalize the expectations and schedule for the program requirements other than coursework. If you are in the project or thesis option, this will include an examination by the committee that may have written and oral requirements.

- At the end of your program of study, you should work with the ENE Program Administrative Assistant and your advisor to ensure that all of the necessary requirements have been met and the proper forms submitted and approved.

1.3 Student participation

Most graduate students 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 and other graduate students who are deeply interested in finding answers to research problems. M.S. students are strongly encouraged to get involved research projects, and use this involvement as the basis for the project or thesis option in their M.S. program. Students commonly find that their research activities are not only rewarding, but significantly improve their employment prospects, especially when their work results in research presentations and publications.

Many class and research activities require that students work in small teams or groups. It is expected this will be done in a collegial manner, with all group members contributing equitably, and with the highest level of professional and personal integrity. All graduate students are expected to participate in Program, Department, and College activities during the academic year. This may include seminars, research colloquia, and special events. Graduate students also have the opportunity to participate student and local chapters of professional organizations, in service activities, and in academic governance at the Department, College, and University levels.

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. ENE 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. Four credits are allowed under the thesis or project options for a research product, which is 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 pursue research careers.

2.1 M.S. ENE 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. In addition to the coursework outlined in Section 3 below, the M.S. ENE Plan A Program

consists of preparation of a thesis 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 two publications in scientific journals.

2.2 M.S. ENE 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. In addition to the coursework outline in Section 3 below, the M.S. ENE Plan B1 Program consists of preparation of a project report based on work conducted under the guidance of a faculty committee. There is no specific format for the report, although it is generally prepared as a journal article, 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 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 M.S. ENE 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, as outlined in Section 3 below. There is no requirement for a thesis, project or creative component.

2.4 University Graduate Specialization in Environmental Policy

Students may elect to pursue a graduate specialization in Environmental Policy by meeting the three-course requirement of the specialization as a part of their elective coursework, and preparing a paper on a policy issue. Specific requirements can be found at www.environment.msu.edu.

3 DEGREE REQUIREMENTS

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. ENE Program requirements. The Program Plan specifies the courses and optional project or thesis that the student will complete. It is strongly recommended that the student and the advisor design the plan using a schedule that considers when courses are offered and the student's desired completion date. Students are encouraged to discuss elective courses with the advisor, other faculty

members, and other students in order to identify high-quality courses that best suit their professional interests.

3.1 Meeting provisional admission and collateral course requirements

Because we seek to make graduate study in environmental engineering accessible to students with diverse backgrounds, students are frequently admitted under provisional status, and there may be collateral course requirements (courses that must be completed, but do not count toward the 30 credit requirement). These decisions are made on the basis of submitted course materials, and should be considered preliminary, based on our best estimate of your preparation for the M.S. program. Regardless of the type of admission, you will discuss your background and interests in your first meeting with your advisor, and he/she may suggest additional preparation as a part of your M.S. program.

International students who are admitted provisionally with a requirement for additional English language testing or coursework 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.

In general, students are expected to have a level of environmental science and engineering competency equivalent to an undergraduate degree in environmental engineering, or civil engineering or chemical engineering with an environmental specialization. This includes college-level courses in mathematics through differential equations, chemistry, physics (mechanics), fluid mechanics, computer use, and water and wastewater treatment processes. Students who have not completed courses equivalent in content or rigor to those offered at MSU, or who have collateral course requirements, should complete the necessary preparatory coursework as early in their graduate program as possible. It is especially important to complete these courses prior to the required graduate courses for which the collateral requirement is prerequisite. Normally, all collateral coursework requirements must be completed in the first year.

If you are admitted with other provisional requirements, you should make sure your advisor is aware of them and you should discuss how to address them early in your program. The provisional status will be changed to regular status when the conditions specified on the admission form have been met, as determined by the Program Director and approved by the Associate Dean for Graduate Studies.

3.2 Program Plan

The Program Plan must include the Core Courses, unless waived, and course credits satisfying one of the options, as shown below.

CORE COURSES

| Course Number | Credits | Title |
|----------------------|----------------|-----------------------------------|
| CE* 421 | 3 | Engineering Hydrology |
| CE* 481 | 3 | Environmental Chemistry |
| CE* 480 | 1 | Environmental Measurements Lab |
| ENE 801 | 3 | Dynamics of Environmental Systems |
| ENE 802 | 3 | Physicochemical Processes |
| ENE 804 | 3 | Biological Processes |
| ENE 806 | 3 | Laboratory Feasibility Studies |
| Total Core | 19 | |

OPTIONS

| | | |
|-----------------------------------|------|-------------------------------------|
| Plan A – Thesis Option | | (approved by MS guidance committee) |
| MS thesis (ENE 899) | 4 | |
| Elective courses | 7 | |
| Plan B1 – Project Option | | (approved by MS guidance committee) |
| MS Project (ENE 892) | 1-4 | |
| Elective courses | 7-10 | |
| Plan B – Coursework Option | | (approved by graduate advisor) |
| Elective courses | 11 | |

TOTAL MINIMUM CREDITS 30

Additional course requirements. The minimum requirement of 30 credits must be met by courses at the 400 level or higher. Courses below the 400 level may be taken, but can not be counted toward the requirements of the degree. Students can plan to take additional courses beyond the 30 required credits, and may choose whether to include these in the Program Plan or not. A maximum of 4 credits are allowed for the project or thesis as a part of the M.S. program. Students can elect more than 4 thesis or project credits, but they can not be counted toward the 30 credit requirement. At least 20 credits (Plan A) or 18 credits (Plans B1 and B) must be at the 800 level or higher.

Students who have previously completed a course equivalent to one or more of the core courses may request a waiver, and if granted, take additional elective credits. Waivers are requested of and reviewed by the advisor, but are subject to approval by the MSU instructor of the required core course and the Program Director. The student should provide a syllabus, in English, and the name and author of the text used, in requesting a waiver.

