

# Electrical Engineering

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## 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, BS 162, ENT 205, MMG 201,	
MMG 301, PLB 105, PSL 250, ZOL 141	3-4

## 2. College Requirements: (30)

CEM 141	General Chemistry	4
EGR 100	Introduction to Engineering Design	2
EGR 102	Introduction to Engineering Modeling	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: (62)

### A. Complete one of the following courses: (1)

CEM 161	Chemistry Laboratory I	1
PHY 191	Physics Laboratory for Scientists I	1

### B. Complete all of the following courses: (40)

CSE 251	Programming in C	1
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 305	Electromagnetic Fields & Waves I	4
ECE 313	Control Systems	3
ECE 320	Energy Conversion & Pwr Electronics	3
ECE 331	Microprocessors & Digital Systems	4
ECE 366	Introduction to Signal Processing	3
ECE 390	Ethics, Professionalism and Cont. Issues	1
ECE 480	Senior Design (W)	4

### C. Select one of the following courses: (3)

CE 221	Statics	3
ME 201	Thermodynamics	3

## D. Major Electives (18)

A minimum of six courses totaling a minimum of 18 credits, of 3- or 4-credits each, selected from at least four different areas. A laboratory course ("L") must be included. Students may substitute, for one of the six required courses, a 3- or 4-credit experiential education experience obtained in a minimum of three out-of-classroom experiences through engineering cooperative education or independent study. Students interested in the experiential education experience must contact the department for approval.

### Electromagnetics

ECE 405	Electromagnetic Fields and Waves II (L)	4
ECE 407	Electromagnetic Compatibility (L)	4

### Power

ECE 423	Power System Analysis & Lab	3
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### Integrated Circuits / VLSI

ECE 402	Applications of Analog Integrated Circuits (L)	4
ECE 404	Radio Frequency Electronic Circuits (L)	4
ECE 410	VLSI Design (L)	4
ECE 411	Electronic Design Automation (L)	4
ECE 412	Intro to Mixed-Signal Integrated Circuits (L)	4

### Solid-State Electronics / Electro-optics

ECE 474	Principles of Electronic Devices	3
ECE 476	Electro-Optics (L)	4
ECE 477	Microelectronic Fabrication (L)	3

### Communications / Signal Processing

ECE 442	Introduction to Communication Networks	3
ECE 457	Communication Systems	3
ECE 466	Digital Signal Processing and Filter Design	3

### Control / Robotics

ECE 415	Computer Aided Manufacturing (L)	3
ECE 416	Digital Control (L)	3

### Biomedical Engineering

ECE 445	Biomedical Instrumentation (L)	3
ECE 446	Biomedical Signal Processing	3
ECE 447	Intro to Biomedical Imaging	3
ECE 448	Modeling & Analysis of Bioelectrical Systems	3

**Biomedical Engineering Concentration: (15)**

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 Electrical 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.

To earn a Bachelor of Science degree in Electrical 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: (6)**

ANTR 350	Human Gross Anatomy & Structural Biology	3
BS 161	Cells and Molecular Biology	3
PSL 250	Introductory Physiology	4
PSL 431	Human Physiology I	3
PSL 432	Human Physiology II	3

**2. Complete 6 credits from the following: (6)**

ECE 445	Biomedical Instrumentation	3
ECE 446	Biomedical Signal Processing	3
ECE 447	Intro to Biomedical Imaging	3
ECE 448	Modeling & Anlys of Bioelectrical Systems	3

**3. Complete at least 3 credits from 1) the list below or 2) any 400-level course listed above but not otherwise counted toward the concentration, or 3) other approved course such as ECE 490 or ECE 491 with biomedical engineering content. (3)**

ME 494	Biofluid Mechanics and Heat Transfer	3
ME 495	Tissue Mechanics	3
MSE 425	Biomaterials and Biocompatibility	3

**Other Electives (Variable)****Total Credits Required for Degree****128**

The requirements listed above apply to students admitted to the major of Electrical Engineering beginning Fall, 2008. 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.

# Electrical Engineering

## Sample Program

Freshman Year				Sophomore Year			
Fall	Credits	Spring	Credits	Fall	Credits	Spring	Credits
WRA 1XX or ISS 2XX	4	WRA 1XX or IAH 201-210	4	ECE 201	3	ECE 202/203	4
Bioscience (AT)	3/4	EGR 102	2	IAH 201-210 or ISS 2XX	4	ECE 230	3
CEM 141	4	MTH 133	4	MTH 234	4	ECE 280	3
EGR 100	2	PHY 183	4	PHY 184	4	ME 201 / CE 221	3
MTH 132	3	ECE 101 or Elective	2/3	PHY 191 or CEM 161	1	MTH 235	3
<b>Total</b>	<b>16/17</b>	<b>Total</b>	<b>16/17</b>	<b>Total</b>	<b>16</b>	<b>Total</b>	<b>16</b>

  

Junior Year				Senior Year			
Fall	Credits	Spring	Credits	Fall	Credits	Spring	Credits
ECE 302/303	4	ECE 320	3	ECE 390	1	ECE 480	4
ECE 305	4	ECE 331	4	Major Elective	3/4	Elective	0/4
ECE 313	3	ECE 366	3	Major Elective	3/4	Major Elective	3/4
ISS 3XX	4	IAH 211 or higher	4	Major Elective	3/4	Major Elective	3/4
Elective	2/3	CSE 251 Elective	1 2/3	Major Elective	3/4		
<b>Total</b>	<b>17/18</b>	<b>Total</b>	<b>17/18</b>	<b>Total</b>	<b>13/17</b>	<b>Total</b>	<b>10/16</b>

### 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.