ELECTRICAL ENGINEERING (BSEE)

Description

The Bachelor of Science in Electrical Engineering program provides broad knowledge in basic and engineering sciences. The curriculum provides thorough knowledge of the field of electrical engineering. A manufacturing emphasis within B.S.E.E. is available to students admitted to the Center for Manufacturing Excellence (CME) Program. All other B.S.E.E. students follow the general program.

Minimum Total Credit Hours: 128-134 total hours 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 electrical 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 electrical engineering program is a broad-based program with an emphasis on the fundamentals of electrical 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:

1. Core topics common to many areas of engineering
2. Circuits, electronics, and systems
3. Digital Logic, computer architecture
4. Technical elective courses
5. Engineering design

The BSEE degree program can be pursued with the manufacturing emphasis or no emphasis (general). In the manufacturing emphasis, a specific set of courses are required. For general, a broad choice of technical elective courses is available.

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 Electrical Engineering (BSEE) 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 and/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 Electrical 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
LIBA 1020	First Year Seminar	
WRIT 1020	First-Year Writing II	
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]	
Select three hours of social sciences courses from the following:		3
Economics (ECON)		
Anthropology (ANTH)		
Political science (POLS)		
Psychology (PSYC)		
Sociology (SOCY)		
ECON 3100	Engineering Economy	3
Total Hours		**21**

[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
ELEC 2350	Principles of Digital Systems	3
ELEC 2360	Digital Systems Laboratory I	1
ELEC 2370	Electrical Engineering Tools and Toys	1
ELEC 3310	Signals and Systems	3
ELEC 3220	Electric Circuit II	1
ELEC 3400	Electrical Engineering Analysis I	3
ELEC 3410	Theory of Fields	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 3910	Probability and Random Signals	3
ELEC 4310	Theory of Control Systems	3
ELEC 4470	Modulation, Noise, and Communications	3
ELEC 4611	Sr. Design in Electrical Engineering I	1
ELEC 4612	Sr. Design in Electrical Engineering II	3
ELEC 4850	Microprocessor Systems Engineering	2
ELEC 4860	Microprocessor Systems Engr Lab	1
Total Hours		**42**

- School of Engineering GPA
  - Must be at least a 2.0
- Enroll in a BSEE emphasis
  - Enroll in an emphasis within the BSEE program.

Major Requirements II

Code	Title	Hours
CSCI 1056	Programming in Python	3
CSCI 2056	Data Structures in Python	3
CMPE 3610	Design and Design Tools in ECE	1
ENGR 1010 & ENGR 1110	Engineering Fundamentals and Engineering Fundamentals Lab	3
ENGR 3090	Statics	3
ENGR 3100	Engineering Analysis I	3
ENGR 3600	Electric Circuit Theory	3
ENGR 3610	Electric Circuit Laboratory	1
Total Hours		**20**

Concentration - General Program

Description

The B.S.E.E. with general emphasis provides broad training in basic and engineering sciences and fundamental knowledge of electrical engineering. The general emphasis provides greater flexibility for a student to choose 14 credit hours of technical elective courses from a breadth of electrical engineering topical areas.

Degree Requirements

Code	Title	Hours
ELEC 1000	Intro to Electrical and Computer Eng	1
or ENGR 1000	Introduction to Engineering	
ENGR 3210	Thermodynamics	3
Select 14 hours of technical electives of the following: [1]		14
BMED 3010	Bioinstrumentation	
BMED 3130	Physiology for Biomedical Engineering	
BMED 3140	Biomedical Measurement	
BMED 4130	Biomedical Signal Processing	
ELEC 4150	Telecommunications Laboratory	
ELEC 4250	Local Area Networks	
ELEC 4330	High Frequency and Microwave Laboratory	
ELEC 4411	Electromagnetic Theory I	
ELEC 4430	Network Analysis and Synthesis	
ELEC 4510	Electrical Energy Conversion	
ELEC 4530	Solid State Devices	
ELEC 4820	Digital CMOS VLSI Design	
ELEC 4870	Digital Signal Processing Laboratory	
ELEC 5230	Microwave Engineering	
ELEC 5250	Introduction to Antennas	
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	
CMPE 4210	Embedded Systems Design	
CMPE 4310	Computer Architecture	
CMPE 4320	Testing of Computing Systems	
CSCI 3061	Introduction to Computer Networks	
CSCI 4023	Introduction to Operating Systems	
CSCI 5021	Computer Systems Engineering	
CSCI 5030	Computer Architecture and Design	
CSCI 5051	Computer System Performance Analysis	
CSCI 5061	Computer Networks	
Total Hours		**18**

[1] A maximum of 6 hrs. of 3000+ level courses from CSCI, Math, Phys can be counted as technical electives, subject to approval by the Chair of ECE.

Concentration - Manufacturing

Description

The B.S.E.E. with emphasis in manufacturing provides broad training in basic and engineering sciences and fundamental knowledge of electrical engineering, with a focus on manufacturing.

Degree Requirements

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 six hours of technical electives of the following:		6
BMED 3010	Bioinstrumentation	
BMED 3130	Physiology for Biomedical Engineering	
BMED 3140	Biomedical Measurement	
BMED 4130	Biomedical Signal Processing	
ELEC 4150	Telecommunications Laboratory	
ELEC 4250	Local Area Networks	
ELEC 4330	High Frequency and Microwave Laboratory	
ELEC 4411	Electromagnetic Theory I	
ELEC 4430	Network Analysis and Synthesis	
ELEC 4510	Electrical Energy Conversion	
ELEC 4530	Solid State Devices	
ELEC 4820	Digital CMOS VLSI Design	
ELEC 4870	Digital Signal Processing Laboratory	
ELEC 5230	Microwave Engineering	
ELEC 5250	Introduction to Antennas	
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	
CMPE 4210	Embedded Systems Design	
CMPE 4310	Computer Architecture	
CMPE 4320	Testing of Computing Systems	

CSCI 3061	Introduction to Computer Networks	
CSCI 4023	Introduction to Operating Systems	
CSCI 5021	Computer Systems Engineering	
CSCI 5030	Computer Architecture and Design	
CSCI 5051	Computer System Performance Analysis	
CSCI 5061	Computer Networks	
Total Hours		**24**