Transfer credits. As many as 9 semester credits of graduate course work may be transferred into a 30 credit M.S degree program from other accredited institutions, international institutions of similar quality, Lifelong Education enrollment status, or the Graduate

* 400-level environmental engineering courses are identified with a CE code (e.g. CE 480), both when enrolling in the course and by default on the transcript. Students may request that their transcript be modified to show these courses with an ENE code (e.g. ENE 480). Contact the ENE Program Administrative Assistant for assistance with this.

Certificate level, if a) they are appropriate to a student's program, b) were completed within the time limits for the degree, c) are approved by the advisor and Program Director, d) the student received a grade of 3.0 or 75% or higher, and e) the credits were not earned in research or thesis courses. As many 14 credits may be transferred from Michigan Technological University, Wayne State University and the University of Michigan under the Michigan Coalition for Engineering Education (MCEE) agreement. 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. As many as 9 semester credits of graduate course work may be transferred into a 30 credit M.S degree program from the undergraduate level to be applied to a Linked Bachelor's-Masters degree program

Program Plan filing. As discussed at the beginning of this section, the Program Plan is developed jointly by the student and the advisor during the first semester. The Program plan must be formally filed and approved by the advisor, Program Director and the Associate Dean of Graduate Studies approved before the student completes 6 credits of graduate work in order for the student to continue to enroll in courses. To initiate filing, go to <https://www.egr.msu.edu/apps/gts2> and enter the option and courses that you and your advisor have agreed to. If the on-line system does not allow something, please see the ENE Program Administrative Assistant about to handle this. Note that the 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 Program Plan, it will be reviewed by the ENE Program Administrative Assistant, and if acceptable, it will be routed for approval. If the Plan does not meet Program requirements, you will be contacted.

On approval, the Program Plan constitutes a formal agreement between MSU and the student covering the specific requirements for the student to earn the M.S. 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 Program Plan. It is not uncommon for students to modify their Program Plans as a result of changes in their interests, changes in course offerings, or a decision to change options (e.g. thesis to project). To do this, the student should discuss the proposed change with their advisor, and submit a modified Program Plan. Changes in program plans will be subject to the approval of the adviser, the Program Director, and the Associate Dean for Research and Graduate Studies. The new Program Plan, as revised, must meet either the standards in effect when the student first enrolled in the M.S. program or those currently in effect at the time of submission.

Students should note that none of the following types of modification 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.

3.3 Other requirements

Residency requirement. At least 9 credits must be taken in residence at MSU.

Time limit. The time limit for the completion of the requirements for the M.S degree is five calendar years from the date of enrollment in the first course included for degree certification.

Grade point average for graduation. A minimum overall GPA of 3.0 is required for courses on the approved Program Plan.

Final examination. The student is required to pass an oral examination in defense of the thesis or project. Section 6 describes this examination.

Thesis distribution. The thesis, an abstract of the thesis, and an abstract title page must be prepared in accordance with the specifications in *The Formatting Guide-Master's Theses and Doctoral Dissertations*, a handbook that is available, along with a packet of required forms relating to the thesis from the Office of the Graduate School. An unbound, original copy with abstract is provided to the Office of the Graduate School. One microfilm copy of the dissertation will be deposited in the University Library and will be available on interlibrary loan. The abstract will be published in *Master's Abstracts* which will announce the availability of the thesis in film form.

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.

Deferred grades (DF): 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.

4 YOUR 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. A key element of a successful and productive graduate school experience is to develop good communication and work closely with your advisor to address your specific objectives.

4.1 Advisor assignment and selection process

You will have been assigned an advisor upon admission, and this faculty member will help you plan your first semester. If you are not receiving financial support related to work on specific research project, this advisor is considered temporary, and you are free to select an advisor from amongst Civil and Environmental engineering tenure-stream faculty members, appointed at the level of Assistant Professor or higher. You are encouraged to review their professional interests, and meet with one or more of them to discuss selection of a permanent advisor. The Program Director is also available to assist you in the selection process. If you plan to elect either the Thesis (Plan A) or Project (Plan B1) option, the academic advisor you select will also normally supervise your research and chair the guidance committee.

If you are receiving financial support related to work on a specific research project, your assigned advisor is considered permanent, and serves as your research supervisor and guidance committee chair. If there are extenuating situations that necessitate changing your permanent advisor, you should meet with him/her 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 Program Director and your prospective advisor as soon as possible and complete the Change of Advisor form.

4.2 Roles and responsibilities of the academic 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 coursework, 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.

4.3 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*.
- Initiating meetings with the academic advisor for course selection, development and approval of the Program Plan, research guidance, and completing required examinations, as necessary to comply with the rules, procedures and policies applicable to them
- Meeting University and academic unit requirements for degree completion.
- Forming a guidance committee, if required, 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 degree.

4.4 Roles and responsibilities of the Department, College and University

If a student's advisor is not available, or there is an issue that can not be resolved between the student and the advisor, the student is encouraged to seek additional assistance. As a general rule, most issues can be resolved by the Program Director, but further assistance may involve the Department Chairperson, the College of Engineering Associate Dean for Graduate Studies, or the Graduate School. 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 AND INTERACTION WITH THE GUIDANCE COMMITTEE (PROJECT/THESIS OPTIONS)

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 Program Director. 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 FINAL ORAL EXAMINATION (PROJECT/THESIS OPTIONS)

The graduate student will present the results of the project/thesis 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 guidance committee, who also constitute the examination committee. The student should also arrange for a suitable room in which to hold the seminar and publication of an announcement of the seminar with the assistance of the ENE Program Administrative Assistant. The student should also ensure that all necessary computer equipment, such as a laptop and data projector, is available.

The following regulations apply to the examination.

- The final oral examination must be scheduled for a date not earlier than two weeks after the thesis or project report have been submitted to the guidance committee.
- The student must be registered during the semester in which the final oral examination is taken.
- The thesis or project report 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.

