INFORMATION FOR GRADUATE STUDENTS COMPUTATIONAL SCIENCE AND ENGINEERING PROGRAM

Ph.D. in Computational Science and Engineering

MICHIGAN TECHNOLOGICAL UNIVERSITY

2019-2020

INFORMATION FOR GRADUATE STUDENTS
Computational Science and Engineering Ph.D. Program

This handbook provides information for graduate students in the Computational Science and Engineering (CS&E) Program at Michigan Technological University. It is focused on information unique to the program itself, and students are referred to the graduate handbooks from their home departments (which is home department of the major advisor) for practical information on offices, keys, computers, supplies, absence requests, teaching and graduate research assistant responsibilities, financial support, and so on. Students should familiarize themselves with this handbook, their home-department handbook, and the general regulations of the Graduate School as found in their *Academics* web pages http://www.mtu.edu/gradschool/administration/academics/, which covers policies and procedures, degree requirements, necessary forms, and more. The Graduate School website http://www.mtu.edu/gradschool/resources-for/students/ also contains a wealth of information for current students.

I. General Information

A. *Program Structure*

    The CS&E program consists of faculty from multiple departments across campus. Questions or requests for more information can be directed to:
Program Director: Dr. Thomas Oommen – GMES (toommen@mtu.edu)
Administrative Assistant: Kelly Mclean – GMES (kelly@mtu.edu)

B. *Graduate Forms*

    Copies of all graduate forms ("D-forms") should be shared with Kelly Mclean, as well as the graduate school, and copies should also be given to the administrative assistant in the home department.

C. *Work Obligation of Teaching Assistants*

    Graduate teaching assistants generally are expected to devote 20 hours per week to their teaching obligations including office hours set aside to help individual students. Details of the TA assignments and work expectations are defined by the department overseeing the assignment.

D. *Work Obligation of Research Assistants*

    On the average, students supported by graduate research assistantships are expected to work 40 hours per week (including approved course work) for the research project from which the stipend and tuition is paid. Since all support funds are derived from government or industry contracts and grants, it is the student's responsibility to perform assigned research tasks in a timely and professional manner. It should be noted that most contracts require formal progress reports on the research performed. The immediate supervisor of research assistants is their research advisor.

E. *Safety*

    There are a number of safety policies and procedures in effect at Michigan Tech that particularly apply to graduate students such as those concerning general safety and hazardous waste. Annual online safety training is mandatory for all employees and will be communicated to you via email when assigned. Additional safety policies and training required to use research or teaching laboratories, or chemicals will be communicated and assigned by respective lab personnel. Please consult your research advisor regarding all applicable safety policies and procedures before beginning work.
    For safety purposes, visitors are not permitted in research and instructional labs unless permission has been granted by the home-department chair; this includes spouses and children. There have been incidents in where unauthorized visitors, including children, have had accidents causing themselves harm. This rule is designed to prevent this type of tragedy.
    For your reference, the Michigan Tech safety manual is available on line at:
http://www.mtu.edu/ehs/documents/safety-manual/

F. *Academic Integrity*

    The University and the CS&E program expect all students to maintain the highest level of academic and scientific integrity in all aspects of their studies, from class work to exams to research.

If you are unsure of or have specific questions about assignments, projects, examinations, etc., please ask your instructor.

A detailed booklet describing Michigan Tech's academic integrity policy and procedures, including definitions of plagiarism, cheating, fabrication, and facilitating academic dishonesty, is available from the Dean of Students office, or on the web at: http://www.admin.mtu.edu/usenate/policies/p109-1.htm All graduate students should carefully read this policy. Students must also view the orientation module on academic integrity at http://www.mtu.edu/gradschool/admissions/admitted/online-orientation/ Further information on Scientific Misconduct Procedures may be found at https://www.mtu.edu/research/administration/integrity-compliance/misconduct/

II. Advisors

Advisors help students structure a program of study that addresses their needs and satisfies degree requirements. New students are usually assigned a research advisor before reaching campus, based on their research interests. If interests are still being explored, the program director acts as the initial advisor. Shortly after a research advisor is selected, an Advisory Committee is formed for each student. The Advisory Committee prepares a program of course study and research work that will lead to the desired graduate degree. It is up to the student and their advisor to fill out, get signed, and submit the appropriate forms to the department or Graduate School (D forms) at the appropriate times (see this link for current forms and instructions) http://www.mtu.edu/gradschool/administration/academics/forms-deadlines/

