Electrical Engineering

Bachelor of Science in Electrical Engineering

Minimum credit hours required~~—130~~127
In addition to the General Education Core Curriculum (page 7), the following courses are required:

Electrical Engineering core: EE 101 (2), EE 211 (3) or ES 332 (3), EE 212 (4), EE 231 (4), EE 308 (4), EE 321 (4), EE 333 (3), EE 341 (3), EE 382 (3), EE 434 (3), EE 451 (4), EE 481 & 481L (3), EE 482 & 482L (3)

Introduction to problem-solving and computer skills: EE 251 ~~(4)~~ (3) or CSE 113 (4)

Mathematics core: MATH 231 (4), 254 (3), 335 (3), 382 (3), upper-level (300-level and above) mathematics elective (3)

Electrical Engineering electives: a minimum of ~~eight~~ six credit hours~~, including at least one lab credit hour,~~ from Electrical Engineering ~~300- and 400-level~~ upper-level (300-level or above) courses, excluding the Electrical Engineering core classes listed above.

Engineering electives: Six hours of engineering courses numbered 200 and above. Courses from Electrical Engineering may not be used to satisfy this requirement.

To enroll in an Electrical Engineering class, a student must have passed the prerequisites of the course. In addition, a student must be in good academic standing and have declared electrical engineering as a major to enroll in EE 382 and EE 481.

Students pursuing a B.S. degree in Electrical Engineering must take all Electrical Engineering courses for a letter grade.

Sample Curriculum for the Bachelor of Science in Electrical Engineering

Semester 1
4 MATH 131 (calculus I)
5 PHYS 121 & 121L (general physics I)
2 EE 101 (introduction to electrical engineering)
3 ENGL 111 (college writing)*
14 Total credit hours

Semester 2
4 MATH 132 (calculus II)
5 PHYS 122 & 122L (general physics II)
4 CHEM 121 & 121L (general chemistry I)*
~~4~~3 EE 251 ~~or CSE 113~~ (programming)
~~17~~ 16 Total credit hours

Semester 3

4 MATH 231 (calculus III)

4 CHEM 122 & 122L (general chemistry II)*

3 EE 211 (circuits I)

4 EE 231 (digital electronics)

3 ENGL 112 (college writing)*

18 Total credit hours

Semester 4

3 MATH 254 (linear algebra)

3 MATH 335 (differential equations)

4 EE 212 (circuits II)

4 EE 308 (microcontrollers)

3 Social Science*

17 Total credit hours

Semester 5

4 EE 321 analog electronics)

3 EE 333 (electricity and magnetism)

3 EE 341 (signals and linear systems)

3 ENGL 341 (technical writing)*

3 Mathematics Elective (upper-level)

16 Total credit hours

Semester 6

3 EE 382 (introduction to design)

3 EE 434 (electromagnetic wave transmission/radiation)

3 MATH 382 (probability and statistics)

~~4~~3 Electrical Engineering Elective ~~with lab~~

3 Social Science*

~~16~~ 15 Total credit hours

Semester 7

3 EE 481 & 481L (senior design project I)

4 EE 451 (digital signal processing)

~~4~~3 Electrical Engineering Elective

3 Humanities*

3 Humanities or Social Science*

~~17~~ 16 Total credit hours

Semester 8

3 EE 482 & 482L (senior design project II)

6 Engineering Elective

3 Humanities or Social Science*

3 Humanities*

15 Total credit hours

* These courses are requirements for the general education core curriculum, but are not pre– or co-requisites for courses in electrical engineering. Students are encouraged to work with their academic advisors to find suitable points of inclusion in the course program.

Minor in Electrical Engineering

Minimum credit hours required—~~19~~18
The following courses are required:

- ~~EE 101 (2),~~ EE 211 or ES 332 (3), EE 212 (4), EE 231(4)
- ~~Six (6)~~ Seven (7) additional credit hours of upper-level (300-level or above) Electrical Engineering courses. ~~selected from: EE 308 (4), EE 321 (4), EE 322 (4), EE 324 (3), EE 333(3), EE 341 (3)~~.

Electrical Engineering Courses:

EE 231, Digital Electronics, 4 cr, 3 cl hrs, 3 lab hrs
Prerequisite: EE 101 or junior standing
Corequisites: EE 251 or CSE 113
Normally offered fall semester
Foundation of combinational digital system analysis and design; including Boolean algebra, logic gates, and truth tables. Sequential digital design via finite state machines. Lab provides exposure to computer-aided design software and programmable logic hardware.

EE 251, Mathematical Engineering, ~~4~~3 cr, 3 cl hrs~~, 3 lab hrs~~
Corequisite: MATH ~~103~~ 131
Normally offered fall semester
Standard programming languages in engineering are applied to data acquisition, data analysis, and mathematical modeling and computations. Fundamental concepts in Matlab and C are used to develop programming skills and techniques by addressing problems related to electrical engineering. ~~Typical topics include programming hardware; collection and manipulation of large data sets; signal and noise analysis; data fitting; numerical solutions to problems; basics of image processing; data encryption; steganography; and signal acquisition and extraction using Matlab toolboxes with commonly available hardware.~~

EE 333, Electricity and Magnetism, 3 cr, 3 cl hrs
Prerequisite: PHYS 122 and MATH 231
Normally offered fall semester
~~Electric and magnetic fields in free space and in matter. Energy storage as a function of field quantities and the relation of this to capacitance and inductance. Maxwell's equations applied to simple electrostatic and magnetostatic problems, plane waves, and transmission lines. Transient and sinusoidal steady state solutions of uniform transmission line problems modeled in terms of circuit parameters.~~

Introduction to Maxwell's equations in free space. Calculation of electric and magnetic fields produced by simple current and charge sources. The effects of materials on Maxwell's equations. Energy storage as a function of field quantities and the relation of this to capacitance and inductance. Electric and magnetic force calculations using virtual work. Propagation of plane waves in vacuum and in materials. Reflection and refraction of plane waves at planar interfaces. Magnetic circuit calculations.

EE 434, Electromagnetic Wave Transmission and Radiation, 3 cr, 3 cl hrs
Prerequisite: EE 333
Normally offered spring semester
~~Reflection and refraction of plane waves at planar interfaces. The propagation characteristics of metallic and dielectric waveguides with particular emphasis on fiber optics. Radiation from linear current elements and planar apertures and arrays of these elements. Analysis of simple communication links.~~

Transient and sinusoidal steady state solutions of uniform transmission line problems modeled in terms of circuit parameters. The propagation characteristics of metallic and dielectric waveguides. Radiation from linear wire antennas along with large and small aperture radiators. Radiation patterns of antenna arrays. Analysis of simple communication links.

EE 446, Introduction to Communications Theory, 3 cr, 3 cl hrs

Prerequisites: EE 341 ~~and MATH 382~~

Corequisite: MATH 382

Principles of communication theory. Modulation techniques, random signals and noise, analysis of communication systems in presence of noise, digital communication, matched filters, channel capacity, multiple access.