The format for the examination is to be decided by the guidance committee, but the following approach 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 discuss the outcome, each indicates in writing whether the student passes or fails the examination, and jointly agree on a grade. The committee may defer both decisions, may require or suggest additional work or changes in the product, and may require a subsequent committee review of these requirements, or may delegate review to the advisor. Students who fail the examination may be allowed to retake the exam, but this can occur no sooner than the following semester. 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 Program Director, the Chairperson of the Department and the Associate Dean of Graduate Studies for approval.

PART II – DOCTOR OF PHILOSOPHY PROGRAM IN ENVIRONMENTAL ENGINEERING (Ph.D. ENE)

7 PROGRAM OVERVIEW

7.1 Relationship of Ph.D. graduate training to the practice of environmental engineering

“Environmental engineering is the application of scientific and engineering principles to assess, manage and design sustainable environmental systems for the protection of human and ecological health.” (www.aeesp.org)

Environmental engineering grew out of and shares a rich history with civil engineering as a result of the role of governmental organizations in environmental and public health protection. In the U.S., environmental engineering has long been considered a specialty area of civil engineering, but it has also evolved as a distinct discipline. Originally termed sanitary engineering, because of the focus on water supply, wastewater treatment and preventing the spread of infectious diseases, the name environmental engineering has been widely used since the 1960’s to describe a broader set of concerns that include all environmental media (air, water, soil, and biota) and protection of both human and ecological health.

Historically, the majority of engineering programs in the U.S., including MSU, have chosen to offer training in environmental engineering at the undergraduate level as a specialty area within a civil engineering program, but also as a separate environmental engineering degree at the M.S. and Ph.D. levels. (There is a recent trend toward offering B.S. ENE programs.) Because of this, most ENE graduate programs admit students with undergraduate degrees in a variety of engineering and science disciplines, but with specific requirements that students be prepared for graduate engineering coursework in ENE. (Specific requirements at MSU are shown in Section 3 below.)

The primary purpose of the M.S. ENE degree program is to train students for professional practice as environmental engineers in consulting firms, corporations, and governmental organizations. It is not uncommon, however, for students to use their graduate degree training for other positions more generally related to the environment, and in organizations with broader missions such as international development, technology development, policy, public health and business. Thus, the M.S. program has a strong focus on the theoretical foundations of environmental science and engineering, as we believe this is essential to train practitioners who can address new problems as they arise over the course of a career. It also provides a basis for students who are interested in careers in teaching and research to continue graduate study at the Ph.D. level.

The primary purpose of the Ph.D. ENE degree is to train students for careers as researchers or educators. We believe that the professional practice is the basis upon which research and education exists, so it is normally expected that Ph.D. will have completed, or will complete as a part of their Ph.D. program, course requirements

normally included in a M.S. ENE program. Beyond this, Ph.D. students will take additional advanced graduate courses designed to provide the strongest possible foundation for their chosen research specialization and to provide knowledge and skills that may complement their other professional interests and their ability to teach at the college or university level.

7.2 A road map to your degree

There are three types of requirements that may affect the path you follow in completing a graduate degree: academic program requirements, requirements associated with any financial support you may receive, and requirements associated with your visa for international students. The primary steps to completing the Ph.D. degree, following admission and arrival at MSU, are as follows:

- Check in with the Graduate Secretary and the ENE Program Administrative Assistant (shown on page *i* of this Handbook), to confirm your arrival, learn about the requirements and schedules for enrollment and orientation, and learn how to contact your advisor. It is important that you complete all of the necessary procedures and meet with your advisor prior to the first day of classes. A check list is provided in Appendix I.
- Check in with your advisor. In most cases, an ENE faculty member has been in communication with you, has agreed to serve as your permanent advisor and is providing financial support for your graduate study. This person will be your primary mentor and will help you throughout your time at MSU. If you have an independent source of financial support, e.g. a government scholarship or fellowship, you will have been assigned a temporary advisor. You will work with the temporary advisor at the beginning of your program, and he/she will help you choose a permanent advisor.
- During your first year of study, your advisor will guide your selection of courses, preliminary research training, and selection of a research topic. It may be desirable to select members of a guidance committee during this time as they will be responsible for approving the Program Plan, which includes course requirements. However, the primary responsibility of the guidance committee is to guide your research, so this requires that your research topic be sufficiently defined so that you can select committee members with the appropriate expertise.
- Before the end of your second academic semester you and your advisor should identify potential members of your guidance committee, you should meet with each of them to discuss your research interests and their willingness to serve on the committee, and you should formally constitute the committee.
- Before or during your third academic semester (e.g. the following Fall if you started in Fall) you should take the doctoral qualifying examination. This examination is designed to assess your ability to conduct independent research.
- After passing the doctoral qualifying examination, you should prepare a draft Program Plan jointly with your advisor, meet with your guidance committee to discuss, modify if needed, gain approval for, and submit your Program Plan. This must be accomplished before the end of the third semester.

- Before or during your fifth academic semester (e.g. the third Fall if you started in Fall) you should take the comprehensive examination. This examination involves preparation of a written dissertation proposal and presentation of the proposal to the guidance committee.
- After passing the comprehensive examination, most students will focus primarily on their research, as their course requirements will generally be completed or nearly completed. It is essential to maintain regular communication with your guidance committee, through either committee or individual meetings.
- As you complete your research, you will devote increasing attention to preparation of your written dissertation or thesis. It is essential that you work closely with your advisor, and preferably, with the guidance committee as well, throughout the writing process.
- With the approval of your advisor, you will distribute a review copy of your dissertation to the guidance committee and defend your work in a final oral examination.
- Following the oral defense, your advisor and committee may require additional work or revisions of the dissertation before final approval.
- With final approval of your oral defense and written dissertation by your advisor and committee, you can submit the dissertation to the graduate school and apply to graduate.
- At the end of your program of study, you should work with the ENE Program Administrative Assistant and your advisor to ensure that all of the necessary requirements have been met and the proper forms submitted and approved. Information on the requirements of the Graduate School, including those for formatting the dissertation, can be found at <http://grad.msu.edu/thesisdissertation/>.

