Computer Engineering

Accredited by the Engineering Accreditation Commission of ABET, www.abet.org

1. University Requirements (23-24)
   Writing, Rhetoric and American Cultures (WRA) 4
   Integrative Studies in Humanities (IAH) 8
   Integrative Studies in Social Sciences (ISS) 8
   Bioscience (one of the following):
      BS 161, ENT 205, IBIO 150, MMG 141, MMG 201, PLB 105, PSL 250 3-4

2. College Requirements: (28)
   CEM 141 General Chemistry 4
   EGR 100 Introduction to Engineering Design 2
   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

3. Major Requirements: (69)
   a. Complete one of the following courses: (1)
      CEM 161 Chemistry Laboratory I 1
      PHY 191 Physics Laboratory for Scientists I 1
   b. All of the following courses: (44)
      CSE 231 Introduction to Programming I 4
      CSE 232 Introduction to Programming II 4
      CSE 260 Discrete Structures in Computer Sci 4
      CSE 331 Algorithms and Data Structures 3
      CSE 410 Operating Systems 3
      ECE 201 Circuits and Systems I 3
      ECE 202 Circuits and Systems II 3
      ECE 203 Electronic Circuits and Systems Lab 1
      ECE 230 Digital Logic Fundamentals 3
      ECE 280 Electrical Engineering Analysis 3
      ECE 302 Electronic Circuits 3
      ECE 303 Electronics Laboratory 1
      ECE 331 Microprocessors & Digital Systems 4
      ECE 390 Ethics, Professions and Cont. Issues 1
      ECE 480 Senior Design (W) 4
   c. Major Electives: (24)
      Complete 24 credits of electives as specified below. At least 18 credits must be from core and focus track electives combined, with at least one course with a laboratory. Additional credits to meet the 24 credit requirement may be taken from other courses listed below, any 400-level Computer Science and Engineering (CSE) or Electrical and Computer Engineering (ECE) courses, or by completing an approved 3 or 4 credit experiential, out-of-classroom education experience obtained through engineering cooperative education or independent study.

   Core Electives: (6)
   At least 6 credits from the following:
   CSE 420 Computer Architecture 3
   ECE 410 VLSI Design (L) 4
   CSE 422* Computer Networks 3
   or
   ECE 442* Introduction to Communication Networks 3
   *CSE 422 or ECE 442 can count towards you total Core Electives

   Focus Track Electives: (12)
   At least 12 credits from the following:
   Hardware
   ECE 402 Appl of Analog Integrated Circuits (L) 4
   ECE 411 Electronic Design Automation (L) 4
   ECE 412 Intro to Mixed-Signal Circuits Design (L) 4
   ECE 445 Biomedical Instrumentation 3
   Software
   CSE 335 Object-oriented Software Design 4
   CSE 450 Translation of Programming Languages 3
   CSE 471 Media Processing & Multimedia Computing 3
   ECE 366 Introduction to Signal Processing 3

   Recommended Electives:
   ECE 305 Electromagnetic Fields & Waves I 4
   ECE 313 Control Systems 3
   ECE 404 Radio Frequency Electronic Circuits 4
   ECE 415 Computer Aided Manufacturing 3
   ECE 416 Digital Control 3
   ECE 457 Communication Systems 3
   ECE 458 Communication Systems Laboratory 1
   ECE 466 Digital Signal Processing & Filter Design 3
   ECE 474 Principles of Electronics Devices 3

   Other Electives (Variable)

Total Credits Required for Degree 128

The requirements listed above apply to students admitted to the major of Computer Engineering beginning Fall, 2013. The Department of Electrical and Computer Engineering (ECE) constantly reviews program requirements and reserves the right to make changes as necessary. Students are encouraged to consult with their advisor to obtain assistance in planning an appropriate schedule. Students who have questions about Computer Engineering should contact the Electrical and Computer Engineering Department Advising Office, 2212 Engineering Building, phone (517) 355-5242.
## Biomedical Engineering Concentration

The department offers a concentration for students who plan to pursue graduate work in biomedical areas or seek employment in selected medical-related areas. The concentration is available to, but not required of, any student enrolled in the Bachelor of Science degree program in Computer Engineering. Courses completed to satisfy requirement 3. above may also be used to satisfy the requirements of the concentration. The concentration will be noted on the student’s transcript.

### Biomedical Engineering

To earn a Bachelor of Science degree in Computer Engineering with a biomedical engineering concentration, students must complete requirements 1., 2., and 3. above and the following:

1. **Complete 6 credits from the following courses:**
   - ANTR 350 Human Gross Anatomy for Pre-Health Professionals 3
   - BS 161 Cell and Molecular Biology 3
   - PSL 250 Introductory Physiology 4
   - PSL 310 Physiology for Pre-Health Professions 4

2. **Complete 6 credits from the following courses:**
   - ECE 445 Biomedical Instrumentation 3
   - ECE 446 Biomedical Signal Processing 3
   - ECE 447 Introduction to Biomedical Imaging 3
   - ECE 448 Modeling and Analysis of Bioelectrical Systems 3

3. **Complete 3 credits from the following courses:**
   - BE 444 Biosensors for Medical Diagnostics 3
   - ME 494 Biofluid Mechanics and Heat Transfer 3
   - ME 495 Tissue Mechanics 3
   - MSE 425 Biomaterials and Biocompatibility 3

A 400-level listed above or other approved Electrical and Computer Engineering (ECE) courses with biomedical engineering content as approved by the student’s advisor. The course used to fulfill this requirement may not be used to fulfill concentration requirement 1. or 2.

## Computer Engineering Sample Program

### Freshman Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tr>
<td>Bioscience</td>
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<td>CSE 231</td>
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<tr>
<td>CEM 141</td>
<td>4</td>
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<td>4</td>
</tr>
<tr>
<td>EGR 100</td>
<td>2</td>
<td>PHY 183</td>
<td>4</td>
</tr>
<tr>
<td>MTH 132</td>
<td>3</td>
<td>ISS 2XX</td>
<td>4</td>
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<tr>
<td>WRA XXX</td>
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### Sophomore Year

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<td>CSE 260</td>
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<td>CEM 161</td>
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<td>ECE 201</td>
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<td>ECE 202 &amp; 203</td>
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<td>MTH 234</td>
<td>4</td>
<td>ECE 280</td>
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<td>PHY 184</td>
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### Junior Year

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<td>CSE 410</td>
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<td>ECE 302 &amp; 303</td>
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<td>CSE 331</td>
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<td>ISS 3XX</td>
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### Senior Year

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<td>ECE 480</td>
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<tr>
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<td>Major Elective</td>
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<td><strong>Total</strong></td>
<td><strong>10/18</strong></td>
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*Last Revised: April 2011*

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### Program Objectives

The bachelor’s degree in electrical/computer engineering provides its graduates with a solid foundation on which they can build successful and sustainable careers in the ever-changing global work environment. The program prepares its graduates for a variety of career paths including engineering positions directly after program completion, entry to engineering graduate school, and entry to other professional graduate-level schools, and eventual leadership in technical, organizational, and entrepreneurial arenas.

Specifically, the electrical/computer engineering program prepares its graduates to become successful in:

- maintaining and increasing their technical and/or broad expertise through lifelong learning;
- using/applying their continual improving expertise in the practice of electrical/computer engineering or a related career; and
- sharing their expertise to the benefit of the larger community.

*Last revised: April 2011*