Computer Engineering

University Requirements (23-24)
- Writing – American Thought and Language (ATL) 4
- Integrative Studies in Humanities (IAH) 8
- Integrative Studies in Social Sciences (ISS) 8
- Bioscience (one of the following):
  - BOT 105, BS 110, BS 111, ENT 205, MMG 205, MMG 301, PSL 250, ZOL 141 3-4

College Requirements (30)
- CEM 141 General Chemistry 4
- CSE 231 Introduction to Programming I 4
- MTH 132 Calculus I 3
- MTH 133 Calculus II 4
- MTH 234 Multivariable Calculus 4
- MTH 235 Differential Equations 3
- PHY 183 Physics for Scientists & Engineers I 4
- PHY 184 Physics for Scientists & Engineers II 4

Major Requirements (50)
- CEM 161 Chemistry Laboratory I
- OR
  - PHY 191 Physics Laboratory for Scientists I 1
  - CSE 232 Introduction to Programming II 4
  - CSE 260 Discrete Structures in Computer Science 4
  - CSE 410 Operating Systems 4
  - CSE 420 Computer Architecture 4
  - ECE 200 Electric Circuits 4
  - ECE 230 Digital Logic Fundamentals 3
  - ECE 302 Electronic Circuits 3
  - ECE 303 Electronics Laboratory 1
  - ECE 313 Control Systems 3
  - ECE 331 Microprocessors & Digital Systems 4
  - ECE 360 Signals and Linear Systems 4
  - ECE 381 Professionalism, Communication & Ethics 1
  - ECE 482 Capstone: Computer Systems Design (W) 4
  - ME 201 Thermodynamics
- OR
  - ME 221 Statics 3
  - STT 351 Probability and Statistics for Engineering 3

Major Electives (8)
- Complete one of the following three groups:
  - **Hardware Emphasis**
    - ECE 410 VLSI Design 4
    - ECE 411 Electronic Design Automation 4
  - **Software Emphasis**
    - CSE 370 Software Engineering 4
    - CSE 450 Translation of Programming Languages 4
  - **Communication Emphasis**
    - CSE 422 Computer Networks 4
    - ECE 457 Communication Systems 3
    - ECE 458 Communication Systems Laboratory 1

Technical Electives (7-9)
- An approved list of Technical Electives is available from the advisor.

Other Electives (Variable)

Total Credits Required for Degree 128

The requirements listed above apply to students admitted to the major of Computer Engineering in the Department of Electrical and Computer Engineering beginning Fall, 2001. The Department of Electrical and Computer Engineering (ECE) constantly reviews program requirements and reserves the right to make changes as necessary. Consequently, each student is strongly encouraged to consult with his/her advisor to obtain assistance in planning an appropriate schedule of courses. Students who have questions about Computer Engineering should contact the Electrical and Computer Engineering Department Advising Office, 2212 Engineering Building, phone (517)355-5242.

Some courses may have prerequisites, which are not otherwise required in the program. Students should check course descriptions to ensure they are aware of prerequisites.

---

1 If PHY 231 is taken in place of PHY 183, PHY 233B must also be completed. If PHY 232 is taken in place of PHY 184, PHY 234B must also be completed.
## Sample Program

### Freshman Year

<table>
<thead>
<tr>
<th>Fall Courses</th>
<th>Credits</th>
<th>Spring Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATL 1XX or ISS 2XX</td>
<td>4</td>
<td>ATL 1XX or ISS 2XX</td>
<td>4</td>
</tr>
<tr>
<td>Bioscience (AT)</td>
<td>3/4</td>
<td>CSE 231</td>
<td>4</td>
</tr>
<tr>
<td>CEM 141</td>
<td>4</td>
<td>MTH 133</td>
<td>4</td>
</tr>
<tr>
<td>MTH 132</td>
<td>3</td>
<td>PHY 183</td>
<td>4</td>
</tr>
<tr>
<td>CEM 161</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>14/15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Sophomore Year

