Department of Electrical and Computer Engineering

Department Head: Dr. Nicolas Younan
Major Advisor: Kylie Crosland
Office: 216 Simrall Engineering Building

Alumni, employers, faculty and students participate in a process used to develop educational objectives for the undergraduate programs in Electrical Engineering and Computer Engineering. Within a few years of graduation, program graduates completing the baccalaureate degree in Electrical or Computer Engineering will:

- Be recognized by their peers as fundamentally sound in the application of mathematics, science, computing, and engineering.
- Be engaged in the practice of Electrical or Computer Engineering as innovative problem solvers with a strong work ethic, by identifying and implementing solutions using the proper tools, practical approaches, and flexible thinking.
- Be productive and demonstrate leadership in the practice of Electrical or Computer Engineering, both individually and within multidisciplinary teams, using effective oral and written communication skills when working with peers, supervisors, and the public.
- Be responsible in the practice of Electrical or Computer Engineering, relying on sound engineering ethics, a commitment to lifelong learning and a genuine concern for society and the environment.

Computer Engineering Major (CPE)

Major Advisor: Ms. Kylie Crosland
Office: 216 Simrall Engineering Building

With the origin of the modern computer dating back to the late 1940's and the growth of computer hardware fueled by the availability of digital integrated circuits starting in the late 1960's, computer engineers have enjoyed a pivotal role in technology that now permeates our entire society. Whether the end product is an integrated circuit, a system of networked embedded computers, or any system that relies on digital hardware or computer software, its development requires the skills of a computer engineer. While computing systems include both hardware and software, it is the optimal combination of these components that is the unique realm of the computer engineer. Today, computer engineers are a driving force in the technological and economic development of the digital age.

The curriculum requirements for computer engineering are built around a substantial engineering core curriculum and required courses in electrical engineering and computer science. The requirements in mathematics, the basic sciences, and engineering sciences provide the breadth of exposure required for all engineering disciplines. Basic electrical engineering requirements include circuit theory, electronics and digital devices which are supplemented by upper-level courses in computer architecture, and computer aided design of digital systems. Basic computer science courses include a coordinated sequence providing fundamental knowledge in data structures, algorithms, object oriented programming, software engineering, real-time application and software development tools. These courses are developed across multiple platforms and are based on the Python and Java language. Upper-level courses in data communications and computer networks, algorithms and operating systems are also provided. Students wishing to gain depth of coverage in communications, parallel computing, VLSI, embedded systems or signal processing can achieve this with the availability of technical electives selected from an approved list or in consultation with a faculty advisor. Required courses in communications skills, social sciences and humanities provide studies in non-technical areas that are traditional in a broad-based education. A capstone senior design course requires students to apply newfound knowledge and explore entrepreneurship. Students research and identify a problem and work in teams applying a combination of hardware and software to develop a solution. Critical and Final Design Reviews enable students to develop their professional presentation skills.

Students expecting to graduate from Mississippi State University with a bachelor of science degree in computer engineering, in addition to satisfactorily completing the CPE curriculum requirements, must meet the following minimum GPA requirements for graduation:

- make an overall C average on all hours scheduled and rescheduled at all institutions attended, including MSU (2.00 or better cumulative GPA)
- make a C average on all hours scheduled and rescheduled at MSU (2.00 or better MSU GPA)
- earn at least a 2.5/4.0 average on all hours with ECE or CSE course prefixes scheduled and rescheduled at all institutions attended, including MSU

The computer engineering program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org.

This program is offered through joint efforts of faculty in the Department of Electrical and Computer Engineering and the Department of Computer Science and Engineering.

Electrical Engineering Major (EE)

Major Advisor: Ms. Kylie Crosland
Office: 216 Simrall Engineering Building

The electrical engineer is a principal contributor to the modern technological age in which we live today. Following in the footsteps of inventors such as Thomas Edison and Alexander Graham Bell, the electrical engineer is developing technology that improves the quality of life. Developments in microelectronics, telecommunications, and power systems have had a profound effect on each of us. Electrical engineers have affected all segments of our society such as transportation, medicine, and the entertainment industry, to name only a few. Indeed, the electrical engineer has principally been responsible for the advent of the computer age in which we live today as well as the computer's miniaturization and rapid expansion in computational power.

