COMPUTER ENGINEERING (BSCPE)

Description

The Bachelor of Science in Computer Engineering program prepares students to have an understanding of computer hardware, software, and electrical engineering fundamentals, thereby acquiring knowledge to develop and/or apply many kinds of computing systems, such as microprocessors, computers, smart phones, and Internet of Things (IoT) devices. Students in the program will have knowledge of computer programming languages, hardware description languages, digital logic design, computer organization, electrical and electronics circuit design, and processing of electrical signals. They will have the ability to apply mathematical and statistical methods for understanding, development, and applications of computing devices.

The graduates of the program will be able to pursue (i) employment in electronic chip design/production companies, hardware/software services companies, and all industries requiring electrical and computer engineers, such as automotive, aerospace, defense, utilities and heavy-machinery; and (ii) advanced study in computer engineering or a related field.

Minimum Total Credit Hours: 126-134 depending on concentration

Goals/Mission Statement

Mission Statement

The mission of the electrical and computer engineering department is to provide quality education to the students of the department.

Statement of Goals

- To provide high quality instruction and intellectual stimulation for the students
- To provide opportunity for undergraduate students to participate in research pursued by faculty
- To instill in our graduates the need for life-long learning
- To enable graduate students to pursue high quality research so that they will emerge as future technological leaders and academics
- To establish strong partnerships and lasting relationships with industry, government, professional societies, alumni and academia. These goals are consistent with the University of Mississippi Vision, Mission, and Core Values Statement and the flagship 2020 goals of UM/2020 Strategic Plan which focuses resources in the areas of instruction, research, and service.

Undergraduate Program Philosophy

The computer engineering undergraduate program is founded on basic sciences, mathematics, and engineering science fundamentals. The program emphasizes theoretical foundation as well as the application of scientific knowledge to the solution of engineering problems. This focus is intended to lead students to develop analysis and design skills, and original thought processes that will serve them throughout their careers in a rapidly changing world.

The computer engineering program is a broad-based program with an emphasis on the fundamentals of computer engineering. The curriculum consists of background courses in science and mathematics; courses in the humanities, social sciences, and fine arts that foster an appreciation of the interrelationship of basic sciences, technological advances, and society; and major multi- course sequences in engineering. Multi-course sequence areas are:

- Core topics common to electrical and computer engineering, such as circuits, electronics, signals and systems analysis, and digital systems
- Programming languages, computer operating systems, and algorithms and data structures computer architecture and microprocessors
- Technical elective courses such as embedded systems, VLSI design and testing of computing systems
- Engineering design

The BSCpE degree program can be pursued with the manufacturing emphasis or no emphasis (general). In the manufacturing emphasis, a specific set of courses are required.

Program Educational Objectives

Based on our philosophy and goals the Faculty of the Department of Electrical and Computer Engineering have adopted the following Undergraduate Program Educational Objectives for graduates of the Bachelor of Science in Computer Engineering (BSCpE) undergraduate program. The graduates of the program within 3-5 years after graduation will:

- Demonstrate professional engineering competence by holding positions of increasing responsibility in industry or government;
- Continue to improve their technical skills, knowledge and understanding through research and development activities, continuing education credits and pursuit of professional certificates;
- Attain advanced degrees and work in academia, government agencies or high-tech companies;
- Generate professional publications, develop patents and foster entrepreneurship.

Student Outcomes

Students of the Bachelor of Science in Computer Engineering program will demonstrate achievement of the following student outcomes:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. An ability to communicate effectively with a range of audiences
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Degree Requirements

The academic regulations for this degree program, as entered in the University of Mississippi Catalog, are in effect for the current or selected academic year and semester. The University of Mississippi reserves the right to

1. change or withdraw courses;
2. change rules for registration, instruction, and graduation; and
3. change other regulations affecting the student body at any time.

General Education

Code	Title	Hours
Select one of the following First Year Writing I courses:		3
HONR 1010	Freshman Honors I	
WRIT 1000	Introduction to College Writing	
WRIT 1010	First-Year Writing I	
Select one of the following First Year Writing II courses:		3
WRIT 1020	First-Year Writing II	
LIBA 1020	First Year Seminar	
HONR 1020	Freshman Honors II	
Select three hours of fine arts from the following: [1]		3
Art History (ARTH)		
Music (MUSC)		
Dance (DANC)		
Theatre Arts (THEA)		
LIBA 1300	Introduction to the Fine Arts	
LIBA 2040	Interdisciplinary Arts	
LIBA 3140	Advanced Interdisciplinary Arts	
MUSC 1010	Introduction to Music Literature	
MUSC 1020	Fundamentals of Music Theory	
MUSC 1030	Introduction to Music	
MUSC 1040	Introduction to World Music Cultures	
MUSC 1050	Music Theory and Analysis I	
DANC 2000	Dance Appreciation	
THEA 2010	Appreciation of the Theatre	
THEA 2020	Introduction to Cinema	
Select six hours of humanities courses from the following:		6
AAST 2010	African American Experience I	
AAST 2020	African American Experience II	
Classics (CLSC)		
English (ENGL 2220-2226)		
ISOM 2010	Introduction to Gender Studies	
ISOM 2020	Introduction to Queer Studies	
History (HIST)		
LIBA 2020	Interdisciplinary Humanities	
LIBA 3050	Humanities and the Experience of War	
LIBA 3120	Advanced Interdisciplinary Humanities	
Philosophy (PHIL)		
Religion (RELG)		
Southern studies (SSTU 1000-level)		
HONR 1010	Freshman Honors I [2]	
HONR 1020	Freshman Honors II [2]	
Total Hours		**15**

[1] Studio and workshop courses cannot be used to satisfy this requirement.