A. PhD Advisor

After a student selects a research advisor and committee the Advisor and Committee Recommendation Form should be completed online, printed, signed, and filed with the program administrator, the home department, and Graduate School http://www.mtu.edu/gradschool/policies-procedures/timelines/index.html
Students should meet with their advisors to determine what coursework should be taken: all electives should be discussed with and approved by the advisor. Students work closely with their advisors to define and make progress on a research project that eventually will serve as the basis of their PhD dissertation. Students are strongly encouraged to meet at least weekly with their advisors to ensure steady progress.

B. Advisory Committee

Each student accepted into the CS&E graduate program is required to have an advisory committee consisting of his or her graduate faculty advisor and two other faculty members.
Before taking the Qualifying Exam, students consult with the research advisor to select Advisory Committee members. The committee is approved by the graduate program director and is formalized by submitting the associated form http://www.mtu.edu/gradschool/policies-procedures/timelines/index.html with the program administrator, home department, and Graduate School. The primary purpose of the Advisory Committee is to guide and monitor the research work of the student. A graduate faculty member external to the home department is required.

C. Policy for Changing Advisor

As a general rule, students are encouraged to practice effective communication and openly discuss with their current advisor any possible significant changes (e.g., research project, advisor, institution, etc.). If there are compelling reasons for changing advisor during the graduate study, the student or the advisor can initiate the process to change advisor in consultation with the program director and home-department chair. If the student or advisor feels that there may be a conflict of interest on the part of the program director or department chair, an outside representative from the Graduate School can be requested.
If the student is under research support from the advisor, the support is not transferred to the new advisor. If the student is under TA support from the home-department, the support will be transferred to the new advisor depending upon home-department policy. If the student is receiving external funding support directly through fellowships such as from NSF or DOE, any fellowship-specific guidelines will be followed; if unspecified, the student will maintain the funding independent of the advisor, pending approval of the funding agency.

The student's course credits will be transferred to the new program if a program change is pursued. It is the responsibility of the student, however, to fulfill the degree requirements of the new program. If the student stays in the same program and pursues a change of advisor, his/her finished course work, qualifying exams, research proposal examination, and published papers will be counted toward the degree. However, the published papers with the previous advisor should not be a part of the thesis with the new advisor.

D. Annual Progress Report and Feedback

Each spring semester students in the CS&E graduate program are requested to submit an annual progress report. Written feedback on the report will be provided by the advisor and program director, at the end of the spring semester or shortly thereafter. If serious deficiencies are identified in a students work and/or progress, a plan for how to proceed will be developed and further feedback will be provided to the student within six months.

III. Graduate Degree Requirements

A. Residency

University policy requires that doctoral students spend at least four semesters (including summer) on campus at Michigan Tech beyond attainment of a bachelor's degree or two semesters on campus at Michigan Tech beyond attainment of a Master's degree in a formal program of study and research under direct supervision. Continuous enrollment in the fall and spring semesters is also required. This requirement may be waived under special circumstances with pre-approval. See the Graduate School Catalog for details.

B. Coursework

A minimum of 30 course and/or research credits beyond the Master's degree, or a minimum of 60 course and/or research credits beyond the Bachelor's degree are required for the Ph.D. degree.

The course work is determined by the student's Advisory Committee and early discussions with the committee in this regard are recommended.

Once students have a research advisor they may enroll in Doctoral Research.

After all required courses are completed, and no later than the semester prior to the final oral examination, the D5 form should be completed, reviewed by the director of the CS&E graduate program, and filed with the Graduate School.

Responsible Conduct of Research (RCR) Training is an important aspect of being an effective scholar and is mandatory whether a Master's or Doctoral degree candidate. Basic training must be completed within the first two semesters or a registration hold will be placed on the student's account. Advanced training must be completed by the end of the third semester. Students may not enter research mode or graduate if RCR training is not complete.
http://www.mtu.edu/gradschool/administration/academics/resources/rcr/

C. Qualifying (Comprehensive) Examination

The qualifying examinations, sometimes called prelims, is administered by the advisory committee and consist of two basic sections: a computational part and a specialty part. The qualifying exams serve to show that CS&E students have
  1. the intellectual potential to do doctoral research,
  2. the computational background to do CS&E doctoral research, and
  3. the special area background to do doctoral research in the chosen specialty area.

