

# B.S. in Computer Engineering

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(120 credit minimum)

**First Year**

<b>1st Semester</b>		<b>Credits</b>
CHEM 125	General Chemistry I	3
FED 101	Fundamentals of Engineering Design	2
ENGL 101	English Composition: Introduction to Academic Writing	3
MATH 111	Calculus I	4
PHYS 111	Physics I	3
PHYS 111A	Physics I Lab	1
FYS SEM	First-Year Student Seminar	0
<b>Term Credits</b>		<b>16</b>

**2nd Semester**

CS 115	Introduction to Computer Science I in C++	3
MATH 112	Calculus II	4
PHYS 122	Electricity & Magnetsm ECE Appl	3
PHYS 121A	Physics II Lab	1
ECE 101	Introduction to Electrical and Computer Engineering	0
ENGL 102	English Composition: Introduction to Writing for Research	3
<b>Term Credits</b>		<b>14</b>

**Second Year****1st Semester**

CS 116	Introduction to Computer Science II in C++.	3
ECE 231	Circuits and Systems I	3
ECE 251	Digital Design	3
MATH 222	Differential Equations	4
History and Humanities GER 200 level ( <a href="http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/">http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/</a> )		3
<b>Term Credits</b>		<b>16</b>

**2nd Semester**

ECE 232	Circuits and Systems II	3
ECE 252	Microprocessors	3
MATH 213	Calculus III B	4
ECE 294	Analog and Digital Circuits Laboratory	2
ECE 271	Electronic Circuits I	3
<b>Term Credits</b>		<b>15</b>

**Third Year****1st Semester**

CS 280	Programming Language Concepts	3
ECE 368	Signal Transmission	3
ECE 395	Microprocessor Laboratory	2
MATH 326	Discrete Analysis for Computer Engineers	3
ECE 321	Random Signals and Noise	3
<b>Term Credits</b>		<b>14</b>

**2nd Semester**

CS 332	Principles of Operating Systems	3
MATH 340 or MATH 337	Applied Numerical Methods or Linear Algebra	3
ECE 353	Computer Organization and Architecture	3
PHIL 334	Engineering Ethics and Technological Practice: Philosophical Perspectives on Engineering	3

Select one of the following:		3
MGMT 390	Principles of Business	
IE 492	Engineering Management	
ECON 201	Economics	
ECON 265	Microeconomics	
ECON 266	Macroeconomics	
<b>Term Credits</b>		<b>15</b>
<b>Fourth Year</b>		
<b>1st Semester</b>		
ECE 414	Electrical and Computer Engineering Project I	1
ECE 495	Computer Engineering Design Lab	3
COE Track Elective I		3
COE Track Elective II		3
Technical Elective		3
History and Humanities GER 300+ level ( <a href="http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-300-level/">http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-300-level/</a> )		3
<b>Term Credits</b>		<b>16</b>
<b>2nd Semester</b>		
ECE 416 or ECE 417	Electrical and Computer Engineering Project II or Electrical & Computer Engineering Project II	3
COE Track Laboratory Elective		2
COE Track Elective III		3
Technical Elective		3
Humanities and Social Science Senior Seminar GER ( <a href="http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/">http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/</a> )		3
<b>Term Credits</b>		<b>14</b>
<b>Total Credits</b>		<b>120</b>

### Computer Engineering Tracks

The computer Engineering technical tracks are designed to provide in-depth study in a specialty area. Students at the fourth year of the curriculum must choose one of the available tracks. Courses are listed below. Students may take alternative courses but must see their academic advisor for approval.

Code	Title	Credits
Computer Engineering Tracks - Select one of the following:		
1. Advanced Computer Systems Track		
ECE 451	Advanced Computer Architecture	
ECE 452	High Performance Computer Architecture	
ECE 453 or IS 461	Introduction to Discrete Event Systems Systems Simulation	
ECE 459	Advanced Computer Systems Design Lab	
2. Computer Communications Track		
ECE 421	Digital Data Communication	
ECE 422	Computer Communications Networks	
ECE 425	Wireless Communication Systems	
ECE 429	Computer Communications Lab	

### Computer Engineering Technical Electives - 3 courses

The ECE Elective must be a 300 or 400 level ECE course or an advisor approved upper level engineering, science or mathematics course. Elective courses cannot cover the same material as other courses taken by the student. For example, a CS course covering the same material as an ECE course taken by the student cannot count as a technical elective. Courses from the Engineering Technology Department are generally not approved as ECE electives.

### Co-op

Co-op courses bearing degree credit replace a technical elective or another course approved by the faculty advisor in the student's major department. In Computer Engineering, ECE 310 Co-op Work Experience I is taken for zero credits, and ECE 410 Co-op Work Experience II is taken for 3 degree credits, upon acceptance by the faculty co-op advisor of an approved proposal.