The curriculum in electrical engineering has a foundation based on the principles of the electrical and physical sciences and uses mathematics as a common language to facilitate the solution of engineering problems. The core curriculum consists of a sequence of courses in digital devices, circuits and electronics, electromagnetic field theory, and modern energy conversion. In the senior year, students have the opportunity to take additional course work in one or more technical areas that include: telecommunications, electromagnetics, power systems, high voltage, feedback control systems, microelectronics, signal processing, and computer systems. Supporting course work outside electrical engineering consists of a strong background in mathematics, physical sciences, computer programming, social sciences, fine arts, humanities, and personal communication skills. Computers are used extensively throughout the curriculum, and students are expected to become proficient in higher-order programming languages and several application software tools. Although the concept of design is stressed throughout the program so as to emphasize the problem-solving skills of the engineer, the senior year includes a capstone design experience where much of the previous study is culminated. Through this two-semester design course sequence, students are required to integrate design and analytical problem-solving skills together with communication skills in a team environment.

Students expecting to graduate from Mississippi State University with a bachelor of science degree in electrical engineering, in addition to satisfactorily completing the EE curriculum requirements, must meet the following minimum GPA requirements for graduation:

- make an overall C average on all hours scheduled and rescheduled at all institutions attended, including MSU (2.00 or better cumulative GPA)
- make a C average on all hours scheduled and rescheduled at MSU (2.00 or better MSU GPA)
- earn at least a 2.5/4.0 average on all hours with ECE or CSE course prefixes scheduled and rescheduled at all institutions attended, including MSU

The electrical engineering program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org.

Computer Engineering Major (CPE)

General Education Requirements

English Composition

EN 1103	English Composition I	3
or EN 1163	Accelerated Composition I	
EN 1113	English Composition II	3
or EN 1173	Accelerated Composition II	
Mathematics		
See Major Core		
Science		
See Major Core		
Humanities		
See General Education courses		6
Fine Arts		
See General Education courses		3
Social/Behavioral Sciences		
See General Education courses		6
Major Core		
Math and Basic Science		
MA 1713	Calculus I	3
MA 1723	Calculus II	3
MA 2733	Calculus III	3
MA 2743	Calculus IV	3
MA 3113	Introduction to Linear Algebra	3
MA 3253	Differential Equations I	3
IE 4613	Engineering Statistics I	3
CH 1213	Chemistry I	3
CH 1211	Investigations in Chemistry I	1
PH 2213	Physics I	3

PH 2223	Physics II	3
Engineering Topics		
CSE 1284	Introduction to Computer Programming	4
CSE 1384	Intermediate Computer Programming	4
CSE 2383	Data Structures and Analysis of Algorithms	3
CSE 2813	Discrete Structures	3
CSE 3324	Distributed Client/Server Programming	4
CSE 4733	Operating Systems I	3
CSE 4833	Introduction to Analysis of Algorithms	3
ECE 1002	Introduction to Electrical & Computer Engineering	2
ECE 3413	Introduction to Electronic Circuits	3
ECE 3424	Intermediate Electronic Circuits	4
ECE 3434	Advanced Electronic Circuits	4
ECE 3443	Signals and Systems	3
ECE 3714	Digital Devices and Logic Design	4
ECE 3724	Microprocessors	4
ECE 4723	Embedded Systems	3
or ECE 4263	Principles of VLSI Design	
ECE 4532	CPE Design I	2
ECE 4542	CPE Design II	2
ECE 4713	Computer Architecture	3
ECE 4743	Digital System Design	3
ECE 4833	Data Communications and Computer Networks	3
CPE Technical Electives [1]		6
Oral Communication Requirement		
CO 1003	Fundamentals of Public Speaking	3
or CO 1013	Introduction to Communication	
Writing Requirement		
GE 3513	Technical Writing	3
Computer Literacy		
Fulfilled in Engineering Topics courses		
Total Hours		128

[1]   See advisor for approved courses.