Items one and two are verified by the computational exams and items one and three are verified by the specialty exams. To ensure some uniformity while allowing for meaningful variations the format of the computational examination must be approved by the Advisor.

The computational part of the exam covers the computational background needed to do research in the area chosen by the student and advisor. It will usually consist of at least one exam that covers coursework. The Advisory Committee will determine the specific courses to be covered in the exam(s). The Advisory Committee working with the faculty writing and grading the exam(s) will determine if the computational exam(s) will cover only the course materials or also extra materials. If extra materials are covered, they should be explicitly known to the student at least eight weeks in advance of the exam.

It is often the case that a computational exam corresponds to a prelim exam given in the home department. For example, many CS&E students take a computational exam that covers the algorithms course offered in the Department of Computer Science. In this case, the corresponding CS&E exam must be taken at the same time as the departmental exam. Usually it will be the case that the faculty who prepare the departmental exam will prepare and grade the corresponding CS&E exam. The Advisor should coordinate with the respective departments to arrange for a reasonable exam schedule for the CS&E student. The specialty exam will test the student on the principles of the specialty area in which the research will be performed. The advisory committee will contribute questions for the specialty exam. After all parts of the computational exams are taken and graded, the Advisory Committee will meet to decide which of the following three possible exam outcomes is appropriate.

Pass: A pass means that, based on the exam results, the Advisory Committee judges that the student has the intellectual potential and the computational background to do CS&E doctoral research in her/his chosen area. Having the "computational background" does not mean that the student knows all that needs to be known to do the research. It does, however, mean that the student has mastered enough preparatory material so that the research can begin in the near future. It also means that the student will be able to reach the necessary computational maturity in time to do the research.

Conditional Pass: A conditional pass means that, based on exam results, the student demonstrates potential but lacks the necessary groundwork in some significant area. A conditional pass allows the student to make up this deficiency. The student will be given explicit written instructions as to what needs to be done to obtain a pass on the computational exam, and will be given adequate time to satisfy those requirements. The deadline for meeting the requirements of a conditional pass must be given in writing to the student. After the student has completed the required work or after the deadline has passed, the Advisory Committee will decide if the requirements have been met. If so, the student will receive a pass; if not, the student has failed the computational exam. In deciding pass or conditional pass, an Advisory Committee vote of 75 percent is required.

Fail: A fail means that, based on the exam results, the Advisory Committee either judges the student has not demonstrated the intellectual potential to do doctoral research or has not shown the necessary computational background to do research in the chosen area. Each part of the exam may be taken a second time.

D. Research Proposal Exam (Preliminary Exam) and Petition to Enter Research Mode

The Research Proposal Examination is taken after the Qualifying Examination has been passed. It is administered by the student's Advisory Committee for the purpose of reviewing and evaluating the student's proposed plan for research. Once a student has identified a research problem in consultation with his or her research advisor, has become familiar with the related literature, and has devised a plan for research, the Research Proposal Examination should be scheduled. A paper describing the proposed research, not exceeding 15 pages in total length, should be distributed to the Advisory Committee one week prior to the scheduled exam. The student should prepare a 30-minute talk outlining both the problem and the proposed research methods. The remainder of the exam will be devoted to questions and answers related to the proposed research. Although no special form is needed for scheduling this examination, please consult the CS&E program administrative assistant to schedule a room, advertise the talk to the program, home-department and University community, and

prepare the Report on Research Proposal Examination. The Advisory Committee will be given the Evaluation of Graduate Learning Objectives (GLO) to complete during the Examination. Both Report and Evaluation forms are retained for departmental records.

Following the proposal defense, the Advisory Committee may recommend changes and/or ask for additions to be made to the dissertation proposal. Depending on the magnitude of the recommendations, the committee may

- require a second public dissertation proposal presentation;

- ask the student to make the changes/additions in writing and submit them to the committee for approval;

- or may simply ask the student to make note of their suggestions.

