COMPUTER SCIENCE, MS

Program Director

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Master of Science Programs

For students who want to expand their technical expertise beyond their undergraduate major, the Department of Electrical Engineering and Computer Science (EECS) offers master of science (M.S.) degrees in computer engineering, computer science, cybersecurity, and electrical engineering. EECS has a long and distinguished record of graduate education, with many of our graduates placed in key positions in industry. Graduates from our master's programs are well represented in such corporations as IBM, General Electric, Lockheed Martin, Microsoft, Amazon, Google, Facebook and Intel. In all of these degrees, students have the option of completing the M.S. degrees by taking only courses, or by combining coursework with a master's thesis.

The M.S. programs consist of at least 30 credits beyond the B.S. degree. A thesis is optional. Students who are contemplating continuing their studies at the Ph.D. level are encouraged to complete an M.S. degree with the thesis option. A maximum of 9 credits of transfer credit may be included in M.S. programs. Professionals having a baccalaureate degree in fields other than computer engineering, computer science, or electrical engineering who are seeking a career change may take advantage of an opportunity to obtain an M.S. degree in one of these fields by combining suitable remedial undergraduate coursework with the regular program of graduate study.

Admission Requirements

Each of these master's programs has its own admission committee that evaluates the overall academic record of an applicant. Each of these committees uses the following guidelines during the evaluation process:

- GRE Verbal score of 150 or better (using New GRE Score System);
- GRE Quantitative score of 155 or better (using New GRE Score System);
- GRE Analytical (multiple choice) score of 650 or better, or a score of 3.5 or better in the new Analytical Writing; *The GRE (Graduate Record Examination) is currently optional for our programs.
- For international students: TOEFL computer-based score of 223 (Internet-based score 85; paper-based score 563) or better;
- Grade point average (GPA) of 3.0/4.0 or better

Student Learning Outcomes

1. Analyze algorithms in terms of correctness as well as time and space complexity
2. Apply key data structures and algorithm design techniques to synthesize efficient computational solutions
3. Use formal methods to specify and reason about program and system behavior
4. Apply concepts of abstract machines and protection mechanisms to analyze, design, and develop system-level components that meet functional specifications
5. Apply knowledge of computer architecture (including supports for parallelism) to achieve software performance goals

Course Requirements

1. **Graduate Work Beyond the B.S. Degree**
   A minimum of 30 credits of graduate work beyond the B.S. degree is required.
2. **Cumulative Total GPA**
   The student must maintain a cumulative total GPA of at least a 3.0 in those courses to be credited towards the M.S. degree, and a minimum cumulative total GPA of 2.8 in all graduate courses taken at Syracuse University.
3. **A Maximum of 9 Credits of Transfer Credit of Graduate Coursework**
   A maximum of 9 credits of transfer credit of graduate coursework taken at another university with a grade of B or better may be included in the M.S. program.
4. **A maximum of 12 Credits Taken at Syracuse University**
   A maximum of 12 credits taken at Syracuse University before the semester of admission may be included in an M.S. program provided they are relevant to a program in computer engineering and have a grade of B or better.
5. **To Maintain Full-Time Status in the EECS Department**
   To maintain full-time status in the EECS Department, students must register for at least 9 credits per semester. During the last semester of course work, students may take less than 9 credits to be considered as full-time students. Part-time students must complete at least 6 credits per academic year.
6. **Core Course Requirement**
   Each student's program must include:

Code	Title	Credits
CIS 623	Assured Programming with Formal Methods	3
CIS 655	Computer Architecture	3
CIS 657	Principles of Operating Systems	3
CIS 675	Design and Analysis of Algorithms	3

7. **Final Examinations**
   Candidates are required to complete the final examination in all core courses with an average grade of B- or better.
   Students must achieve a transcript grade of B- or better in each of the core courses.
8. **Program must include a minimum of 18 credits of CIS courses**
9. **No more than 6 credits of 500-level courses may be included in an M.S. program.**
10. **Taking Courses Offered by Other Departments**
    Taking courses offered by other departments is generally not allowed. In some cases, it will be permitted with prior approval by the CS program committee.
11. **Students may select a thesis option up to 6 credits**
    The Master's Thesis must be prepared in accordance with the Graduate School's instructions for the Preparation of Theses and Dissertations and must receive prior approval from the thesis advisor. Theses must be presented orally and defended before a faculty panel. Students electing the thesis option must include CIS 997 - Masters Thesis (normally 6 credits) in their programs of study.
12. **Students may take up to 3 independent study credits.**

Three-Year M.S. Plan

The baccalaureate degree in many fields outside computer science may not constitute adequate preparation for the mathematical and technical aspects of graduate study in computing. Students with such a background who nevertheless are seriously interested in a graduate

degree in computer science may achieve the needed preparation by combining suitable undergraduate coursework with the regular program of graduate study requiring an additional year of coursework. Students beginning this work should have one year of calculus equivalent to MAT 295 Calculus I and MAT 296 Calculus II, and at least one high-level programming language equivalent to CPS 196 Introduction to Computer Programming: C, or ECS 102 Introduction to Computing. (See Syracuse University Undergraduate Catalog for descriptions of MAT 295 Calculus I, MAT 296 Calculus II, CPS 196 Introduction to Computer Programming, ECS 102 Introduction to Computing.) The following three-year plan of combined undergraduate and graduate coursework provides the student with the preparation described above, needed for completion of the graduate courses for the M.S. Courses numbered below 500 do not carry graduate credit and constitute the intermediate preparation needed for graduate courses listed later in the plan. Requirements for the M.S. in computer science remain as described above.

First Semester (Fall)		Credits
CIS 375	Introduction to Discrete Mathematics	3
CIS 351	Data Structures	3
One elective graduate course with permission of Program Director		3
	Credits	**9**
Second Semester (Spring)		
CIS 352	Programming Language: Theory & Practice	3
CIS 341	Computer Organization & Programming Systems	3
CIS 342	Introduction to Systems Programming	1
One elective graduate course with permission of Program Director		3
	Credits	**10**
Third Semester (Fall)		
One graduate elective		3
CIS 477	Introduction to Analysis of Algorithms	3
CIS 486		3
	Credits	**9**
Fourth Semester (Spring)		
CIS 623	Assured Programming with Formal Methods	3
CIS 655/CSE 661	Computer Architecture	3
CIS 675	Design and Analysis of Algorithms	3
	Credits	**9**
Fifth Semester (Fall)		
CIS 657	Principles of Operating Systems	3
Two elective graduate courses		6
	Credits	**9**
Sixth Semester (Spring)		
Two elective graduate courses		6
	Credits	**6**
	Total Credits	**52**