7.3 Student participation

Most graduate students quickly discover that their education is advanced in a number of ways beyond their coursework and dissertation research. Doctoral students are especially encouraged to get involved in research beyond their own, with the approval of their advisor, and to participate in mentoring junior students.

Many class and research activities require that students work in small teams or groups. It is expected this will be done in a collegial manner, with all group members contributing equitably, and with the highest level of professional and personal integrity. All graduate students are expected to participate in Program, Department, and College activities during the academic year. This may include seminars, research colloquia, and special events. Graduate students also have the opportunity to participate in student and local chapters of professional organizations, in service activities, and in academic governance at the Department, College, and University levels.

8 PROGRAM COMPONENTS

8.1 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, and (6) 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 9 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. There are three programs that allow a Ph.D. student to acquire an additional credential during the doctoral study period as summarized below.

8.2 Concurrent M.S./Ph.D.

Students who do not hold a M.S. Environmental Engineering degree 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 4 credits of doctoral research may be used to satisfy the M.S. project requirement.

8.3 University Graduate Specialization in Environmental Policy.

Students may elect to pursue a graduate specialization in Environmental Policy by meeting the three-course requirement of the specialization as a part of their elective coursework, and preparing a paper on a policy issue. Specific requirements can be found at www.environment.msu.edu.

8.4 University Doctoral Specialization in Environmental Science and Policy.

Students may elect to pursue a doctoral specialization in Environmental Science and Policy by meeting the four-course requirement of the specialization as a part of their elective coursework, and participating in required program activities such as seminars. Specific requirements can be found at www.environment.msu.edu.

9 PROGRAM REQUIREMENTS

9.1 Meeting provisional admission and collateral course requirements

Because we seek to make graduate study in environmental engineering accessible to students with diverse backgrounds, students are frequently admitted under provisional status, and there may be collateral course requirements. These decisions are made on the basis of submitted course materials, and should be considered preliminary, based on our best estimate of your preparation for the Ph.D. program. Regardless of the type of admission, you will discuss your background and interests in your first meeting with your advisor, and he/she may suggest additional preparation as a part of your Ph.D. program.

International students who are admitted provisionally with a requirement for additional English language testing or coursework 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.

In general, entering Ph.D. students are expected to have a level of environmental science and engineering competency equivalent to a M.S. degree in environmental engineering. For those students holding a M.S. degree in some other discipline, this competency is generally considered to be prior coursework substantively equivalent to the normal collateral requirements and the core courses for the M.S. ENE program at MSU (see section 3 of this handbook). Students who are admitted to the concurrent M.S./Ph.D. program are expected to have a level of environmental science and engineering competency equivalent the normal collateral requirements for the M.S. ENE program at MSU. Incoming students who are deficient with respect to these requirements will generally be expected to complete this coursework as a part of their Ph.D. program and in addition to the regular Ph.D. course requirements outlined below. It is strongly recommended that students address this requirement as early in their graduate program as possible. It is especially important to complete these courses prior to the required graduate courses for which a collateral requirement is prerequisite.

If you are admitted with other provisional requirements, you should make sure your advisor is aware of them and you should discuss how to address them early in your program. The provisional status will be changed to regular status when the conditions specified on the admission form have been met, as determined by the Program Director and approved by the Associate Dean for Graduate Studies.

9.2 Prescribed course work

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 11 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 environmental engineering?
- 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 Environmental Engineering degree that meets similar standards to those of Michigan State University will normally complete a minimum of 15 hours of doctoral coursework. Students who are lacking in traditional MS-level training in environmental 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. Students pursuing a concurrent MS/PhD program are expected to complete 26 hours of coursework meeting the requirements of the MS ENE program and a minimum 15 hours of doctoral coursework.

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.

Doctoral program filing. The student's Program Plan shall be submitted as a guidance committee report for approval to the Program Director and to Associate Dean of Graduate Studies by no later than the end of the student's third 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 subject material and the instructor must be specified for any selected topics course that is included in the student's program of study.

To initiate filing, go to <https://www.egr.msu.edu/apps/gts2> and enter the option and courses that you and your advisor have agreed to. If the on-line system does not allow something, please see the ENE Program Administrative Assistant 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 Program Plan, it will be reviewed by the ENE Program Administrative Assistant,

and if acceptable, it will be routed for approval. If the Plan does not meet Program requirements, you will be contacted.

On approval, the Program Plan 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 Program Plan. It is not uncommon for students to modify their Program Plans as a result of changes in their interests, changes in course offerings, or a decision to change options (e.g. thesis to project). To do this, the student should discuss the proposed change with their advisor, and submit a modified Program Plan. Changes in program plans will be subject to the approval of the adviser, the Program Director, and the Associate Dean for Research and Graduate Studies. The new Program Plan, as revised, must meet either the standards in effect when the student first enrolled in the M.S. 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.

9.3 Qualifying examination

The Qualifying Examination is the first of three examinations that the Ph.D. student is required to pass. The intent of the examination is to assess the student's potential for successfully completing doctoral-level studies and research in environmental engineering. The Qualifying Examination is usually taken at the beginning of the third semester in the program. The Qualifying Examination committee must consist of at least three regular faculty members in the Department of Civil and Environmental Engineering. At least two members of the examining committee cannot be directly associated with the student's current research project. Examination topics are drawn from the core scientific areas and associated engineering specialties underlying environmental engineering: environmental chemistry, environmental biology, and hydrology. Students must be examined in at least two of these areas by faculty whose expertise is in the respective area.

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, 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 who is not successful may retake the qualifying exam once, but before completion of the student's third semester in the program. A student may appeal the Examining Committee's decision. Such an appeal must be made in writing to the Associate Chair for Graduate Studies and Research. 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. 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 passing result is considered valid for up to 5 years from the time the examination is taken.

