**ENGINEERING PLUS UNDERGRADUATE DEGREE PROGRAM**

**Electrical Emphasis**

The e+ degree requirements include completion of 128 semester hours of required and elective courses with a minimum grade point average of 2.25. Beginning with the incoming class of Fall 2016, the minimum passing grade for prerequisite and corequisite courses for the e+ Electrical Emphasis curriculum is a C, including courses completed outside the department (APPM, PHYS, etc.).

The e+ **Electrical emphasis** curriculum consists of 54 engineering credit hours, including a two-semester capstone design experience.

<table>
<thead>
<tr>
<th>Course Title/Subject</th>
<th>*Sem. Offered</th>
<th>Course Number</th>
<th>Level</th>
<th>Units</th>
<th>Prerequisites</th>
<th>Corequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>C and MATLAB Programming for EE/ECE</td>
<td>Fall/Spr</td>
<td>ECEN 1310†</td>
<td>First Year</td>
<td>4</td>
<td>Recommended: APPM 1350</td>
<td></td>
</tr>
<tr>
<td>First-Year Engineering Projects or intro to Digital and Analog Electronics</td>
<td>Fall/Spr</td>
<td>GEEN 1400† or ECEN 1400*</td>
<td>First Year</td>
<td>3</td>
<td>Restricted to &lt;75 hours</td>
<td>APPM 1350</td>
</tr>
<tr>
<td>Introduction to Engineering</td>
<td>Fall</td>
<td>COEN 1500†</td>
<td>First Year</td>
<td>1</td>
<td>Restricted to &lt;56 hrs.</td>
<td></td>
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<tr>
<td>Statics for Engineers or Statics and Structures</td>
<td>Fall/Spr</td>
<td>GEEN 2851 or MCEN 2023†</td>
<td>Soph/Junior</td>
<td>3</td>
<td>PHYS 1110 or APPM 1360</td>
<td>APPM 2350</td>
</tr>
<tr>
<td>Materials Science</td>
<td>Fall/Spr</td>
<td>MCEN 2024</td>
<td>Sophomore</td>
<td>3</td>
<td>CHEN 1211 &amp; CHEM 1221†; and PHYS 1110</td>
<td></td>
</tr>
<tr>
<td>Introduction to Circuits and Electronics</td>
<td>Fall/Spr</td>
<td>ECEN 2250</td>
<td>Sophomore</td>
<td>3</td>
<td>APPM 1360 and PHYS 1120</td>
<td>APPM 2360</td>
</tr>
<tr>
<td>Electronics Design Lab</td>
<td>Fall/Spr</td>
<td>ECEN 2270</td>
<td>Sophomore</td>
<td>3</td>
<td>ECEN 2250</td>
<td>ECEN 2260</td>
</tr>
<tr>
<td>Engineering for the Community</td>
<td>Fall/Spr</td>
<td>GEEN 2400</td>
<td>Sophomore</td>
<td>3</td>
<td>ECEN 1400 or GEEN 1400†</td>
<td></td>
</tr>
<tr>
<td>Data Analysis</td>
<td>Fall/Spr</td>
<td>MCEN 3037†</td>
<td>Junior</td>
<td>2</td>
<td>APPM 2360</td>
<td></td>
</tr>
<tr>
<td>Invention and Innovation</td>
<td>Fall/Spr</td>
<td>GEEN 3400</td>
<td>Junior</td>
<td>3</td>
<td>Restricted to 57+ hrs.</td>
<td></td>
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<tr>
<td>Thermodynamics for Engineers or Thermodynamics</td>
<td>Fall/Spr</td>
<td>GEEN 3852 or MCEN 3012</td>
<td>Junior</td>
<td>3</td>
<td>APPM 2350; Restricted to 57+ hrs.</td>
<td></td>
</tr>
<tr>
<td>Measurements Lab</td>
<td>Fall/Spr</td>
<td>MCEN 4037</td>
<td>Junior/Senior</td>
<td>2</td>
<td>ECEN 2270; MCEN 3037†; and Writing; Restricted to 57+ hrs.</td>
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<tr>
<td>Circuits as Systems</td>
<td>Fall/Spr</td>
<td>ECEN 2260</td>
<td>Soph/Junior</td>
<td>3</td>
<td>ECEN 2250</td>
<td>ECEN 2270</td>
</tr>
<tr>
<td>Digital Logic</td>
<td>Fall/Spr</td>
<td>ECEN 2350</td>
<td>Soph/Junior</td>
<td>3</td>
<td>ECEN 1310† or CSCI 1300</td>
<td></td>
</tr>
</tbody>
</table>

