

# Electrical and Computer Engineering

## Computer Engineering

Department Web site: [www.ece.iit.edu](http://www.ece.iit.edu)

Computer engineering involves the design and application of computer hardware and computer software. Computer hardware consists of the physical components that implement a computer system: processor and memory chips, circuit boards, and peripheral devices. Computer software consists of computer programs that accomplish a specific task using sequences of simple, programmable steps. Computers have become an integral part of many large systems that require sophisticated control, including automobiles, medical instrumentation, telecommunication systems, and factory automation. Computers are a driving force behind many of today's exciting new technologies, including wireless communications, interactive multimedia, and high-speed computer networks. Computer engineers must have detailed knowledge of

both hardware and software to design, build and use complex information processing systems for a wide range of applications.

The objectives of the ECE undergraduate computer engineering program are to produce electrical engineering graduates who are prepared to:

- Enter their profession and make intellectual contributions to it
- Embark on a lifelong career of personal and professional growth
- Take advanced courses at the graduate level

## Bachelor of Science in Computer Engineering

Required Courses	Credit Hours	Required Courses	Credit Hours
<b>Computer Engineering Requirements</b>		<b>Humanities and Social Sciences Requirements</b>	21
ECE 100, 211, 212, 213, 214, 218, 311, 441, 485	25	See general education requirements on page 25	
CS 115, 116, 330, 331, 350, 351, 450, 487	22		
<b>Mathematics Requirements</b>		<b>Junior Computer Engineering Elective</b>	3/4
MATH 151, 152, 251, 252, 474	24	ECE 307, 308, 312 or 319	
Junior mathematics elective (MATH 333 or 471)			
<b>Physics Requirements</b>	11	<b>Science Elective</b>	3
PHYS 123, 221, 224		BIOL 107, BIOL 115, MS 201, or CHEM 126	
<b>Chemistry Requirement</b>	3	<b>Professional Electives</b>	9/12
CHEM 122			
<b>Engineering Science Requirement</b>	3	<b>Interprofessional Projects</b>	6
MMAE 200 or MMAE 320			
		<b>Total Credit Hours</b>	<b>130/134</b>

## Computer Engineering Curriculum

Semester 1					Semester 2				
		Lect.	Lab. Hrs.	Cr. Hrs.			Lect.	Lab. Hrs.	Cr. Hrs.
MATH 151	Calculus I	4	1	5	MATH 152	Calculus II	4	1	5
CHEM 122	Principles of Chemistry I	3	0	3	PHYS 123	Mechanics	3	3	4
CS 115	Object-Oriented Programming I	2	1	2	Science Elective*		3	0	3
ECE 100	Introduction to the Profession I	2	3	3	CS 116	Object-Oriented Programming II	2	1	2
Social Science Elective		3	0	3	Humanities 100-level Course		3	0	3
<b>Totals</b>		<b>14</b>	<b>5</b>	<b>16</b>	<b>Totals</b>		<b>15</b>	<b>5</b>	<b>17</b>

Semester 3				
MATH 252	Introduction to Differential Equations	4	0	4
PHYS 221	Electromagnetism and Optics	3	3	4
ECE 211	Circuit Analysis I	3	0	3
ECE 212	Analog and Digital Laboratory I	0	3	1
ECE 218	Digital Systems	3	0	3
CS 331	Data Structures and Algorithms	2	2	3
<b>Totals</b>		<b>15</b>	<b>8</b>	<b>18</b>

Semester 4				
MATH 251	Multivariate and Vector Calculus	4	0	4
PHYS 224	Thermal and Modern Physics	3	0	3
ECE 213	Circuit Analysis II	3	0	3
ECE 214	Analog and Digital Laboratory II	0	3	1
CS 350	Computer Organization and Assembly Language Programming	2	2	3
CS 330	Discrete Structures	3	0	3
<b>Totals</b>		<b>15</b>	<b>5</b>	<b>17</b>

Semester 5				
Engineering Science Elective**		3	0	3
ECE 311	Engineering Electronics	3	3	4
CS 351	Systems Programming	2	2	3
Junior Mathematics Elective***		3	0	3
Humanities Elective		3	0	3
<b>Totals</b>		<b>14</b>	<b>5</b>	<b>16</b>

Semester 6				
Junior Computer Engineering Elective****		3	0/3	3/4
CS 450	Operating Systems I	3	0	3
MATH 474	Probability and Statistics†	3	0	3
IPRO I	Interprofessional Project I††	1	6	3
Social Science Elective		3	0	3
<b>Totals</b>		<b>13</b>	<b>6/9</b>	<b>15/16</b>

Semester 7				
ECE 441	Microcomputers	3	3	4
ECE 485	Computer Organization and Design*****	3	0	3
CS 487	Software Engineering I	3	0	3
Professional Elective†††		3/4	0/3	3/4
Humanities or Social Science Elective		3	0	3
<b>Totals</b>		<b>15/16</b>	<b>3/6</b>	<b>16/17</b>

Semester 8				
Professional Elective†††		3	0/3	3/4
Hardware-design Elective††††		3/4	0/3	3/4
IPRO II	Interprofessional Project II††	1	6	3
Humanities Elective		3	0	3
Social Science Elective		3	0	3
<b>Totals</b>		<b>13/14</b>	<b>6/12</b>	<b>15/17</b>

**Total Credit Hours** **130/134**

This program is accredited by the Engineering Accreditation Commission for the Accreditation Board for Engineering and Technology (ABET).

\* Science elective must be BIOL 107, BIOL 115, CHEM 126, or MS 201.

\*\* Engineering science elective: Choose either MMAE 200 or MMAE 320.

\*\*\* Junior mathematics elective: Choose either MATH 333 or MATH 471.

\*\*\*\* Junior CPE elective: Choose one of ECE 307, 308, 312, or 319.

\*\*\*\*\* CS 470 may be substituted with adviser approval.

† ECE 475 may be substituted with adviser approval.

†† Interprofessional projects may be taken at any time during the sophomore, junior or senior years. (Course scheduling must be adjusted accordingly with adviser approval.)

††† Professional electives may be chosen from the 400-level ECE courses identified with a (P) in the course descriptions except ECE 448, and any 400-level computer science courses except CS 460, 461 and 485. A maximum of three credits of Undergraduate Research (ECE 491 or CS 491) or Special Problems (ECE 497 or CS 495) may be used as a professional elective with adviser approval.

†††† Hardware-design elective *must* be CS 471, ECE 429 or ECE 446.