9.4 Comprehensive examination

The primary objective of the comprehensive examination is to formalize an agreement between the student and the guidance committee on a research project that both parties agree is likely to lead to the successful completion of the Ph.D. degree program in a reasonable period of time.

The examination consists of submission of a written proposal for a doctoral research project and an oral presentation and defense of the proposal to the guidance committee. Students are encouraged to complete the comprehensive examination early in their research so as to benefit fully from committee guidance. The written proposal is expected to be similar to those that would be submitted to a competitive funding agency such as NSF or NIH. It must be approved by the student's advisor given to committee members at least 2 weeks before the examination. The oral defense of the proposal will normally involve a formal presentation and informal question and answer session with the committee. The committee may, at its discretion, examine the student on other issues related to their academic program and preparation for research.

The guidance committee will evaluate and may suggest modification of the student's oral presentation and written proposal using the following criteria:

- 1) Does the student demonstrate a solid understanding of the current state of knowledge and knowledge gaps in a viable research area?
- 2) Has the student clearly identified research questions, specific aims or hypotheses that provide a scientific underpinning for the proposed research?
- 3) Are there alternative or additional questions, specific aims or hypotheses that the student should consider?
- 4) Is the approach to addressing/testing the identified questions, specific aims or hypotheses likely to succeed, within the student's capabilities, and feasible given the applicable time and resource constraints.
- 5) Are there alternative or additional tests or approaches that the student should consider?
- 6) Has the student identified the expected results and are these reasonable, well-thought out, and based on the questions, specific aims or hypotheses?
- 7) Has the student identified the expected benefits from the proposed research?

The guidance committee will determine whether the student passes, passes with additional requirements to be overseen by the committee or advisor, or fails the examination. In the case of failure, the student may be allowed to retake the examination, but this may occur no sooner than the following semester.

Schedule of the comprehensive examination. The comprehensive examination must normally be completed before or during your fifth academic semester (e.g. the third Fall if you started in Fall), and must also be completed at least one year before the final defense. The written portion (research proposal) of the comprehensive examination must be approved by the faculty advisor and distributed to the guidance committee at least two weeks before the examination date. It is the student's responsibility to schedule the exam far enough in advance so that all committee members can be present.

Registration requirement. A student must be registered during the semester that the comprehensive exam is administered. 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.

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.

Candidacy. Once the comprehensive examination is completed, the faculty advisor should submit the Record of the Comprehensive Examination form to the examiners for

their signature and further processing. Upon approval by the Program Director and Associate Dean for Graduate Studies, the student is considered a Ph.D. Candidate. Candidates are expected to maintain a minimum enrollment of one credit during the academic year.

9.5 Research

Doctoral students are generally involved in research through their period of doctoral study. In addition to the requirements of passing departmental exams and preparing a dissertation, students are expected to acquire knowledge, skills and attitudes that will allow them to be successful as independent researchers after they complete their Ph.D. degrees. The advisor, the program and the department will likely have other expectations of the student that are not explicitly defined, but are nonetheless, essential elements of the student's graduate experience. Examples include preparation of reports and manuscripts for publication, development of proposals, presentations at professional meeting, assisting other research efforts, contributing to research administration activities, and participation in service and outreach activities related to the research.

The doctoral program must minimally include twenty-four (24) dissertation research credits (ENE 999).

It is a Department requirement that all Ph.D. students must have at least one paper ready for submission to a peer-review scholarly journal as a condition for graduation. At a minimum, the paper must be reviewed and approved by the student's dissertation committee.

9.6 Dissertation or thesis

The doctoral dissertation or thesis is primary mechanism by which the student reports his/her research methods and results for the purposes of earning the Ph.D. degree. It is recognized, however, that articles in professional journals are the primary means by which research findings are disseminated. Most environmental engineering advisors encourage and most students choose to write their dissertation using an approach where the primary chapters are substantially similar to journal manuscripts, thereby addressing both objectives. You should be aware that there are both formal requirements by the Graduate School (see *Formatting Guide-Master's Theses and Doctoral Dissertations* at www.grad.msu.edu) and informal requirements from your advisor and guidance committee. It is important for students to understand these expectations at the beginning of the writing process. Students should also be aware that most advisors will expect them to have a full command of the English language, including the ability to write with only a minimal number of grammatical errors. Students with limitations in this regard may be expected to retain an editor in order to produce an acceptable thesis.

9.7 Final examination

The student must deliver a review copy of their dissertation to the members of the guidance committee at least two weeks prior to the final examination. It is the student's responsibility to schedule the exam far enough in advance so that all committee members can be present, and should arrange for the time, place and announcement of the examination with the ENE Program Administrative Assistant. The examination consists of a presentation of the dissertation research in a seminar open to the community, followed by a closed examination by the guidance committee. For more information, see section 12 of this handbook.

9.8 Other Requirements

Enrollment. In order to be considered full time for academic purposes, doctoral students must be enrolled for at least 6 credits. Minimum enrollment for students who have completed the comprehensive examination is 1 credit. Minimum enrollment for graduate assistants is 3 credits. The doctoral program must minimally include twenty-four (24) dissertation research credits (ENE 999).

Residency requirement. One year of residence on the campus after first enrollment for doctoral degree credit is required to permit the student to work with and under the direction of the faculty, and to engage in independent and cooperative research utilizing university facilities. A year of residence will be made up of two consecutive semesters, involving the completion of at least six credits of graduate work each semester

Time limit. All of the comprehensive examinations must be passed within five years and all remaining requirements for the degree must be completed within eight years from the time when a student begins the first class at Michigan State University that appears on his or her doctoral program of study. Application for extensions of the eight-year period of time toward degree must be submitted by the department/school for approval by the dean of the college and the Dean of The Graduate School. Upon approval of the extension, doctoral comprehensive examinations must be passed again.

Grade point average for graduation. A minimum overall GPA of 3.0 is required for courses on the approved Program Plan.