Select three courses from the following five:

- Microelectronics                                      | Fall/Spr      | ECEN 3250     | Junior | 9     | ECEN 2260                     |                                     |
- Linear Systems                                         | Fall/Spr      | ECEN 3300     |         |       | ECEN 2260                     |                                     |
- Programming of Digital Systems                         | Fall/Spr      | ECEN 3350     |         |       | ECEN 2260                     |                                     |
- Digital Design Laboratory                               | Fall/Spr      | ECEN 3360     |         |       | ECEN 2260                     |                                     |
- Electromagnetic Fields and Waves                       | Fall/Spr      | ECEN 3400     |         |       | ECEN 2260                     |                                     |
- Capstone Laboratory, Part 1                            | Fall           | ECEN 4610     | Senior  | 3     | ECEN 2270 and three of the five Electrical Emphasis courses from above |                                     |
- Capstone Laboratory, Part 2                            | Spr            | ECEN 4620     | Senior  | 3     | ECEN 4610                     |                                     |

**TOTAL ENGINEERING COURSE CREDIT HOURS** 54

* Semester course is typically offered. Please note this can change from semester to semester.

* ECEN 1400 is the preferred choice of EE department, but not required specifically for E+ majors.

† Standard course substitutions:
- ECEN 1310: CSCI 1300 (4), CSCI 1310 (4), or CSCI 1320 (4)
- GEEN 1400: ASEN 1400 (3), COEN 1400 (3), COEN 1410 (3), or ECEN 1400 (3)
- COEN 1500: ECEN 1100 (1)
- MCEN 2023: GEEN 2851 (3) or CVEN 2121 (3)
- CHEN 1211 & CHEM 1221: CHEM 1113 (4) & 1114 (1); or MCEN 1024 (4)
- MCEN 3037: CVEN 3227 (3) or CHEN 3010 (3)

‡Writing: WRTG 3030; or WRTG 3035; or HUEN 1010; or HUEN 3100; or PHYS 3050.
Additional required courses are as follows:

Science requirements (12-14 credit hours):
PHYS 1110 (4) General Physics 1
PHYS 1120 (4) General Physics 2
PHYS 1140 (1) Experimental Physics 1
Choose an additional from the following: PHYS 2130; or PHYS 2170; or MCEN 1024; or CHEN 1211 & CHEM 1221; or CHEM 1113 & 1114; or CHEM 1251; or CHEM 1271; or EBIO 1210 & 1230; or EBIO 1220 & 1240; or MCDB 1150 & 1151; or MCDB 2150 & 2151.

Note: CU Teach Engineering science course requirements vary slightly, depending on the students’ election of a science area of specialty.

Math requirements (16 credit hours):
APPM 1350 (4) Calculus 1
APPM 1360 (4) Calculus 2
APPM 2350 (4) Calculus 3
APPM 2360 (4) Differential Equations

Note: some math courses may be waived with AP/IB credit

Writing requirements (3 credit hours) choose one:
HUEN 1010 (3) Humanities for Engineers: The Human Quest (first-year freshmen only)
HUEN 3100 (3) Advanced Humanities for Engineers: The Human Quest Continues
WRTG 3030 (3) Writing on Science and Society
WRTG 3035 (3) Technical Communication and Design
PHYS 3050 (3) Writing in Physics: Problem-Solving and Rhetoric

Humanities and Social Sciences (15 credit hours) of approved courses, of which 6 must be at the upper-division level (3000 or higher):
See details at engineering.colorado.edu/hss

Customizable Concentration (12 or more credit hours):
Contracted approval required in advance by an e+ advisor

Free electives (up to 16 credit hours)

Note: up to 6.0 total credit hours can be AP/IB transfer credit.