B.S. IN COMPUTER ENGINEERING/M.S. IN SOFTWARE ENGINEERING DUAL DEGREE

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 BS/MS program in Software Engineering is directed to computer engineering and other engineering disciplines who seek advanced professional training or specialization in a particular area of software engineering; This program allows the student 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. The BS/MS students will receive undergraduate degrees in Computer Engineering and a graduate degree in Software Engineering administered by the Department Electrical and Computer Engineering.

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.

Admission Requirements

This program is intended for exceptional students to acquire both a Bachelor of Science and a Master of Science degree simultaneously, in five years rather than the 4 plus 2 years (approximately) it normally requires.

Requirements

You must be an undergraduate student in the College of Engineering (CoE). A master's degree is considered the first professional degree in engineering. The Admission Committee will carefully review academic credentials for admission into our M.S. program. Students should discuss the program and possibility of entering with an academic adviser. Completed applications are due prior to the beginning of the final exams in your junior year.

Get the application form (it is different for US students and International students) from the CoE Office of Research and Graduate Studies, fill it out and then return it to the same office. The application fee is waived for currently enrolled students in the CoE.

Take the GRE Examination before the end of your senior year and attain a combined score of more than 1000 on the Verbal and Quantitative portions. You must have a cumulative GPA of at least 3.0 at the time of application.

For further information about admission into the graduate school see the Bulletin of the Graduate School (https://bulletin.miami.edu/graduate-academic-programs/engineering/).

For more detailed information about the CoE Five-Year programs, please refer to the College of Engineering Bulletin section (https://bulletin.miami.edu/undergraduate-academic-programs/engineering/#fiveyearbsmsprogramtext).

The graduate component of the BS/MS in Software Engineering consists of 6 required credits, 12 core credits taken from a selected set of courses designed to provide core fundamentals and 12 credits of open electives of which at least must be at the 700 level. The open electives allows students to explore various topics related to software and aligned with their interests and goals.

Curriculum Requirements

Code	Title	Credit Hours
BS IN COMPUTER ENGINEERING DEGREE REQUIREMENTS		**129**
Refer to the link below for more information on the BSCpE requirements.		
https://bulletin.miami.edu/undergraduate-academic-programs/engineering/electrical-computer-engineering/computer-engineering-bscpe-computer-engineering-option/#curriculumtext		
MS IN SOFTWARE ENGINEERING REQUIREMENTS		**30**
Refer to the link below for more information on the MSSE requirements.		
https://bulletin.miami.edu/graduate-academic-programs/engineering/electrical-computer-engineering/software-engineering-ms (https://bulletin.miami.edu/graduate-academic-programs/engineering/electrical-computer-engineering/software-engineering-ms/)/		
Total Credit Hours		**159**

Sample Plan of Study

Freshman Year		
Fall		**Credit Hours**
EGN 123	Computing and Digital Solutions for the future	3
ECE 118	Introduction to Programming	3
WRS 105	First-Year Writing I	3
MTH 151	Calculus I for Engineers	5
A&H Cognate Course		3
	Credit Hours	**17**
Spring		
ECE 112	Introduction to Engineering II	2
ECE 218	Data Structures	3
WRS 107	First-Year Writing II: STEM	3
PHY 221	University Physics I	3
MTH 162	Calculus II	4
P&S Cognate Course		3
	Credit Hours	**18**
Sophomore Year		
Fall		
ECE 211	Logic Design	3
ECE 318	Algorithms	3
MTH 210	Introduction to Linear Algebra	3
PHY 222	University Physics II	3
PHY 224	University Physics II Lab	1
A&H Cognate Course		3
P&S Cognate Course		3
	Credit Hours	**19**
Spring		
ECE 201	Electrical Circuit Theory	3
ECE 212	Processors: Hardware, Software, and Interfacing	3
ECE 315	Digital Design Laboratory	1
ECE 310 or ISE 310	Introduction to Engineering Probability or Introduction to Engineering Probability	3

MTH 309	Discrete Mathematics I	3
P&S Cognate Course		3
Basic Science Elective		3
	Credit Hours	**19**
Junior Year		
Fall		
ECE 202	Electronics I	3
ECE 203	Electrical Circuits Laboratory	1
ECE 316	Structured Digital Design	1
ECE 322	Systems Programming	3
ECE 414	Computer Organization and Design	3
Basic Science Elective		3
Basic Science Lab Elective		1
A&H Cognate Course		3
	Credit Hours	**18**
Spring		
ECE 302	Electronics II	3
ECE 303	Electronics Laboratory	1
ECE 454	Digital System Design and Testing	3
ECE 455	Design-for-Testability Laboratory	1
ECE 467	Database Design and Management	3
MTH 311	Introduction to Ordinary Differential Equations	3
CE Technical Elective		3
	Credit Hours	**17**
Senior Year		
Fall		
ECE 206	Circuits, Signals, and Systems	3
ECE 417	Embedded Microprocessor System Design	3
ECE 481	Senior Project I	1
CE Technical Elective		3
ECE 610	Software Requirements and Interaction Design	3
MSSE Core Elective		3
	Credit Hours	**16**
Spring		
ECE 421	Computer Operating Systems	3
ECE 482	Senior Project II	2
CE Technical Elective		3
ECE 618	Software Engineering and Operations	3
MSSE Core Elective		3
CE Technical Elective		3
	Credit Hours	**17**
Year Five		
Fall		
MSSE Core Elective		3
600-level Elective		3
700-level Elective		3
	Credit Hours	**9**
Spring		
MSSE Core Elective		3
600-level Elective		3

700-level Elective	3
Credit Hours	**9**
Total Credit Hours	**159**