broad for lifelong learning.

2. Experienced in-depth training in state-of-the-art specialty areas in electrical engineering. This is implemented through our senior electives. Students are required to take two sequences of at least two courses each at the senior level.

3. Benefited from imaginative and highly supportive laboratory experiences where appropriate throughout the program. The laboratory experience will be closely integrated with coursework and will make use of up-to-date instrumentation and computing facilities. Students should experience both hardware-oriented and simulation-oriented exercises.

4. Experienced design-oriented challenges that exercise and integrate skills and knowledge acquired in several courses. These may include design of components or subsystems with performance specifications. Graduates should be able to demonstrate an ability to design and conduct experiments as well as analyze the results.

5. Learned to function well in teams. Also, students must develop communication skills, written and oral, both through team and classroom experiences. Skills including written reports, webpage preparation, and public presentations are required.

6. Completed a well-rounded and balanced education through required studies in selected areas of fine arts, humanities, and social sciences. This provides for the ability to understand the impact of engineering solutions in a global and societal context. A course in engineering ethics is also required of all undergraduates.

Undergraduate Program

Bachelor of Science—Electrical Engineering

A minimum of 194 units is required for graduation. A complete list of requirements for the major can be found on page 52. Schedules should be planned to meet both General Education and major requirements.

The department academic advisor can suggest a recommended study plan for electrical engineering freshmen and sophomores. Each student is assigned a departmental faculty advisor who must be consulted in planning the junior and senior year programs.

The required 32 units (8 courses) of departmental electives are taken primarily in the senior year, and they permit students to develop depth in specialty areas of their choice. A student’s elective course program must be approved by a departmental faculty advisor. The advisor will check the program to ensure satisfaction of the departmental requirements. A wide variety of elective programs will be considered acceptable.

Three matters should be noted: (1) students who fail to attain a grade-point average of at least 2.0 in the major may be denied the privilege of continuing in the major, (2) a large majority of electrical and computer engineering courses have prerequisites which must be completed successfully. Successful completion of prerequisite courses means receiving a grade of C- or better in prerequisite courses except for Mathematics 3A-B and Mathematics 5A and 5B which require a grade of C or better to apply these courses as prerequisites, (3) courses required for the pre-major or major, inside or outside of the Department of Electrical Engineering, cannot be taken for the passed/not passed grading option. They must be taken for letter grades.

Bachelor of Science—Computer Engineering

This major is offered jointly by the Department of Computer Science and the Department of Electrical and Computer Engineering. For information about this major, see page 25.

Electrical & Computer Engineering Courses

Many of the ECE courses are restricted to ECE majors only. Instructor and quarter offered are subject to change.

LOWER DIVISION

1A. Computer Engineering Seminar

Prerequisite: Open to computer engineering majors only. Seminar: 1 hour

1B. Ten Puzzling Problems in Computer Engineering

Prerequisite: Open to pre-computer engineering and computer engineering majors only.

Not open for credit for those who have taken ECE 1

Gaining familiarity with, and motivation to study, the field of computer engineering, through puzzle-like problems that represent a range of challenges facing computer engineers in their daily problem-solving efforts and at the frontiers of research.

2A. Circuits, Devices, and Systems

Prerequisites: Mathematics 3A-B, and Mathematics 4A or 3C with a minimum grade of C; and, Math 4B or 5A with a minimum grade of C (may be taken concurrently); Physics 3 or 23 (may be taken concurrently); open to electrical engineering, computer engineering, and pre-computer engineering majors only. Lecture, 3 hours; laboratory, 4 hours.

Introduction to basic circuit analysis. KCL, KVL, nodal analysis, superposition, independent and dependent sources; diodes and i-V characteristics; basic op-amp circuits; first-order transient analysis; AC analysis and phasors. Introduction to the use of test instruments.

2B. Circuits, Devices, and Systems

Prerequisites: ECE 2A with a grade of C- or better, open to electrical engineering, computer engineering, and pre-computer engineering majors only. Lecture, 3 hours; laboratory, 4 hours.

Second order circuits. Laplace transform and solution of steady state and transient circuit problems in the s-domain; Bode plots; Fourier series and transforms; filters. Transistor as a switch; load lines; simple logic gates; latches and flip-flops.

2C. Circuits, Devices, and Systems

Prerequisites: ECE 2B with a grade of C- or better (may be taken concurrently); open to electrical engineering, computer engineering, and pre-computer engineering majors only. Lecture, 3 hours; laboratory, 4 hours.

Two-port network parameters; small-signal models of nonlinear devices; transistor amplifier circuits; frequency response of amplifiers; non-ideal op-amps; modulation, bandwidth, signals; Fourier analysis.

4. Design Project for Freshmen

Prerequisite: Open only to Electrical Engineering majors. Lecture: 2 hours; Laboratory: 3 hours

Aims at exposing freshmen students to the different sub-fields within Electrical and Computer Engineering. Composed of lectures by different faculty members and a weekly laboratory based on projects that are executed using the Arduino environment.

10A. Foundations of Analog and Digital Circuits & Systems

Prerequisites: Mathematics 3A-B, and Mathematics 4A or 3C with a minimum grade of C; and, Math 4B or 5A with a minimum grade of C (may be taken concurrently); Physics 3 or 23 (may be taken concurrently); open to electrical engineering, computer engineering and computer engineering majors. Lecture: 3 hours

Not open for credit for those who have received a C- or higher in ECE 2A.

The objective of the course is to establish the foundations of analog and digital circuits. The course will introduce the student to the power of abstraction, resistive networks, network analysis, nonlinear analysis, and the digital abstraction. (F)

10B. Foundations of Analog and Digital Circuits and Systems Lab

Prerequisite: ECE 10A (may be taken concurrently) with a C- or better grade. Laboratory: 4 hours

Not open for credit for those who have received a C- or higher in ECE 2A.

The goal of 10AL is to provide the student with a hands-on application of the concepts discussed in ECE 10A. The lab will introduce the use of microcontrollers as a data acquisition system, network analysis, resistors, nonlinear analysis, and digital abstraction.

10B. Foundations of Analog and Digital Circuits and Systems Lab

Prerequisite: ECE 10A with a C- or better grade. Lecture: 3 hours

Not open for credit for those who have received a C- or higher in ECE 2B.

The objective of the course is to introduce the MOSFET both as a simple digital switch and as controlled current source for analog design. The course will cover basic digital design, small-signal analysis, charge storage elements and operational amplifiers. (W)