Master of Science in Applied Computer Science Rules and Procedures
Michigan Technological University

March 11, 2025

1   Introduction

The purpose of this handbook is to provide students pursuing the MS in Applied Computer Science with an overview of the rules governing this program. Students should also familiarize themselves with the degree requirements set forth by the Graduate School. The requirements set by the Graduate School supersede any policies contained in this handbook. The Graduate School requirements are given at `https://www.mtu.edu/gradschool/policies-procedures/requirements/`. Note that the rules and procedures contained in this handbook are subject to change. Please see the Director of Computer Science Graduate Programs for updates.

2   Policies and Procedures

2.1   Admission Requirements

Applicants should have a BS degree in a field outside computer science, information technology and related fields. Examples of BS degrees that are ineligible for admission are computer science, information technology, computer engineering, and computer and network system administration. Examples of BS degrees that are eligible for admission include biology, physics, math, engineering programs, economics, scientific and technical communication, business, and many others.

Students must demonstrate basic computer and mathematical knowledge prior to admission as described below. The MTU courses listed below provide this basic knowledge but are not required. None of these courses can be applied toward the degree. Students with MTU's minor in computer science are expected to have met this requirement.

1. **Programming**: Students must know a high-level language and be able to use it as a problem-solving tool, including design, coding, documentation, debugging, and testing of programs. (CS 1131 or CS 1142)

2. **Data Structures**: Students must know fundamental concepts in data structures including: abstract data types (priority queues, dictionaries and graphs) and their implementations, algorithm analysis, sorting, and text processing. (CS 2321)

3. **Discrete Mathematics**: Students must know fundamental concepts in discrete structures that are used in computer science, including: sets, trees, graphs, functions, relations, recurrences, proof techniques, logic, combinatorics, and probability. (CS 2311)

4. **Calculus and Linear Algebra.**

   (a) **Basic Calculus**: Single-variable calculus including trigonometric, exponential, and logarithmic functions, differentiation and its uses, and basic integration. (MA 1160 or MA 1161)

   (b) **Linear Algebra**: An introduction to linear algebra and how it can be used including systems of equations, vectors, matrices, orthogonality, subspaces, and the eigenvalue problem. (MA 2320 or MA 2321)

A TOEFL score at least 79 (IBT) or 6.5 (IELTS) is required for international applicants whose native language is not English. Successful applicants typically have an undergraduate GPA of 3.2 or better on a 4.0 point scale.

2.2   Advisor and Committee

Students in the report option will have an advisory committee consisting of the student's advisor and at least two additional members. The primary advisor must be a tenured or tenure-track faculty member in the Department of Computer Science. Students are encouraged to find a co-advisor or committee member in their application area. A majority of committee members must be tenured or tenure-track faculty members in the Department of Computer Science.

All advisory committee members must be members of Michigan Tech's Graduate Faculty. The advisory committee members will be selected by the advisor in consultation with the student. An advisor should be chosen during the first year of residence.

2.2.1   Change of Advisor

Before initiating the process to change your graduate advisor, please consider all the options listed on the Graduate School's website for how to address difficulties in the student-advisor relationship (`https://www.mtu.edu/gradschool/resources-for/students/academic/succeeding/index.html`).

Once you have decided to change your graduate advisor, you must follow the steps listed below.

1. Meet with your graduate program director to initiate the process to change advisor. If meeting with the graduate program director is not feasible or appropriate, meet with the department chair.

2. Discuss the following with the graduate program director (or Chair) and, if appropriate, the current advisor:

   - Whether additional resources within or outside the department (such as the Ombuds office) could help resolve the situation.

   - The impact of the change of advisor on your time to complete the degree.

   - Your current and future funding.

   - Research already conducted. Whether this will be incorporated into the dissertation, thesis, or report, and if so, how.

   - Impact on immigration status (if any). Consult International Programs and Services (IPS), if necessary.

   - Record the agreement from the discussions in writing, including indications of agreement from all affected faculty advisors, and provide copies to the student, the graduate program director, and all affected faculty advisors.

3. File an updated Advisor and Committee Recommendation Form for approval by the Graduate School (`https://www.mtu.edu/gradschool/documents/policies-procedures/forms/advisor-committee.pdf`).

4. If the student and the graduate program director are unable to reach agreement on the advisor change, contact the assistant dean of the Graduate School to determine additional steps to resolve the situation.

2.3 Coursework Requirements

All students must satisfy application area, computer science, and core requirements.

