You are required to complete eighteen (18 or 19) semester credit hours of Technical Electives. You need 19 credits if your CORE Electives total 6 credits (EE 321 and EE 332).

- Twelve (12 or 13) credits of electives must be from the lists of EE/CprE electives below, including one approved sequence.
- The remaining six (6) credits required can be chosen from the lists of EE/CprE or Non-EE/CprE technical electives.

Courses not on these lists may be counted as technical electives only if approved by the ECpE Curriculum Committee. A written request must be submitted and approved before the course is taken. For 500-level Technical Elective options, see your academic adviser. NO Graduate or Undergraduate Seminars are allowed for Technical Elective credit. Graduate Special Topics courses require ECpE Curriculum Committee review.

**IMPORTANT NOTATIONS (Please Read):**

1. @ EE 422 and EE 423 must be take at the same time.
2. * Course is cross-listed (same course). Can only apply one towards graduation EE, CprE, SE, or ComS.
3. ✔ Will need to check "Schedule of Classes" at http://classes.iastate.edu/ for class availability.
4. Math 489 & ME 484 are not allowed as EE or Non-EE Technical Electives - They can be used as a general education course.
5. ENGR/EE/CprE 467, EE 442 & EE 448 cannot be used to fulfill any elective requirements.
6. EE 351 and EE 388 may be used to fulfill International Perspective requirements - You must choose if you want the course applied to either a general education or technical elective requirement but not both.
7. Only one course of the following sets of courses may be applied as a technical elective: either MatE 273 or MatE 392; either ComS 207 or ComS 227; either ComS 208 or ComS 228.
8. Only Math 207 or Math 317 can apply towards graduation requirements, not both courses.

**LIST OF APPROVED SEQUENCES**

Need to have one approved sequence

The semester the courses are offered may change

<table>
<thead>
<tr>
<th>COURSES</th>
<th>DESCRIPTION</th>
<th>SEM</th>
<th>CR</th>
<th>PREREQUISITES (Check latest catalog for complete lists)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ELECTROMAGNETIC, FIELDS, ANTENNAS AND PROPAGATION</strong> (SELECT TWO)</td>
<td></td>
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</tr>
<tr>
<td>EE 414</td>
<td>Microwave Engineering</td>
<td>F</td>
<td>4</td>
<td>EE 311, EE 230</td>
</tr>
<tr>
<td>EE 417</td>
<td>Electromgntc Radiation, Antennas &amp; Prop</td>
<td>S</td>
<td>4</td>
<td>EE 311</td>
</tr>
<tr>
<td>*EE/CprE 418</td>
<td>High Speed Syst Engr Msrmnt &amp; Test</td>
<td>F</td>
<td>4</td>
<td>EE 230, EE 311</td>
</tr>
<tr>
<td>EE 489X</td>
<td>Survey of Remote Sensing Technologies</td>
<td>S</td>
<td>3</td>
<td>4 courses physical or biological sciences or engineering</td>
</tr>
<tr>
<td><strong>COMMUNICATIONS</strong> (SELECT ALL THREE FOR SEQUENCE)</td>
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</tr>
<tr>
<td>EE 321</td>
<td>Communication Systems I</td>
<td>F</td>
<td>3</td>
<td>EE 224</td>
</tr>
<tr>
<td>EE 422@</td>
<td>Communication Systems II</td>
<td>S</td>
<td>3</td>
<td>EE 321, EE 423+</td>
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<tr>
<td>EE 423@</td>
<td>Communication Systems Lab</td>
<td>S</td>
<td>1</td>
<td>EE 321, EE 422+</td>
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</table>

*EE/CprE 435 w/EE/CprE 330: Analog VLSI Circuit Design | S   | 4  | EE 324, EE 330, EE 332 & EE 322 or Stat 330 (or)

*EE/CprE 465 w/EE/CprE 330: Digital VLSI Design | F   | 4  | EE 330

**SEMICONDUCTOR DEVICES** (SELECT TWO)

EE 432  | Microelectronics Fabrication Techniques | S   | 4  | Phys 222, Math 267, EE 332 or MatE 334      |
| EE 438  | Optoelectronic Devices & Applications   | S   | 3  | EE 311, EE 332                                 |
| EE 439  | Nanoelectronics                        | F   | 3  | EE 332 or MatE 331                             |