Electrical Engineering Major (EE)

General Education Requirements

English Composition		
EN 1103	English Composition I	3
or EN 1163	Accelerated Composition I	
EN 1113	English Composition II	3
or EN 1173	Accelerated Composition II	
Mathematics		
See Major Core		
Science		
See Major Core		
Humanities		
See General Education courses		6
Fine Arts		
See General Education courses		3
Social/Behavioral Sciences		
See General Education courses		6

Major Core		
Math and Basic Science		
MA 1713	Calculus I	3
MA 1723	Calculus II	3
MA 2733	Calculus III	3
MA 2743	Calculus IV	3
MA 3113	Introduction to Linear Algebra	3
MA 3253	Differential Equations I	3
IE 4613	Engineering Statistics I	3
CH 1213	Chemistry I	3
CH 1211	Investigations in Chemistry I	1
PH 2213	Physics I	3
PH 2223	Physics II	3
Engineering Topics		
CSE 1284	Introduction to Computer Programming	4
CSE 1384	Intermediate Computer Programming	4
CSE 2383	Data Structures and Analysis of Algorithms	3
ECE 1002	Introduction to Electrical & Computer Engineering	2
ECE 3213	Introduction to Solid State Electronics	3
ECE 3413	Introduction to Electronic Circuits	3
ECE 3424	Intermediate Electronic Circuits	4
ECE 3434	Advanced Electronic Circuits	4
ECE 3443	Signals and Systems	3
ECE 3313	Electromagnetics I	3
ECE 3323	Electromagnetics II	3
ECE 3614	Fundamentals of Energy Systems	4
ECE 4512	EE Design I	2
ECE 4522	EE Design II	2
ECE 3714	Digital Devices and Logic Design	4
ECE 3724	Microprocessors	4
EM 2413	Engineering Mechanics I	3
or ME 3513	Thermodynamics I	
EE technical electives [1]		9
Engineering Science elective [1]		3
Professional Enrichment elective [1]		3
Oral Communication Requirement		
CO 1003	Fundamentals of Public Speaking	3
or CO 1013	Introduction to Communication	
Writing Requirement		
GE 3513	Technical Writing	3
Computer Literacy		
Fulfilled in Engineering Topics courses		
Total Hours		128

[1]   See advisor for approved courses.

A minor in Electrical Engineering (EE) will prepare students for additional study or employment in electrical engineering fields. Students will become familiar with basic theory and techniques necessary for analyzing electrical and electronics systems and informing their design decisions involving electrical and electronics systems. Academic advising toward the EE mionor is available from the ECE Undergraduate Program Coordinator located in 216 Simrall.

Students majoring in Electrical Engineering and Computer Engineering are not eligible.

A minimum of 16 hours must be taken to obtain the EE minor. All courses used to earn the EE minor must be taken at MSU. A grade of "C" or better must be earned in all courses for the EE minor. A minimum grade point average of 2.0/4.0 is required in all courses taken as a part of the EE minor.

For all eligible MSU majors, the EE minor consists of three required courses and two restricted elective courses. Note that some course choices may require other courses as prerequisites.

Required Courses		
ECE 3413	Introduction to Electronic Circuits	3
ECE 3424	Intermediate Electronic Circuits	4
ECE 3443	Signals and Systems	3
Select two of the following courses:		6
ECE 3213	Introduction to Solid State Electronics	
ECE 3313	Electromagnetics I	
ECE 3323	Electromagnetics II	
ECE 3434	Advanced Electronic Circuits	
ECE 3614	Fundamentals of Energy Systems	
ECE 4263	Principles of VLSI Design	
ECE 4293	Nano-electronics	
ECE 4313	Antennas	
ECE 4323	Electromagnetic Compatibility	
ECE 4333	RF and Microwave Engineering	
ECE 4413	Digital Signal Processing	
ECE 4433	Introduction to Radar	
ECE 4613	Power Transmission Systems	
ECE 4633	Power Distribution Systems	
ECE 4653	Introduction to Power Electronics	
ECE 4673	Fundamentals of High Voltage Engineering	
ECE 4813	Communications Theory	
ECE 4913	Feedback Control Systems I	
ECE 4923	Feedback Control Systems II	
ECE 4933	State Space Design and Instruments	
Total Hours		16