Application The application area requirement is satisfied by taking nine to twelve credits at the 4000-level or above in an application area. The courses cannot be in computer science as indicated by the CS prefix on the course number. These courses are selected by the student in consultation with the student's advisor. Application area courses must be approved by the student's advisor.

Computer Science The computer science requirement is satisfied by taking twelve to fifteen credits in computer science at the 4000-level or above. These courses are identified by the CS prefix on the course number.

Core The core requirement is satisfied by taking CS 4321 Algorithms and completing a significant project in the application area. The project is completed as part of CS 5010 Applied Computer Science or through the project option described in section 2.4.1.

The table below summarizes the course requirements.

Required Courses	Report Option (credit hours)	Coursework Option (credit hours)
CS 4321 Algorithms	3	3
CS Electives [a,b]	12–15	12–15
Application Area Electives [a,c]	9–12	9–12
CS 5010 Applied Computer Science	0	3-6
CS 5990 Masters Research in Computer Science	3-6	0
Total	30	30

a. In accordance with Graduate School policy, at most 12 hours total may be at the 4000-level or below.

b. Electives may be any CS course at the 4000-level or above, except CS 5091, CS 5994, CS 6091, CS 6990 and CS 6999. CS 3331 Formal Models of Computation may count toward the degree. CS 5990 can only be taken under the project option.

c. Courses at the 4000-level or above outside computer science. Application area electives must be approved by the student's advisor.

The degree can be completed in the coursework or report option. The option requirements are given in Section 2.4.

One grade of BC may be applied toward the degree. Otherwise, courses must be completed with a grade of B or better.

2.3.1   Plan of Study

It is recommended that students complete the MS in Applied Computer Science Degree Planning Worksheet during their first semester of study. The worksheet is given in Appendix B.

2.3.2   Credit Transfer

A maximum of six course credits taken as a student at other colleges or universities may be accepted for credit towards the MS in Cybersecurity at Michigan Tech. A transferred course cannot have been applied toward any other degree (at Michigan Tech or elsewhere) except under the policies for Michigan Tech's accelerated MS program. If these credits were taken before enrollment at Michigan Tech, a request for transfer credit should be made during the student's first semester on campus.

Transfer credits must be

- approved by a faculty member who teaches an equivalent course at Michigan Tech and by the graduate director, or by the graduate committee and by the student's advisory committee;
- within 10 years of the student's first semester at Tech; and
- completed with a grade of B or better.

2.4   Degree Options

Students may select from among the coursework or project options. Both options require 30 hours of course work. The options are described in detail below.

2.4.1   Report Option

Under the project option, three to six of the 30 hours of credit required for graduation must be in CS5990. Students in the project option may take up to three hours of CS 5999, but the combined total of credits in CS 5990 and CS 5999 cannot exceed six.

In addition to completing the required coursework, the student is expected to:

1. Prepare a written project plan which describes any background necessary for completion of the project and a project plan.
2. Present the project plan to the advisory committee.
3. Prepare a final report at the conclusion of the project.
4. Defend the project report in a public oral seminar presentation.

The final oral defense must be announced to the Department of Computer Science faculty and graduate students at least two weeks prior to the defense. The written report must also be distributed two weeks in advance of the oral defense. A defense may be cancelled if these requirements are not met. Section 4.1 describes the expected process for scheduling an oral presentation.

The department recommends the following timetable for the milestones along the way to a report masters. (Note: items marked with a '+' are milestones; items marked with a '*' are requirements.)

+ Find a major advisor during the first two semesters in the program.

+ Present a project plan to the advisory committee during the 3rd term in residence (not counting summers).

* Provide a "defendable" project report to the entire committee no later than two weeks prior to the oral defense. Make the report available to the CS department faculty and graduate students.

* Defend the report in a public forum. This includes two question and answer sessions: the first consists of both students and faculty; the second being closed to the general audience consists of faculty only.

2.4.2   Course Work Option

The course work option requires 30 hours of graded course work. None of the 30 hours of credit required for graduation may be in CS5990. A student in the coursework option may take up to three credits of CS 5999 but the total credits of CS 5999 and CS 5010 may not exceed six.

2.5   Review

All graduate programs at the university provide constructive written feedback to students who are completing a report, thesis, or dissertation, at least annually. Following is the process for yearly evaluation of students that have chosen the thesis or project options for their MS degree.