### CoOp Option A Track

(145 credits minimum)

#### First Year

1st Semester		Credits
CHEM 125	General Chemistry I	3
FED 101	Fundamentals of Engineering Design	2
ENGL 101	English Composition: Introduction to Academic Writing	3
MATH 111	Calculus I	4
PHYS 111	Physics I	3
PHYS 111A	Physics I Lab	1
FYS SEM	First-Year Student Seminar	0
<b>Term Credits</b>		<b>16</b>

#### 2nd Semester

CS 115	Introduction to Computer Science I in C++	3
MATH 112	Calculus II	4
PHYS 122	Electricity & Magnetsm ECE Appl	3
PHYS 121A	Physics II Lab	1
ECE 101	Introduction to Electrical and Computer Engineering	0
ENGL 102	English Composition: Introduction to Writing for Research	3
<b>Term Credits</b>		<b>14</b>

#### Second Year

##### 1st Semester

CS 116	Introduction to Computer Science II in C++.	3
ECE 231	Circuits and Systems I	3
ECE 251	Digital Design	3
MATH 222	Differential Equations	4
History and Humanities GER 200 level ( <a href="http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/">http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/</a> )		3
<b>Term Credits</b>		<b>16</b>

##### 2nd Semester

ECE 232	Circuits and Systems II	3
ECE 252	Microprocessors	3
ECE 271	Electronic Circuits I	3
MATH 213	Calculus III B	4
ECE 294	Analog and Digital Circuits Laboratory	2
ENGR 211	Professional Skills for Engineers I	1
<b>Term Credits</b>		<b>16</b>

#### Summer

CO-OP I		
<b>Term Credits</b>		<b>0</b>

#### Third Year

##### 1st Semester

ENGR 310	Co-op Work Experience I	12
<b>Term Credits</b>		<b>12</b>

##### 2nd Semester

CS 280	Programming Language Concepts	3
ECE 368	Signal Transmission	3
ECE 395	Microprocessor Laboratory	2

MATH 326	Discrete Analysis for Computer Engineers	3
ECE 321	Random Signals and Noise	3
<b>Term Credits</b>		<b>14</b>
<b>Summer</b>		
CO-OP II		
<b>Term Credits</b>		<b>0</b>
<b>Fourth Year</b>		
<b>1st Semester</b>		
ENGR 410	Co-op Work Experience II	12
<b>Term Credits</b>		<b>12</b>
<b>2nd Semester</b>		
CS 332	Principles of Operating Systems	3
MATH 340 or MATH 337	Applied Numerical Methods or Linear Algebra	3
ECE 353	Computer Organization and Architecture	3
PHIL 334	Engineering Ethics and Technological Practice: Philosophical Perspectives on Engineering	3
Select one of the following:		3
MGMT 390	Principles of Business	
IE 492	Engineering Management	
ECON 201	Economics	
ECON 265	Microeconomics	
ECON 266	Macroeconomics	
<b>Term Credits</b>		<b>15</b>
<b>Fifth Year</b>		
<b>1st Semester</b>		
ECE 414	Electrical and Computer Engineering Project I	1
ECE 495	Computer Engineering Design Lab	3
COE Track Elective I		3
COE Track Elective II		3
Technical Elective		3
History and Humanities GER 300+ level ( <a href="http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-300-level/">http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-300-level/</a> )		3
<b>Term Credits</b>		<b>16</b>
<b>2nd Semester</b>		
ECE 416 or ECE 417	Electrical and Computer Engineering Project II or Electrical & Computer Engineering Project II	3
COE Track Laboratory Elective		2
COE Track Elective III		3
Technical Elective		3
Humanities and Social Science Senior Seminar GER ( <a href="http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/">http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/</a> )		3
<b>Term Credits</b>		<b>14</b>
<b>Total Credits</b>		<b>145</b>

### Computer Engineering Tracks

The computer Engineering technical tracks are designed to provide in-depth study in a specialty area. Students at the fourth year of the curriculum must choose one of the available tracks. Courses are listed below. Students may take alternative courses but must see their academic advisor for approval.

Code	Title	Credits
Computer Engineering Tracks - Select one of the following:		
1. Advanced Computer Systems Track		
ECE 451	Advanced Computer Architecture	
ECE 452	High Performance Computer Architecture	

ECE 453 or IS 461	Introduction to Discrete Event Systems Systems Simulation
ECE 459	Advanced Computer Systems Design Lab
<b>2. Computer Communications Track</b>	
ECE 421	Digital Data Communication
ECE 422	Computer Communications Networks
ECE 425	Wireless Communication Systems
ECE 429	Computer Communications Lab

## Computer Engineering Technical Electives - 3 courses

The ECE Elective must be a 300 or 400 level ECE course or an advisor approved upper level engineering, science or mathematics course. Elective courses cannot cover the same material as other courses taken by the student. For example, a CS course covering the same material as an ECE course taken by the student cannot count as a technical elective. Courses from the Engineering Technology Department are generally not approved as ECE electives.