Microfilming and Publication of Dissertation. All doctoral dissertations submitted to The Graduate School must be microfilmed. Michigan State University subscribes to the service offered by University Microfilms International. One microfilm copy will be deposited in the University Library and will be available for interlibrary loan. The abstract will be published in *Dissertation Abstracts*, which will announce the availability of the dissertation in film form. The microfilming and binding fee, required of all doctoral students submitting dissertations, will cover the cost of the library microfilm copy, binding, and publication and distribution of the abstract. The student may order additional bound copies for the department, the school, the director, or others through University Microfilms International, or may make other arrangements for obtaining additional bound copies. An extra fee is

charged if the dissertation is to be copyrighted. Information about the amount of this fee and method of payment may be obtained from The Graduate School. Microfilming is considered by the university to be a form of publication. Publication by microfilm, however, does not preclude the printing of the dissertation in whole or in part in a journal or monograph. Refer to Costs in the General Information, Policies, Procedures and Regulations section of this catalog.

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.

Graduation. Attendance at graduation is optional, but most students choose to participate in this event as it represents an important professional and personal milestone. As a part of the ceremony, doctoral students are “hooded” by their advisor, or by another faculty member serving as a representative of their advisor. Students should inform their advisor well in advance of their plans to participate in graduation, and arrange for either the advisor or a representative to be present. Students will also need to make arrangements for graduation attire.

Deferred grades (DF): 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.

Dual Major Doctoral Degrees. 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 within one semester following its development and within the first two years of the student’s enrollment at Michigan State University. A copy of the guidance committee report must be attached. The following conditions must prevail:

- 1) The intent to receive the degree in two areas must be outlined in the guidance committee report.
- 2) The content of the guidance committee report must reflect the required standards for both departments.
- 3) The course work must be satisfactory to both departments.
- 4) The comprehensive examination must be passed to the satisfaction of both departments.
- 5) A guidance committee including members from both departments must be satisfied that the dissertation represents a contribution meeting the usual standards in both areas.

10 YOUR 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. A key

element of a successful and productive graduate school experience is to develop good communication and work closely with your advisor to address your specific objectives. Students may elect to have two co-advisors, and the term advisor is used in this handbook for both.

10.1 Advisor assignment and selection process

You will have been assigned an advisor upon admission, and this faculty member will help you plan your first semester. In most cases, this ENE faculty member has been in communication with you, has agreed to serve as your permanent advisor and is providing financial support for your graduate study. This person will be your primary mentor and will help you throughout your time at MSU. If you have an independent source of financial support, e.g. a government scholarship or fellowship, you will have been assigned a temporary advisor. You will work with the temporary advisor at the beginning of your program, and he/she will help you choose a permanent advisor. You are free to select an advisor from amongst Civil and Environmental engineering tenure-stream faculty members, appointed at the level of Assistant Professor or higher. You are encouraged to review their professional interests, and meet with one or more of them to discuss selection of a permanent advisor. The Program Director is also available to assist you in the selection process. Your academic advisor will also normally supervise your research and chair the guidance committee.

If there are extenuating situations that necessitate changing your permanent advisor, you should meet with him/her 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 Program Director and your prospective advisor as soon as possible and complete the Change of Advisor form.

10.2 Roles and responsibilities of the academic 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.

10.3 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*.
- Initiating meetings with the academic advisor for course selection, development and approval of the Program Plan, research guidance, and completing required examinations, as necessary to comply with the rules, procedures and policies applicable to them
- Meeting University and academic unit requirements for degree completion.
- Forming a guidance committee, if required, 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 degree.

10.4 Roles and responsibilities of the Department, College and University

If a student's advisor is not available, or there is an issue that can not be resolved between the student and the advisor, the student is encouraged to seek additional assistance. As a general rule, most issues can be resolved by the Program Director, but further assistance may involve the Department Chairperson, the College of Engineering Associate Dean for

Graduate Studies, or the Graduate School. 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.

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 & Environmental 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. For students in the civil & environmental 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 & environmental engineering faculty, appointed at the level of Assistant Professor or higher.

11 FORMATION OF AND INTERACTION WITH THE GUIDANCE COMMITTEE

Doctoral students have the responsibility to form a guidance committee with the approval and assistance of the student’s advisor, and approval of the Program Director and Associate Dean for Graduate Studies. The guidance committee will consist of at least four 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 at least one of whom must hold a primary appointment in a different academic department at MSU. The committee must include the student’s advisor, who normally serves as the committee chairperson. An emeritus faculty member may serve as one of the four MSU regular faculty members on your doctoral guidance committee, and may continue to serve as chairperson, with the approval of the department chairperson. Please see the *MSU Academic Programs* publication for additional information regarding committee membership.

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.

12 FINAL ORAL EXAMINATION

The graduate student will present the results of the dissertation research 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 guidance committee, who also constitute the examination committee. The student should also arrange for a suitable room in which to hold the seminar and publication of an announcement of the seminar with the assistance of the ENE Program Administrative Assistant. The student should also ensure that all necessary computer equipment, such as a laptop and data projector, is available.

The following regulations apply to the examination.

- The final oral examination must be scheduled for a date not earlier than two weeks after the thesis has been submitted to the guidance committee.
- 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 format for the examination is as follows. 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 discuss the candidate's performance, and each indicates in writing whether the student passes or fails the examination. In the case of failure, the student may be allowed to retake the examination, but this may occur no sooner than the following semester. The committee may defer both decisions, may require or suggest additional work or changes in the product, and may require a subsequent committee review of these requirements, or may delegate review to the advisor. 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 Program Director, the Chairperson of the Department and the Associate Dean of Graduate Studies for approval.

PART III – DEPARTMENT, COLLEGE AND UNIVERSITY POLICIES

13 ACADEMIC PERFORMANCE

13.1 Academic standards

Course grades. The student must earn a grade of 2.0 or higher in each course in the approved Program Plan, including collateral courses and courses accepted in transfer or used as part of the minimum credit requirements, in order for the course requirement to be met. If the grade earned was below 2.0, the course must be repeated and the student earn a grade greater than 2.0 to satisfy the requirement

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 their 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. 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 additional credits, to meet the nine-credit visa requirement set by the Department of Homeland Security.

