MS IN SOFTWARE ENGINEERING

Overview

Software Engineering is concerned primarily with the systematic and disciplined approach to developing software systems. It requires the application of both computer engineering and computer science principles and practices to the creation, operation, and maintenance of software systems and applications. Software systems are becoming increasingly complex, and emerging technologies are pushing the boundaries of reusable components and software quality assurance. The growth of software use in all areas and aspects of everyday life has increased over the past decades and has now become an integral part of society. The reliance on software in critical areas including infrastructure, transportation, utilities, national security, and defense has resulted in the need for properly trained and motivated individuals. ACM along with IEEE, has also indicated in their Computing Curricula 2020 (Dec 31st. 2020), that there has also been a shift away from knowledge-based learning to competency-based learning. They define competency as a combination of Knowledge (know-what) + Skills (know-how) + Disposition (know-why). This program brings together these areas using fundamental software courses to provide base knowledge, mid-level and advanced application areas with practical examples to build the competencies and the communication, intellectual, social and moral dispositions needed in this field.

The Masters program in Software Engineering is directed to professionals who want to advance their competency (knowledge, skills and disposition) in the software arena. This program allows the professional to move beyond the simple view of software as an exercise in "coding". It encompasses the overall process of software development with an emphasis on developing the skills needed to design, develop, and manage large and small software-related projects in diverse fields. The program also offers courses in various application areas including Artificial Intelligence and Learning, Cyber-Security, Cloud-based and Mobile application development, Data analysis and Data science.

Admissions Requirements

Admission to MS degree programs in the College of Engineering (CoE) at the University of Miami is competitive. A qualified applicant needs a strong academic record, as evidenced by their grades in relevant coursework (traditionally a cumulative gpa of 3.0 or higher). Additionally, prospective students should have acceptable scores on TOEFL or ILETS exams (English proficiency exams for international students only), as well as comprehensive letters of recommendation. Transfer of credits from other institutes complies with the rules of the graduate school. Many of our applicants have research experiences that have resulted in publication.

Traditionally a BS degree in engineering is required for admission into one of our MS programs. Students who do not have a degree in an Engineering field can still apply and will be considered by the admission committee, but if admitted pre-requisite coursework is traditionally required before being fully admitted into MS studies with us.

Graduation Requirements

The M.S.S.E. program is a non-thesis program and complies in full with the CoE degree requirements

- An approved integrated program with a minimum of 30 credit hours with an average grade of B or better and no grade below C.
- At least 6 course credit hours must be at the 700-level.

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Curriculum Requirements

Code	Title	Credit Hours
Required Courses		
ECE 610	Software Requirements and Interaction Design (NEW COURSE: Software Requirements and Interaction Design)	3
ECE 618	Software Engineering and Operations (NEW COURSE: Software Engineering and Operations)	3
Core Electives (select at least 4)		**12**
ECE 612	Software Architecture and Design (NEW COURSE: Software Architecture and Design)	
ECE 613	Software Verification and Testing (NEW COURSE: Software Verification and Testing)	
ECE 637	Principles of Artificial Intelligence	
ECE 648	Machine Learning	
ECE 672	Object-Oriented and Distributed Database Management Systems	
ECE 673	Information Assurance	
ECE 676	Internet and Intranet Security	
Other Electives		**12**
	600- and 700- level courses in ECE or other departments selected in consultation with and approval of academic advisor	
Total Credit Hours		**30**

Sample Plan of Study

Year One		
Fall		**Credit Hours**
ECE 610		3
MSSE Core Elective		6
MSSE 600-level Elective		6
	Credit Hours	**15**
Spring		
ECE 618		3
MSEE Core Elective		6
MSEE 700-level Elective		6
	Credit Hours	**15**
	Total Credit Hours	**30**

Mission

The mission of the Software Engineering Masters Program is to produce graduates who have advanced competency in the design of reliable, trustworthy, secure, and usable software systems and who can successfully apply this competency in large-scale projects in many diverse fields such as medical, transportation, manufacturing, business, industrial and military applications.

Program Educational Objectives

We expect that the alumni of the Software Engineering Program will exhibit the following:

1. Successful careers in dynamic and multidisciplinary fields with the ability to apply software engineering practices within societal, global, and environmental contexts in an ethical manner.
2. Demonstrating life-long learning through activities such as completion of professional software engineering certifications.

Student Learning Outcomes

1. Graduates of the program will be able to exhibit competency (knowledge, skill, disposition) in the Software Engineering discipline. They should be able to apply in their work 1) advanced software process planning and development skills and 2) advanced knowledge of software solutions.
2. The student will leave the university with the ability to apply critical thinking to complex software engineering problems. This means that they should be able to 1) identify advanced software engineering problems and address them, and 2) demonstrate proficiency in critically analyzing and solving advanced software engineering problems.

3. The students will demonstrate proficiency in conveying the results of their work both in terms of written communication and convincing oral presentation.