### CoOp Option B Track

(145 credits minimum)

#### First Year

1st Semester		Credits
CHEM 125	General Chemistry I	3
FED 101	Fundamentals of Engineering Design	2
ENGL 101	English Composition: Introduction to Academic Writing	3
MATH 111	Calculus I	4
PHYS 111	Physics I	3
PHYS 111A	Physics I Lab	1
FYS SEM	First-Year Student Seminar	0
<b>Term Credits</b>		<b>16</b>

#### 2nd Semester

CS 115	Introduction to Computer Science I in C++	3
MATH 112	Calculus II	4
PHYS 122	Electricity & Magnetism ECE Appl	3
PHYS 121A	Physics II Lab	1
ECE 101	Introduction to Electrical and Computer Engineering	0
ENGL 102	English Composition: Introduction to Writing for Research	3
<b>Term Credits</b>		<b>14</b>

#### Second Year

##### 1st Semester

CS 116	Introduction to Computer Science II in C++.	3
ECE 231	Circuits and Systems I	3
ECE 251	Digital Design	3
MATH 222	Differential Equations	4
History and Humanities GER 200 level ( <a href="http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/">http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/</a> )		3
<b>Term Credits</b>		<b>16</b>

##### 2nd Semester

ECE 232	Circuits and Systems II	3
ECE 252	Microprocessors	3
ECE 271	Electronic Circuits I	3
MATH 213	Calculus III B	4
ECE 294	Analog and Digital Circuits Laboratory	2
<b>Term Credits</b>		<b>15</b>

**Third Year****1st Semester**

CS 280	Programming Language Concepts	3
ECE 368	Signal Transmission	3
ECE 395	Microprocessor Laboratory	2
MATH 326	Discrete Analysis for Computer Engineers	3
ECE 321	Random Signals and Noise	3
ENGR 211	Professional Skills for Engineers I	1
<b>Term Credits</b>		<b>15</b>

**2nd Semester**

ENGR 310	Co-op Work Experience I	12
<b>Term Credits</b>		<b>12</b>

**Summer**

CO-OP I		
<b>Term Credits</b>		<b>0</b>

**Fourth Year****1st Semester**

CS 332	Principles of Operating Systems	3
MATH 340	Applied Numerical Methods	3
ECE 353	Computer Organization and Architecture	3
PHIL 334	Engineering Ethics and Technological Practice: Philosophical Perspectives on Engineering	3
Select one of the following:		3
MGMT 390	Principles of Business	
IE 492	Engineering Management	
ECON 201	Economics	
ECON 265	Microeconomics	
ECON 266	Macroeconomics	
<b>Term Credits</b>		<b>15</b>

**2nd Semester**

ENGR 410	Co-op Work Experience II	12
<b>Term Credits</b>		<b>12</b>

**Summer**

CO-OP II		
<b>Term Credits</b>		<b>0</b>

**Fifth Year****1st Semester**

ECE 414	Electrical and Computer Engineering Project I	1
ECE 495	Computer Engineering Design Lab	3
COE Track Elective I		3
COE Track Elective II		3
Technical Elective		3
History and Humanities GER 300+ level ( <a href="http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-300-level/">http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-300-level/</a> )		3
<b>Term Credits</b>		<b>16</b>

**2nd Semester**

ECE 416 or ECE 417	Electrical and Computer Engineering Project II or Electrical & Computer Engineering Project II	3
COE Track Laboratory Elective		2
COE Track Elective III		3
Technical Elective		3

Humanities and Social Science Senior Seminar GER ( <a href="http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/">http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/</a> )	3
<b>Term Credits</b>	<b>14</b>
<b>Total Credits</b>	<b>145</b>

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ECE 459	Advanced Computer Systems Design Lab	
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ECE 421	Digital Data Communication	
ECE 422	Computer Communications Networks	
ECE 425	Wireless Communication Systems	
ECE 429	Computer Communications Lab	

### Computer Engineering Technical Electives - 3 courses

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Refer to the General Education Requirements (<http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/>) section of this catalog for further information on electives.

*This curriculum represents the maximum number of credits per semester for which a student is advised to register. A full-time credit load is 12 credits. First-year students are placed in a curriculum that positions them for success which may result in additional time needed to complete curriculum requirements. Continuing students should consult with their academic advisor to determine the appropriate credit load.*