Retention In and Dismissal From the Graduate Program.

- Should a student's cumulative grade–point average fall below 3.0 after having completed 16 or more credits in courses in the approved program of study, the student may be enrolled in probationary status 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. 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 regular courses (does not include project, thesis and independent study credits), the student will be placed on probationary status and may enroll 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 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 graduate 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 is rated “poor” with respect to 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.

- A doctoral student may be dismissed from the program for failing to pass the qualifying or comprehensive examination, as described in Section 9 above.

13.2 Academic Hearing Grievance 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 ENE Program Director, the Department Chairperson, and the Associate Dean for Graduate Studies, generally in this order. If the problem can not be resolved informally, students’ rights and responsibilities, including grievance procedures are detailed in the *Academic Freedom for Students at Michigan State University*. Procedures more specifically designed for graduate students may be found in the publication *Graduate Student Rights and Responsibilities*. Grievance procedures outlined in these documents shall be followed and the Engineering College Advisory Council, guided by the Associate Dean for Graduate Studies, shall be responsible for interpretation of these rules.

13.3 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 (<http://grad.msu.edu/geu/agree.pdf>).

13.3 Student Awards

Environmental engineering students may be nominated by their advisor for an annual award, Outstanding ENE Graduate Student Award, at the M.S. or Ph.D. levels. 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.

14 INTEGRITY AND SAFETY IN RESEARCH AND CREATIVE ACTIVITIES

14.1 The MSU perspective

Each graduate student shall have the document *Guidelines for Integrity in Research and Creative Ideas*. See section 1.5 for access to this document. 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.

14.2 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.

14.3 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.

14.4 Research involving human subjects

The University Human Research Protection Program serves as the home for MSU’s Institutional Review Board (IRBs). 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 IRB review. Instructions for applying for approval are available at: (<http://www.humanresearch.msu.edu/>).

14.5 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

14.6 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.

15 STUDENT CONDUCT AND CONFLICT RESOLUTION

15.1 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* for specific policies, ordinances and regulations that define some of the relevant University expectations.

15.2 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. In attempting to resolve a conflict with any part of the University, a student may contact the University Ombudsman (see <http://www.msu.edu/unit/ombud>) for assistance and guidance, which is provided in a neutral, confidential, and independent manner.

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: www.msu.edu/user/gradsch/conflict.htm.

16 WORK RELATED POLICIES

16.1 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.

Receipt of externally funded fellowships by students who have written their own grant applications and worth at least \$20,000 (direct costs) 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.

16.2 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:

- a) 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.
- b) 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.
- c) 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.

16.3 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.

16.4 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://grad.msu.edu/geu/agree.pdf>.

16.5 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.

16.6 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.

16.7 Graduate assistants not covered by the GEU

The information listed below is subject to yearly change. Please consult The Graduate School home page for the latest information at <http://www.grad.msu.edu>.

Stipends. Payments will be paid on a biweekly basis – paychecks will be issued every other Friday. For Fall semester 2009, the monthly stipend for a level-one assistantships is approximately \$840 and \$1,678 for ¼ time and ½ time appointments, respectively. For a level-two assistantship (requires a year of assistantship experience) the monthly stipend is approximately \$948 and \$1,896 for ¼ time and ½ time appointments, respectively. Level-three teaching assistantships require six semesters of experience (including summers) and a Master's degree or equivalent (minimum of 30 credits); the stipends for level 3 appointments are currently the same as for level 2.

Tuition and fee benefits. Even though the graduate student does not enroll for 10 credits or more, benefits include the following:

- a) Tuition waiver in the amount of 9 credits for Fall semester, 9 credits for Spring semester, and 5 credits for summer session. The tuition waiver will be provided during the period of the assistantship, to a maximum of 23 credits per year.
- b) Exemption from out-of-state resident tuition. This exemption applies to a summer session that precedes or follows an appointment for an entire academic year, regardless of whether the student was previously enrolled at MSU. If the

student does not have a signed graduate assistantship form before registering for summer session, he or she will pay out-of-state resident course fees and tuition. Upon receiving a copy of the appointment form for the entire academic year through the middle of the semester of the subsequent fall semester, the Office of the Registrar will refund the full amount of out-of-state tuition that the student paid for the summer session.

- c) Matriculation and infrastructure/technology support fees are waived.

Health Insurance. Graduate assistants (domestic and international) are automatically enrolled in a health insurance plan, the premium of which is paid by the University. Information about coverage and options can be found at (<http://www.humanresearch.msu.edu/>) or by contacting Human Resources at 517-353-4434 or 800-353-4434.

16.8 Use of Department facilities and supplies

Graduate students in the Environmental Engineering Program are provided with a campus mailbox in the Engineering Research Complex. 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.

16.9 Fees and Rates

For current information regarding fees and rates associated with enrolling in the Graduate Programs in Civil & Environmental Engineering, please see the “Online Calculator” for Tuition, Fees, and Housing Calculator at the web site <http://www.citr.msu.edu/studrec/>

16.10 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.

16.11 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.

17 RESOURCES

17.1 The University

Michigan State University has been advancing knowledge and transforming lives through innovative teaching, research, and outreach for nearly 150 years. It is known worldwide as a major public university with global reach and extraordinary impact. Its 14 degree-granting colleges, and affiliated private law school, offer 200 programs of study. They attract scholars worldwide who are interested in combining education with practical problem solving.

Students from all 83 counties in Michigan, all 50 states in the United States, and about 125 other countries are represented in the student body of 44,452 students (fall, 2003). There are approximately 4,500 faculty and academic staff, and approximately 6,000 support staff employees. Library resources include a research collection of approximately 4.5 million volumes housed in the main library and nine branch libraries across campus. More than 500 registered student organizations include honoraries; professional organizations and professional fraternities and sororities; recreational and athletic groups; and international, racial/ethnic, religious, academic interest area, political, social service, volunteer, and media organizations.

