Electrical Engineering and Computer Science

Directors of undergraduate studies: Mark Reed (Electrical Engineering), 523 BCT, 432-4306, mark.reed@yale.edu; James Aspnes (Computer Science), 401 AKW, 432-1232, james.aspnes@yale.edu

Electrical Engineering and Computer Science is an interdepartmental major designed for students who want to integrate work in these two fields. It covers discrete and continuous mathematics, algorithm analysis and design, digital and analog circuits, signals and systems, systems programming, and computer engineering. It provides coherence in its core program, but allows flexibility to pursue technical electives.

PREREQUISITES
The prerequisites for the major are MATH 112, 115, and ENAS 151 or MATH 120; CPSC 112 (for students without previous programming experience); and PHYS 180 and 181, or 200 and 201. For the Class of 2022 and subsequent classes, acceleration credits may not be used to satisfy prerequisites. For the Class of 2021 and previous classes, acceleration credits may be used to satisfy some of these requirements. However, because the B.S. programs in Electrical Engineering and in Engineering Sciences (Electrical) both limit the use of such credits, students who wish to retain the option of switching to these programs should consult the director of undergraduate studies in Electrical Engineering when planning their course schedules.

REQUIREMENTS OF THE MAJOR

B.S. degree program The major requires fifteen term courses beyond the prerequisites: CPSC 201, 202, 223, 323, and 365 or 366; EENG 200, 201, 202, and 203; one from MATH 222, 225, or S&DS 241; four advanced electives, two in electrical engineering, two in computer science; and a senior project. MATH 244 may be substituted for CPSC 202. Electives must be 300- or 400-level courses in the departments of Electrical Engineering and Computer Science, or must be approved by the DUS in each department. Double-titled courses may be counted either way to fulfill this requirement. CPSC 480 and 490 may not be used as electives. With permission of the DUS in each department, EENG 471 or 472 may be used as an electrical engineering elective.

For students who have taken the equivalent of one year of calculus in high school and have some programming experience, a typical program would be:

<table>
<thead>
<tr>
<th>First-Year</th>
<th>Sophomore</th>
<th>Junior</th>
<th>Senior</th>
</tr>
</thead>
<tbody>
<tr>
<td>EENG 200</td>
<td>CPSC 201</td>
<td>CPSC 202</td>
<td>Senior project</td>
</tr>
<tr>
<td>ENAS 151</td>
<td>EENG 202</td>
<td>CPSC 323</td>
<td>One elective</td>
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<tr>
<td>PHYS 180</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EENG 201</td>
<td>CPSC 223</td>
<td>CPSC 365 or 366</td>
<td>Two electives</td>
</tr>
<tr>
<td>PHYS 181</td>
<td>EENG 203</td>
<td>One elective</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 222</td>
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Students with no programming experience should take CPSC 112 in the fall of their first year and either postpone EENG 200 until their sophomore year or take ENAS 151 or MATH 120 in the spring.

For students with one term of calculus and no programming experience, a typical program would be:

<table>
<thead>
<tr>
<th>First-Year</th>
<th>Sophomore</th>
<th>Junior</th>
<th>Senior</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPSC 112</td>
<td>CPSC 201</td>
<td>CPSC 202</td>
<td>Two electives</td>
</tr>
<tr>
<td>MATH 115</td>
<td>EENG 200</td>
<td>CPSC 323</td>
<td></td>
</tr>
<tr>
<td>PHYS 180</td>
<td>EENG 202</td>
<td>S&amp;DS 241</td>
<td></td>
</tr>
<tr>
<td>EENG 201</td>
<td>CPSC 223</td>
<td>CPSC 365 or 366</td>
<td>Senior project</td>
</tr>
<tr>
<td>MATH 120</td>
<td>EENG 203</td>
<td>One elective</td>
<td>One elective</td>
</tr>
<tr>
<td>PHYS 181</td>
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</tbody>
</table>

For students with no calculus and no programming experience, a typical program would be:

<table>
<thead>
<tr>
<th>First-Year</th>
<th>Sophomore</th>
<th>Junior</th>
<th>Senior</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPSC 112</td>
<td>CPSC 201</td>
<td>CPSC 202</td>
<td>Two electives</td>
</tr>
<tr>
<td>MATH 112</td>
<td>EENG 200</td>
<td>CPSC 323</td>
<td></td>
</tr>
<tr>
<td>PHYS 170</td>
<td>ENAS 151</td>
<td>EENG 202</td>
<td></td>
</tr>
<tr>
<td>EENG 201</td>
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</tr>
<tr>
<td>MATH 115</td>
<td>MATH 222</td>
<td>EENG 203</td>
<td>One elective</td>
</tr>
<tr>
<td>PHYS 171</td>
<td></td>
<td>One elective</td>
<td></td>
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</tbody>
</table>
Students who start with MATH 112 may satisfy the physics prerequisite by taking PHYS 170 and 171 in their first year, as shown in the table above. However, because the B.S. programs in Electrical Engineering and in Engineering Sciences (Electrical) do not allow this substitution, students who wish to retain the option of switching to these programs should postpone physics until their sophomore year.

**Credit/D/Fail** Courses taken Credit/D/Fail may not be counted toward the requirements of the major.

**SENIOR REQUIREMENT**
The senior project must be completed in CPSC 490 or EENG 471 or 472, depending on the adviser’s department, and must be approved by the DUS in each department.

**ADVISING AND APPROVAL OF PROGRAMS**
The entire program of a student majoring in Electrical Engineering and Computer Science must be approved by the DUS in each department.

**Accreditation** Students interested in pursuing an ABET-accredited degree should consider the B.S. program in Electrical Engineering. See under Electrical Engineering.

**REQUIREMENTS OF THE MAJOR**

**Prerequisites** MATH 112, 115, and ENAS 151 or MATH 120; CPSC 112 (students without previous programming experience); PHYS 180, 181, or 200, 201 (PHYS 170, 171 is acceptable for students who need to take MATH 112)

**Number of courses** 15 term courses beyond prereqs (incl senior project)

**Specific courses required** CPSC 201, 202, 223, 323, and 365 or 366; EENG 200, 201, 202, and 203; one from MATH 222 or 225 or S&DS 241

**Distribution of courses** 4 addtl 300- or 400-level electives, 2 in electrical engineering, 2 in comp sci

**Substitution permitted** MATH 244 for CPSC 202; advanced courses in other depts, with permission of DUS in each dept

**Senior requirement** Independent project (CPSC 490 or EENG 471 or 472) approved by DUS in each dept