**POWER SYSTEMS** (SELECT EE 456 AND ONE OTHER FOR SEQUENCE)

EE 456  | Power Systems Analysis I               | F   | 3  | EE 303, Cr/E EE 324                           |
and EE 455 | Intro to Energy Distribution Systems | ✔  | 3  | EE 303, Cr/E EE 324                           |
or EE 457  | Power Systems Analysis II              | S   | 3  | EE 303, Cr/E EE 324                           |
or EE 458  | Econ Systms for Electrical Pwr Planning | ✔  | 3  | EE 303 or Econ 301                            |
<table>
<thead>
<tr>
<th>COURSES</th>
<th>DESCRIPTION</th>
<th>SEM</th>
<th>CR</th>
<th>PREREQUISITES (Check latest catalog for complete lists)</th>
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<tbody>
<tr>
<td>LINEAR SYSTEMS</td>
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<tr>
<td>EE 475</td>
<td>Automatic Control Systems</td>
<td>F</td>
<td>3</td>
<td>EE 324</td>
</tr>
<tr>
<td>EE 476</td>
<td>Control Systems Simulation</td>
<td>S</td>
<td>3</td>
<td>EE 475</td>
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<table>
<thead>
<tr>
<th>COMPUTER ENGINEERING (SELECT 381 AND ONE OTHER FOR SEQUENCE)</th>
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<tbody>
<tr>
<td>CprE 381</td>
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<tr>
<td>CprE 308</td>
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<tr>
<td>CprE 388</td>
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<table>
<thead>
<tr>
<th>OTHER APPROVED EE/CPRE COURSES</th>
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</thead>
<tbody>
<tr>
<td>These courses cannot be used to fulfill sequence requirements</td>
</tr>
<tr>
<td>The semester the courses are offered may change</td>
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<table>
<thead>
<tr>
<th>SIGNALS &amp; SYSTEMS</th>
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<tbody>
<tr>
<td>EE 324</td>
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<table>
<thead>
<tr>
<th>COMMUNICATIONS</th>
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<tbody>
<tr>
<td>EE 323</td>
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<table>
<thead>
<tr>
<th>POWER SYSTEMS</th>
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<tbody>
<tr>
<td>EE 452</td>
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<tr>
<td>EE 459</td>
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<table>
<thead>
<tr>
<th>INDEPENDENT STUDY (ONLY 2 CREDITS OF EE 490 CAN APPLY TO TECH ELECTIVES &amp; BSEE DEGREE)</th>
</tr>
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<tbody>
<tr>
<td>EE 490</td>
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<table>
<thead>
<tr>
<th>COMPUTING &amp; NETWORKING SYSTEMS</th>
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<tbody>
<tr>
<td>CprE 310</td>
</tr>
<tr>
<td>CprE 450</td>
</tr>
<tr>
<td>CprE/ComS 454</td>
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<tr>
<td>CprE 488</td>
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<tr>
<td>CprE 489</td>
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</table>

<table>
<thead>
<tr>
<th>SECURE &amp; RELIABLE COMPUTING</th>
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</thead>
<tbody>
<tr>
<td>CprE 431</td>
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<thead>
<tr>
<th>SOFTWARE SYSTEMS</th>
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<tbody>
<tr>
<td>CprE/ComS 425</td>
</tr>
<tr>
<td>CprE/ComS 444</td>
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<tr>
<td>CprE 458</td>
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<table>
<thead>
<tr>
<th>SOFTWARE ENGINEERING</th>
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</thead>
<tbody>
<tr>
<td>*SE/ComS 319</td>
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<tr>
<td>*CprE/SE 329</td>
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<tr>
<td>*CprE/SE 339</td>
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<tr>
<td>*SE/ComS 409</td>
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<tr>
<td>SE/Com S/CprE 412</td>
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<tr>
<td>*CprE/SE 416</td>
</tr>
<tr>
<td>*SE/ComS 417</td>
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<tr>
<td>*CprE/SE 419X</td>
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<table>
<thead>
<tr>
<th>INTERDISCIPLINARY/ OTHER COURSES</th>
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<tbody>
<tr>
<td>CprE 315 (not offered)</td>
</tr>
<tr>
<td>*CprE/EE 466</td>
</tr>
<tr>
<td>EE 351</td>
</tr>
<tr>
<td>EE 388</td>
</tr>
<tr>
<td>EE 488</td>
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<tr>
<td>EE 496</td>
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</table>

<table>
<thead>
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<tbody>
<tr>
<td>CprE 315 (not offered)</td>
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<tr>
<td>*CprE/EE 466</td>
</tr>
<tr>
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<tr>
<td>EE 388</td>
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<tr>
<td>EE 488</td>
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<tr>
<td>EE 496</td>
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</table>
### COURSES

