

Master of Science Degree in Computer and Information Sciences Program Requirements

In addition to satisfying the general requirements of the University, candidates for the Master of Science degree must satisfy both the departmental general requirements and the computer science course requirements.

An Application for Advanced Degree for the Master of Science degree should be filed with the Departmental Graduate Committee no later than the beginning of the semester in which the degree is expected. Application forms are available from the Office of Graduate and Professional Education.

A. Departmental General Requirements

The Departmental General Requirements include:

1. At least ~~9 credits~~ **6 credits** of the 30 credits used to satisfy the degree requirements must be 800-level CISC courses. Credits for independent study, research and master's thesis do not count towards this requirement.
2. A minimum grade average of 3.0 is required in the graduate courses used to satisfy the degree requirements. The University also requires a minimum GPA of 3.0 in all graduate courses taken including any not used towards the required 30 credits. Students are encouraged to explore graduate courses (600 level or higher) in other areas such as electrical engineering, mathematics, linguistics, statistics, and business and economics. Graduate courses outside of Computer and Information Sciences to be used towards meeting degree requirements require written approval of the Graduate Committee.
3. Students are encouraged to participate in the research activities of the Department by taking [CISC 666](#), [CISC 866](#)-Special Problems and Independent Study or [CISC 868](#)-Research. This is especially true of potential PhD students. No more than three credits of [CISC 666](#), [CISC 866](#) or [CISC 868](#) (combined) may be applied toward meeting the degree requirements or used in satisfying the required minimum grade average without prior written approval from the Graduate Committee. (Exception for master's thesis students-see later section.)
4. **Each semester** all graduate students must explicitly register for [CISC 890](#) - Colloquium and sign up and satisfactorily participate in one of the Department's special research interest groups. One faculty member for each group will be responsible for overseeing satisfactory participation for each student on an individual basis (e.g., simply attending, giving a presentation) and will assign a pass/fail grade accordingly. Each MS student needs 3 semesters of passed [CISC 890](#) to graduate. Special arrangements for part-time students and those who finish in less than 3 semesters will be made.

B. Computer Science Course Requirements

Breadth requirement courses:

Area 1: Theory

- Elements of the Theory of Computation ([CISC 601](#))
- Logic in Computer Science ([CISC 604](#))
- Algorithm Design and Analysis ([CISC 621](#))

Area 2: Systems and Networks

- Computer Networks II ([CISC 650](#))
- Computer Systems: Architecture ([CISC 662](#))
- Operating Systems ([CISC 663](#))
- Compiler Construction ([CISC672](#))

Area 3: Software

- Computer Graphics ([CISC 640](#))
- Software Engineering: Principles and Practices ([CISC675](#))
- Artificial Intelligence ([CISC 681](#))

Area 4: Information

- Bioinformatics ([CISC636](#))
- Machine Learning ([CISC689](#)) or Introduction to Data Mining ([CISC683](#))
- Database Systems ([CISC637](#))
- Introduction to Computer Vision ([CISC642](#))

1. All students must take four breadth courses, one in each of the four areas.
2. All students must take a graduate course in either algorithm design and analysis (e.g., [CISC 621](#)) or in theory of computation (e.g., [CISC 601](#)).
3. A grade of B- or better is required in each of the four breadth courses taken to meet the breadth requirement.
4. Substitutions or satisfaction through courses taken at another university are permitted, but require written approval by the Graduate Committee.

C. Master's Thesis

A master's thesis is optional; successful completion requires a combination of six credits of [CISC 868](#) and/or [CISC 869](#), which are included in the thirty credits needed for the MS degree. Students

with a high GPA and/or motivation and ability to perform research are strongly encouraged to get involved in a research project. One way to do this is to complete an MS thesis.

Each student working on a master thesis, with the advice of the master's thesis advisor, needs to establish an advisory committee. The committee consists of 2-3 members of the faculty approved by the CIS Graduate Program Committee. The committee chair is a faculty member in the CIS department, and the thesis advisor. At least one other member should be a faculty member in the CIS department. The proposed advisory committee must be submitted to the Graduate Program Committee for approval. Upon completion of the master's thesis, a final oral examination must be passed, consisting of a defense of the master's thesis. The final oral examination is directed and evaluated by the student's advisory committee.

Admission to the master's degree program does not guarantee that a student can pursue a thesis since more students may desire to do a thesis than there are faculty available to guide them. A thesis student may obtain three credits of [CISC 666](#), [CISC 866](#), [CISC 868](#) in addition to the six credits of [CISC 868](#) and/or [CISC 869](#) applied toward the MS thesis only if the areas of study do not overlap, as approved by the CIS Graduate Committee. The MS thesis student must still satisfy all other Department requirements.

Master of Science Degree in Software Engineering Program Requirements

Credit Requirements: The Master of Science - Software Engineering program requires 30 credit hours of course work. The 30-credit course program of each student must include:

- Fifteen (15) credits of core requirement courses.
- Twelve (12) credits of a specialization track courses.
- Three (3) credits of practicum.

The core courses may be taken in any order. However, all core courses must be completed before the student begins the practicum. The specialization courses may be taken at any time and in any order, as long as all course pre- and co-requisites are respected.

The core courses are:

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| CISC 611/CPEG 611 | Software Process Management | 3 cr |
| CISC 612/CPEG 612 | Software Design | 3 cr |
| CISC 613/CPEG 613 | Software Requirements Engineering | 3 cr |
| CISC 614/CPEG 614 | Formal Methods in Software Engineering | 3 cr |
| CISC 615/CPEG 615 | Software Testing and Maintenance | 3 cr |

The specialization track is determined by the student's interests and must be approved by the student's advisor. The selected courses should form a coherent whole, giving the student a degree of expertise in a single area. Examples of specialization tracks may be found on the program website.

The practicum ([CISC 691/CPEG 691](#)) will be guided by the individual student's interests. It must be arranged with, and approved by, a CIS or ECE faculty member. The student will contribute to a significant software engineering project either on campus or in association with an off-campus organization such as a private business or government agency.