[2] if not being used to fulfill composition requirements

General Education II

Code	Title	Hours
MATH 2611	Unified Calculus & Analytic Geometry I	3
MATH 2612	Unified Calculus & Analytic Geometry II	3
MATH 2613	Unified Calculus & Analytic Geometry III	3
MATH 2614	Unified Calculus & Analytic Geometry IV	3
MATH 3530	Elementary Differential Equations	3
CHEM 1050	General Chemistry I	3
CHEM 1051	General Chemistry Laboratory I	1
PHYS 2110	Physics for Science & Engineering I	3
PHYS 2120	Physics for Science & Engineering II	3
PHYS 2111	Lab Physics for Science & Engineering I	1
PHYS 2121	Lab Physics for Science & Engineering II	1
Total Hours		**27**

Major Requirements

Code	Title	Hours
CMPE 4310	Computer Architecture	3
CMPE 4611	Senior Design in Computer Engineering I	1
CMPE 4612	Senior Design in Computer Engineering II	3
ELEC 2350	Principles of Digital Systems	3
ELEC 2360	Digital Systems Laboratory I	1
ELEC 2370	Electrical Engineering Tools and Toys	1
ELEC 3220	Electric Circuit II	1
ELEC 3310	Signals and Systems	3
ELEC 3511	Electronics Circuits I	3
ELEC 3512	Electronics Circuits II	3
ELEC 3513	Electronics Laboratory	1
ELEC 3850	Advanced Digital Systems	3
ELEC 3860	Advanced Digital Systems Laboratory	1
ELEC 4250	Local Area Networks	3
ELEC 4850	Microprocessor Systems Engineering	2
ELEC 4860	Microprocessor Systems Engr Lab	1
Total Hours		**33**

Major Requirements II

Code	Title	Hours
CSCI 1056	Programming in Python	3
CSCI 2056	Data Structures in Python	3
CSCI 4023	Introduction to Operating Systems	3

CSCI 4033	Algorithm and Data Structure Analysis	3
CMPE 3610	Design and Design Tools in ECE	1
ENGR 1010 & ENGR 1110	Engineering Fundamentals and Engineering Fundamentals Lab	3
ENGR 3100	Engineering Analysis I	3
ENGR 3600	Electric Circuit Theory	3
ENGR 3610	Electric Circuit Laboratory	1
MATH 3010	Discrete Mathematics	3
ECON 3100	Engineering Economy	3
3 hours of social sciences		3
Total Hours		**32**

Standard Option

Code	Title	Hours
ELEC 1000	Intro to Electrical and Computer Eng	1
Select nine hours of Tech Elective I of the following:		9
CMPE 4210	Embedded Systems Design	
CMPE 4320	Testing of Computing Systems	
ELEC 4820	Digital CMOS VLSI Design	
ELEC 5360	Introduction to Quantum Computing	
Select nine hours of Tech Elective II of the following:		9
ELEC 3400	Electrical Engineering Analysis I	
ELEC 3410	Theory of Fields	
ELEC 3910	Probability and Random Signals	
ELEC 4310	Theory of Control Systems	
ELEC 4470	Modulation, Noise, and Communications	
ELEC 4530	Solid State Devices	
ELEC 5330	Electronic Properties of Materials	
ELEC 5340	Wireless Mobile Communications	
ELEC 5350	Digital Communications	
ELEC 5360	Introduction to Quantum Computing	
ELEC 5370	Digital Signal Processing	
or other courses from Technical Elective I, II not already completed or a maximum of 3 hours of CSCI at 3000 level or above		
Total Hours		**19**

Concentration - Manufacturing

Code	Title	Hours
MANF 1501	Intro to Engineering / Manufacturing	1
MANF 1502	Intro to Engineering & Manufacturing II	1
MANF 2510	Manufacturing Processes	3
MANF 2520	Product Realization Laboratory	1
MANF 2550	Lean I: Standardized Work & Takt Time	1
MANF 3250	Principles of Ops & Supply Chain Mgmt	3
MANF 3510	Manufacturing Product/Process Design	1
MANF 3530	Accounting & Financial Mgmt for Manf	3
MANF 3550	Lean II: Continuous Flow/Layout	1
MANF 4550	Lean III: Practical Problem Solving	3
Select nine hours of Technical Electives I of the following:		9
ELEC 4820	Digital CMOS VLSI Design	
ELEC 5360	Introduction to Quantum Computing	
CMPE 4210	Embedded Systems Design	
CMPE 4320	Testing of Computing Systems	
Total Hours		**27**