Upon successful completion of the Research Proposal Examination, the student completes the Petition to Enter Research Mode for signed approval of his or her advisor and submits it to the Graduate School.

E. Doctoral Dissertation and Final Oral Examination

The research conducted by the student will be presented to the Advisory Committee as a written dissertation. An oral presentation of that dissertation will be made following the completion of the written work. The dissertation is acceptable if the advisor and at least two of the remaining three members of the Advisory Committee concur on its acceptance. The oral defense is open to the university community.

The final examination may be scheduled any time after a period of two academic semesters following the successful completion of the Research Proposal Examination and upon completion of the dissertation in satisfactory form. It is the responsibility of the student to be aware of the most current policies and rules regarding graduation (check with the Graduate School and their website). Two weeks prior to the final examination a completed draft of the dissertation, prepared in accordance with the manual "Instructions Concerning the Preparation of Theses and Dissertations", must be submitted to the Graduate School along with a completed Pre-Defense Form. The student is responsible for obtaining all necessary signatures on this form, as well as scheduling a room for the defense with help from an office assistant as needed. The dissertation is also distributed to the Advisory Committee at this time.

One week before the oral examination, the student submits a defense title and abstract to the CS&E administrative assistant so that announcements can be sent to the department and University community.

The day of the defense, the student brings the Report on Final Oral Examination for subsequent approval; the Advisory Committee completes the Evaluation of Graduate Learning Objectives and Assessment of Final Defense for program record. Following the oral defense, the Ph.D. candidate incorporates all corrections and suggestions of the Advisory Committee into the final dissertation.

After passing the oral examination, the student submits to the Graduate School the Report on Final Oral Examination. Candidates who do not pass the first time may take the final examination again. If the second try is not successful the student is dropped from the program.

Students can familiarize themselves with the deadlines, dissertation submission policies, and necessary graduation forms via the Graduate School's website http://www.mtu.edu/gradschool/administration/academics/timeline/dissertation/

Note to All Students: It is the responsibility of each CS&E graduate student to be familiar with program and home-department policies, as outlined in this handbook and the home-department graduate handbook, and with Graduate School policies as outlined in the Graduate School Catalog. It is the responsibility of each graduate student to be sure that Doctoral (D) forms are completed and authorized in a timely fashion, and are filed with the program administrative assistant and/or Graduate School as prescribed.

Note to International Students: Visa requirements for international students often change. International students should stay well informed of current visa requirements through International Programs & Services or the Graduate School related to timelines and possible changes of status after graduation.

IV. Time Line to Degree

What:	When:
Advisor and Committee Recommendation Form	BY END OF FIRST ACADEMIC YEAR naming research advisor
Responsible Conduct of Research	BASIC by end of first academic year ADVANCED by end of third semester
Report on Qualifying Examination	WITHIN FIRST TWO YEARS in PhD program Submit advisory committee approved form to home department and graduate school
Advisor and Committee Recommendation Form	SEMESTER FOLLOWING passing qualifying exams naming advisory committee
D5 Degree Schedule*	SEMESTER COURSEWORK IS COMPLETE or SEMESTER BEFORE petition to enter research mode
D6 Report on Research Proposal Examination*	UPON PASSING ORAL RESEARCH PROPOSAL EXAM Submit advisory committee approved form to home department and graduate school
Petition to Enter Research Mode* *** These three forms are often submitted**	ONE WEEK PRIOR to the first day of classes in the semester student plans to enter research mode **at the same time**
D7 Pre-Defense Form	TWO WEEKS PRIOR TO ORAL DEFENSE Submit with draft copy of dissertation to graduate school & advisory committee
D8 Report on Final Oral Examination	DAY OF DEFENSE Complete for advisory committee signatures following oral defense
Approval of Dissertation, Thesis, Report	COMPLETE ALL REVISIONS, obtain advisory committee approvals, submit form to graduate school WITHIN ONE WEEK submit dissertation, thesis, report to Digital Commons & ProQuest
Workspace Cleanout Form	BEFORE GRADUATING/LEAVING
Survey of Earned Doctorate; Exit Survey	BEFORE COMPLETING DEGREE

Current versions of all tracking forms are available online at:
http://www.mtu.edu/gradschool/administration/academics/timeline/dissertation/