<table>
<thead>
<tr>
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<th>DESCRIPTION</th>
<th>SEM</th>
<th>CR</th>
<th>PREREQUISITES (Check latest catalog for complete lists)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BioE 220</td>
<td>Introduction to Biomedical Engineering</td>
<td>S</td>
<td>3</td>
<td>Biol 212, ENGR 160/Equivalent, Math 166, Chem 167 or 178, Phys 222</td>
</tr>
<tr>
<td>Biol 211</td>
<td>Principles of Biology I</td>
<td>F/S</td>
<td>3</td>
<td>HS Biol</td>
</tr>
<tr>
<td>Biol 211L</td>
<td>Principles of Biology I Lab</td>
<td>F/S</td>
<td>1</td>
<td>Credit or enrollment in Biol 211</td>
</tr>
<tr>
<td>Biol 212</td>
<td>Principles of Biology II</td>
<td>F/S</td>
<td>3</td>
<td>HS Biol; HS Chem or Cr/E in Chem 163/177</td>
</tr>
<tr>
<td>Biol 212L</td>
<td>Principles of Biology II Lab</td>
<td>F/S</td>
<td>1</td>
<td>Credit or enrollment in Biol 212</td>
</tr>
<tr>
<td>ComS 207</td>
<td>Fundamentals of Computer Programming</td>
<td>F/S</td>
<td>3</td>
<td>Math 150 or placement in Math 140/141/142 or higher</td>
</tr>
<tr>
<td>ComS 208</td>
<td>Intermediate Computer Programming</td>
<td>F/S</td>
<td>3</td>
<td>Coms 207, Cr/E Math 151, 160, or 165</td>
</tr>
<tr>
<td>ComS 227</td>
<td>Introduction to Object-Oriented Programming</td>
<td>F/S</td>
<td>4</td>
<td>None</td>
</tr>
<tr>
<td>ComS 228</td>
<td>Introduction to Data Structures</td>
<td>F/S</td>
<td>3</td>
<td>ComS 227 with C- or better, Cr/E Math 165</td>
</tr>
<tr>
<td>ComS 229</td>
<td>Advanced Programming Techniques</td>
<td>F/S</td>
<td>3</td>
<td>ComS 228, Cr/E Math 166</td>
</tr>
<tr>
<td>ComS 252</td>
<td>Linux Operating System Essentials</td>
<td>F</td>
<td>3</td>
<td>ComS 107 or ComS 207 or ComS 227</td>
</tr>
<tr>
<td>ConE 241</td>
<td>Construction Materials &amp; Methods</td>
<td>F/S</td>
<td>3</td>
<td>ConE 222</td>
</tr>
<tr>
<td>EE 391X</td>
<td>Open Laboratory and Design Studio</td>
<td>F</td>
<td>2</td>
<td>junior classification (only approved for non-EE tech elec)</td>
</tr>
<tr>
<td>EM 274</td>
<td>Statics of Engineering</td>
<td>F/S/SS</td>
<td>3</td>
<td>Cr/E Math 166, Cr/E Phys 111 or Phys 221</td>
</tr>
<tr>
<td>Engr 340</td>
<td>Intro to Wind Energy: Syst Dsgn &amp; Delvry</td>
<td>✓</td>
<td>3</td>
<td>Math 166, Phys 222</td>
</tr>
<tr>
<td>MatE 215</td>
<td>Intro to Materials Science &amp; Engr</td>
<td>F/S</td>
<td>3</td>
<td>Chem 167 or Chem 177, Math 165</td>
</tr>
<tr>
<td>MatE 273</td>
<td>Principles of Materials Science &amp; Engr</td>
<td>F/S/SS</td>
<td>3</td>
<td>Chem 167 or Chem 177, Math 165, Sophomore</td>
</tr>
<tr>
<td>MatE 392</td>
<td>Principles of Materials Science &amp; Engr</td>
<td>SS</td>
<td>3</td>
<td>MatE 391, Chem 167 or Chem 177</td>
</tr>
<tr>
<td>ME 231</td>
<td>Engineering Thermodynamics I</td>
<td>F/S/SS</td>
<td>3</td>
<td>Math 265, Chem 167, Phys 222</td>
</tr>
<tr>
<td>NS 320</td>
<td>Naval Ship Systems I: Engineering</td>
<td>F</td>
<td>3</td>
<td>NROTC students only - Phys 221, Sophomore</td>
</tr>
<tr>
<td>NS 330</td>
<td>Naval Ship Systems II: Weapons</td>
<td>S</td>
<td>3</td>
<td>NROTC students only - Phys 221, Sophomore</td>
</tr>
</tbody>
</table>

EE students may select up to six credits of Non-EE/CprE Electives from 300- and 400-level courses in the following areas: Computer Science, Mathematics, Physics, other Engineering departments (e.g. ConE 380 or EM 351). For Math 317—see notation #8. The courses listed below are approved exceptions to these guidelines.