<table>
<thead>
<tr>
<th>Fall Courses</th>
<th>Credits</th>
<th>Spring Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE 232/260</td>
<td>4</td>
<td>CSE 232/260</td>
<td>4</td>
</tr>
<tr>
<td>ECE 230</td>
<td>3</td>
<td>ECE 200</td>
<td>4</td>
</tr>
<tr>
<td>MTH 234</td>
<td>4</td>
<td>IAH 20X</td>
<td>4</td>
</tr>
<tr>
<td>PHY 184</td>
<td>4</td>
<td>ME 201/221</td>
<td>3</td>
</tr>
<tr>
<td>CEM 161</td>
<td>1</td>
<td>MTH 132</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Junior Year

<table>
<thead>
<tr>
<th>Fall Courses</th>
<th>Credits</th>
<th>Spring Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 302</td>
<td>3</td>
<td>CSE 420</td>
<td>4</td>
</tr>
<tr>
<td>ECE 303</td>
<td>1</td>
<td>ECE 360</td>
<td>4</td>
</tr>
<tr>
<td>ECE 331</td>
<td>4</td>
<td>ECE 381</td>
<td>1</td>
</tr>
<tr>
<td>CSE 410</td>
<td>4</td>
<td>ISS 3XX</td>
<td>4</td>
</tr>
<tr>
<td>STT 351</td>
<td>3</td>
<td>Major Elective</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Senior Year

<table>
<thead>
<tr>
<th>Fall Courses</th>
<th>Credits</th>
<th>Spring Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 313</td>
<td>3</td>
<td>ECE 482</td>
<td>4</td>
</tr>
<tr>
<td>Elective</td>
<td>Va</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>IAH 2XX</td>
<td>4</td>
<td>Major Elective</td>
<td>4</td>
</tr>
<tr>
<td>Technical Elect</td>
<td>3</td>
<td>Technical Elect</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>10/Va</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Program Objectives

The undergraduate program in computer engineering is offered jointly by the Department of Electrical & Computer Engineering and the Department of Computer Science & Engineering. With an emphasis on integrated-circuit and information technologies in computing and control, the program provides graduates with the background, knowledge, skills and hands-on experience needed to enter the practice of computer engineering in such industries as manufacturing, automotive, consumer products, aerospace, defense, communications and computers. Graduates are also well-prepared for graduate studies, lifelong learning and professional development. The program leverages the scholarly and curricular strengths of both departments and distinguishes itself with a focus on embedded systems.

The computer engineering faculty are committed to sustaining a vigorous academic environment that values quality and diversity in the educational experience. Program strengths include the major engineering design experience; integration of hardware/software issues, especially in the context of embedded systems; use of contemporary engineering design and modeling tools throughout the curriculum; and advanced engineering design options in hardware, software and communications. The curriculum provides a thorough base of mathematics, probability and statistics, physical science, engineering science, laboratory experience, and design experience. This background enables students to apply computer engineering principles to a variety of contemporary problems. In addition, the curriculum provides the general education necessary to identify the impact of engineering decisions in the broader societal context. This computer engineering program integrates the knowledge and skills acquired in a diverse set of courses, the extracurricular experiences, and the faculty expertise and scholarship needed to enable the graduates of the program to:

- understand, analyze and design hardware and software systems and components;
- identify and solve computer engineering problems;
- design and conduct laboratory experiments to investigate and test the characteristics and dynamics of systems and components;
- be proficient in the use of modern computer engineering techniques and tools;
- be proficient in the oral and written communication of their work and ideas;
- learn and work independently;
- participate effectively within and across disciplinary groups and understand the value of teaming;
- understand the technical and professional qualities of an engineer that are valued in today's workplace;
- understand contemporary issues relevant to the practice of computer engineering;
- understand the global and societal impact of engineering problems and solutions;
- be prepared for a lifetime of continuing education;
- conduct themselves in accordance with the highest professional and ethical standards.

*Last revised October, 2001*