Before the start of the fourth week of classes in the Fall semester, each student that has chosen the thesis or report options will complete a yearly progress report for MS Thesis students. (See Appendix A.) The student will complete the report and submit it to their advisor. The advisor will complete the form and meet with the student to discuss the student's progress. The student will then submit the form to the graduate director by email as a PDF and in hard copy.

If deficiencies are identified in a student's performance, the student will receive written feedback from the graduate committee specifically addressing the area(s) of deficiency, timeline for making up the deficiency, and consequences for continued unsatisfactory performance. From this point, the student must complete the evaluation form each semester of enrollment until there is a satisfactory review.

3 Professional Development

Success in graduate school and in a career depends on factors outside of coursework. The following link identifies a range of resources available to help students succeed in graduate school and beyond. `https://www.mtu.edu/gradschool/resources-for/students/professional/`.

3.1 Career Counseling

In addition to the resources identified above, it can be helpful to get advice on professional development specific to a career area. Students are encouraged to contact a faculty advisor in their chosen area to help with coursework selection and career advice.

3.2 Individual Development Plan

An Individual Development Plan encourages a student to reflect on career goals and how best to use the resources and time available during graduate study in order to meet those goals. Students pursuing the Report and Thesis options are especially encouraged to complete an Individual Development Plan.

Many IDP forms are available online. Michigan Tech has created the form linked here `https://www.mtu.edu/gradschool/resources-for/students/professional/documents/mtu-gs-idp.docx` for this purpose. Students are encouraged to use any form they find useful. More information on IDPs is available from the graduate school at: `https://www.mtu.edu/gradschool/resources-for/students/professional/idp/`.

4 Additional Requirements

4.1 Oral Presentation Scheduling

Following are the steps for scheduling an oral presentation.

1. Reserve a room through the site: `https://www.mtu.edu/registrar/students/room-schedule/`.

2. Create a Google Calendar invitation including the presentation location, an abstract and a link or copy of the report, proposal, thesis or dissertation. Send the invitation to the Graduate Assistant. Note that the Graduate Assistant should be able to invite others.

3. The Graduate Assistant will distribute the invitation to the College of Computing faculty and graduate students.

4.2 Forms and Deadlines

Forms and Deadlines for the Graduate School are available at: `https://www.mtu.edu/gradschool/policies-procedures/forms-deadlines/`.

Personalized requirements for each student are maintained at `https://mymichigantech.mtu.edu`.

Students are responsible for keeping track of form requirements and ensuring the required forms are submitted on time.

A MS Applied Computer Science Student Annual Review Form

MS Applied Computer Science Student Annual Progress Report
Sep 1 (YEAR) - Aug. 31 (YEAR+1)

Student Name:

Advisor(s):

Semester you entered the MS program:

Degrees attained prior to entry to MS program:

Milestones

Please fill in the dates you have reached, or expect to reach the following milestones. Work with your advisor for the expected dates.

	Planned Completion Date	Actual Completion Date
Witten plan approved		
Oral plan defended (thesis only)		
Written report approved		
Oral defense		

Comments on milestones:

Research Activities

Write a short summary of your research activities. If you have any papers that have been published, accepted or submitted to conferences or journals, list these. Also list other research activities such as software infrastructure development in this section.

Teaching Activities

1. Courses and/or Labs taught since your last performance review (attach student evaluation report for each course):

2. TA positions served since your last performance review. (attach faculty evaluation for each course):

Professional Development/Service Activities

Indicate any service activities you have engaged in. Include service to the department, the profession or the community.   Examples include "gave campus tours on preview day", "participated in a poster session for undergraduates", etc.

Advisor's Comments

In your opinion, the student's progress toward degree in the past year is

_____Satisfactory
_____Needs improvement
_____Unsatisfactory

Please explain your rating and comment on the student's progress toward graduation, and his/her plan for future milestones.

Signatures:

Advisor: _____   Date:_____

Co-advisor: _____   Date:_____

Student: _____   Date:_____

B   MS Applied Computer Science Degree Planning Worksheet

MS in Applied Computer Science
Degree Planning Worksheet

Describe your goals related to your application:

Planned Coursework		
Course	Credits	Semester
Required (6-9 credits)		
CS 4321 Algorithms (3 credits)	3	
CS 5010 Applied Computer Science or CS 5990 Masters Research in Computer Science (3-6 credits)		
Application Area Electives (9-12 credits)		
CS Electives (12-15 credits)		
TOTAL (30 Credits)		