EXAMPLES OF THE PATHWAYS TO EE MINOR

The examples presented here are for the CHEMISTRY, COMPUTER SCIENCE, MATHEMATICS OR PHYSICS majors. The students from other majors can prepare EE minor pathways along these lines and /or contact ES Department for advising.

To build the foundation necessary for taking ES courses and to minimize the number of additional units to do minor in Electrical Engineering, it is recommended that the students take the following courses to satisfy GE Areas B1, B3 and B4 and GE Science lab requirements:

- GE Area B1: Physics 114 and Physics 116
- GE Area B3: CS 115
- GE Area B4: Math 161.

Then, the students must choose the courses as recommended below to meet their major and minor requirements.

1. PATHWAY FOR CHEMISTRY MAJORS (B.S. IN CHEMISTRY WITH MINOR IN ELECTRICAL ENGINEERING)

Follow the path given below to complete EE minor taking only 27 additional units.

- a. Satisfy the major core and supporting courses requirement as specified.
- b. Take the following courses to satisfy minor in EE requirements:
  - ES 110: Intro. to Engineering & Lab Experience 2
  - ES 112: Fund. of Digital Logic Design 1
  - ES 210: Digital Circuits & Logic Design 4
  - ES 220: Electric Circuits 3
  - ES 221: Electric Circuits Laboratory 1
  - ES 230: Electronics I 3
  - ES 231: Electronics I Lab 1
  - ES 310: Microprocessors & System Design 4
  - ES 330: Electronics II 3
  - ES 432: Physical Electronics 3
  - MATH 142E: Discrete Structures I 2

**TOTAL UNITS: 27.**

2. PATHWAY FOR COMPUTER SCIENCE MAJORS (B.S. IN COMPUTER SCIENCE WITH MINOR IN ELECTRICAL ENGINEERING)

ES and CS disciplines have significant amount of cross-disciplinary interests. This will allow a CS major to get ES credit for some of the CS courses as follows:

- CS 242 - Math 142E
- CS 252 - ES 112 + ES 210 (not equivalent but sufficient overlap to be acceptable)
- CS 315 - ES 314 (not equivalent but sufficient overlap with this and some other required CS courses)
- CS 351 - ES 310 (not equivalent but sufficient overlap and similarity to be acceptable)
CS 465/365 - ES 465 (equivalent to CS 465; CS 365 also acceptable)

Therefore, follow the path given below to complete EE minor taking only 10 additional units.

a. Satisfy the major core and supporting courses requirement as specified.
b. Choose the following two courses as the additional supporting courses:
   Math 211: Calculus II
   Phys 214: Intro. Physics II
c. Choose the following two CS elective:
   CS 365 or CS 465, and,
   CS 390 (at least 1 unit).
d. Take the following courses to satisfy minor in ES requirements:
   ES 110: Intro. to Engineering. & Lab Experience 2
   ES 220: Electric Circuits 3
   ES 221: Electric Circuits Laboratory 1
   ES 230: Electronics I 3
   ES 231: Electronics I Lab 1.

TOTAL UNITS: 10.

3. PATHWAY FOR MATHEMATICS MAJORS (B.S. IN MATHEMATICS WITH MINOR IN ELECTRICAL ENGINEERING)

ES and Mathematics disciplines have ES 400: Linear Systems Theory and Math 430: Linear Systems Theory as crosslisted courses. Therefore, follow the path given below to complete EE minor taking only 23 additional units.

a. Satisfy the major core and supporting courses requirement as specified.
b. Choosing the following Math elective:
   Math 430: Linear Systems Theory.
c. Take the following courses to satisfy minor in ES requirements:
   ES 110: Intro. Engineering. & Lab Experience 2
   ES 112: Fund. of Digital Logic Design 1
   ES 210: Digital Circuits & Logic Design 4
   ES 220: Electric Circuits 3
   ES 221: Electric Circuits Laboratory 1
   ES 230: Electronics I 3
   ES 231: Electronics I Lab 1
   ES 310: Microprocessors & System Design 4
   ES 330: Electronics II 3
   ES 497: Engineering Science Colloquium 1

TOTAL UNITS: 23.

4. PATHWAY FOR PHYSICS MAJORS (B.S. IN PHYSICS OR B.S. IN APPLIED PHYSICS WITH MINOR IN ELECTRICAL ENGINEERING)
ES and Physics disciplines have significant amount of cross-disciplinary interests. This will allow a Physics major to get ES credit for some of the Physics courses as follows:
- Phys 313 - ES 230 (not equivalent but sufficient overlap to be acceptable)
- Phys 313L - ES 231 (not equivalent but sufficient overlap to be acceptable)
- Phys 430 - ES 430 (crosslisted)
- Phys 475 - ES 432 (crosslisted)
- Phys 445 - ES 445 (crosslisted).

Therefore, follow the path given below to complete EE minor taking only 13 additional units.

a. Satisfy the major core and supporting courses requirement as specified.
b. Choose the following Physics electives (unless included in the core):
   - Phys 430: Electricity and Magnetism
   - Phys 445: Photonics
   - Phys 475: Physics of Semiconductor Devices
   - Phys 494: Phys Seminar.
c. Take the following courses to satisfy minor in EE requirements:
   - ES 110: Intro. Engineering & Lab Experience 2
   - ES 112: Fund. of Digital Logic Design 1
   - ES 210: Digital Circuits & Logic Design 4
   - ES 220: Electric Circuits 3
   - ES 221: Electric Circuits Laboratory 1
   - MATH 142E: Discrete Structures I 2

**TOTAL UNITS: 13.**