In Fall semester, 2003, there were 9,689 students in graduate and professional programs of study. The Graduate School at MSU provides programs that serve all graduate students, including a variety of free workshops throughout the year. The Council of Graduate Students represents all registered MSU graduate and graduate-professional students. The Graduate Employee’s Union represents Teaching Assistants.

17.2 The College

Michigan State University’s Engineering College offers graduate programs through 6 academic Departments: Biosystems Engineering, Chemical Engineering and Materials Science, Civil and Environmental Engineering, Computer Science and Engineering, Electrical and Computer Engineering, and Mechanical Engineering. The college houses many research centers and laboratories, which vigorously promote the interdisciplinary

collaboration of its faculty members with each other, and with other university Departments, other universities, and the general public.

A \$34.5 million addition and renovation in 1989 provided 167,000 square feet of space for laboratories, classrooms, offices, and the engineering library. The Engineering Building, constructed in 1962, underwent a \$14-million, 46,000-square-foot addition in 1997, accommodating the Herbert H. and Grace A. Dow Institute for Materials Research, one of the premier facilities in the world for the study of composite materials. Other facilities include the Engineering Facility at the MSU Research Complex; the Jolly Road Research Facility; the Automotive Research Experiment Station located in the Hulett Road Research Facility; and the Advanced Materials Engineering Experiment Station in Midland, Michigan.

17.3 The Department

The civil & environmental engineering graduate program has approximately 100 students, of which about 50% are doctoral students and 50% are master's students. The graduate students work in close relationship with the 23 faculty in the Civil & Environmental Engineering Department in a strong and growing research program. Typically, about 15 graduate courses are offered in an academic year, with an average class size of 10 students. We invite you to visit the Department's home web page at <http://www.egr.msu.edu/cee/> to learn more about the Department, including the current events.

17.4 The campus

Campus cultural and other special centers include the Wharton Center for Performing Arts, Kresge Art Museum, MSU Museum, Kellogg Center, Abrams Planetarium, WKAR-AM/FM public radio, and WKAR public television. Sports devotees can follow the performance of any of the 25 men's and women's intercollegiate teams on campus. Those wishing to participate in athletics can take advantage of any of the many facilities available. These include gymnasiums for basketball and racquet sports, an indoor ice-skating rink, five swimming pools, a number of outdoor tennis courts, and two 18-hole golf courses. The intramural sports program is one of the largest in the nation.

The campus has been called "an academic park" and the beautiful gardens and landscaping are testimony to many generations of careful stewardship. The 5,200 acres, located three miles east of Michigan's Capitol in Lansing, represent a unique blend of the traditional and the innovative and is adjacent to its college town, East Lansing. The Red Cedar River traverses the campus and offers opportunities for lively activities such as canoe races or quiet reflection for those who wish to walk or study along its tree-lined shores.

17.5 The Lansing community

The greater Lansing area, with a population of approximately a half-million, boasts a fine symphony orchestra which performs at the Wharton Center; several dance and theater

groups, art galleries; the state capitol building, museums, state and local libraries; an arboretum, a zoo, a variety of parks, and a number of restaurants to suit most pocketbooks and tastes.

Graduate students in need of a change of scene can take the train to Chicago from East Lansing or drive an hour or two to Ann Arbor, Grand Rapids, or Detroit. In addition, day or weekend jaunts can be made to such attractions as Greenfield Village and the Henry Ford Museum, the Irish Hills, the Kellogg Biological Station, numerous National and State Forests in both the lower and upper peninsulas, Lake Michigan and Lake Huron beaches and parks, and Mackinac Island. Recreational activities in Michigan are highlighted by water sports in the summer months and skiing in winter.

APPENDIX I – NEW STUDENT CHECK LIST.

- University Picture ID** – 150 Administration Building (Registrar’s Office) 353-3300.
- University email account** – see <http://help.msu.edu/activate/> 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 at 103 International Center. Return the form to Margaret Conner, 3546 Engineering Building.
- 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 <http://www.reg.msu.edu/ROInfo/EnReg/CEInformation.asp>

APPENDIX II – SOURCES OF ADDITIONAL INFORMATION

1. Michigan State University Academic Programs
<http://www.reg.msu.edu/ucc/ucc.asp>
2. Michigan State University Description of Courses Catalog
<http://ntweb1.ais.msu.edu/j4100/scripts/CatalogSearch.asp>
3. Michigan State University Schedule of Courses
<http://ntweb8.ais.msu.edu/ScheduleBook/schedule.asp>
4. Graduate Students Rights and Responsibilities
<http://www.vps.msu.edu/SpLife/default.pdf>
5. Guidelines for Graduate Student Advising and Mentoring Relationships
<http://www.grad.msu.edu/staff/mentoreport.pdf>
6. Guidelines for Integrity in Research and Creative Activities
<http://grad.msu.edu/staff/mentoreport.pdf>
7. MSU/Graduate Employees Union Contract
<http://grad.msu.edu/geu/agree.pdf>
8. Graduate Employees Union website
<http://www.geuatmsu.org/>
9. Spartan Life: Student Handbook and Resource Guide
<http://www.vps.msu.edu/SpLife/index.htm>
10. Academic Freedom for Students at Michigan State University
<http://www.vps.msu.edu/SPLife/acfree.htm>
11. Tuition, Fees, and Housing Calculator
<http://www.ctrl.msu.edu/studrec/>
12. The Graduate School
<http://www.msu.edu/user/gradschl/>
13. Council of Graduate Students (COGS)
<http://www.msu.edu/user/cogs/>
14. Office for International Students and Scholars at Michigan State University
<http://www.isp.msu.edu/oiss/>
15. Graduate Students Professional Development
<http://grad.msu.edu/cpd.htm>
16. Office of the Ombudsman
<http://www.msu.edu/unit/ombud>