B.S. in Electrical Engineering

(120 credit 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
	Term Credits	**16**

2nd Semester		
CS 115	Introduction to Computer Science I in C++	3
MATH 112	Calculus II	4
PHYS 122	Electricity & Magntsm 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
	Term Credits	**14**

Second Year

1st Semester		
PHYS 234	Physics III	3
ECE 231	Circuits and Systems I	3
ECE 251	Digital Design	3
MATH 222	Differential Equations	4
History and Humanities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/)		3
	Term Credits	**16**

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
	Term Credits	**15**

Third Year

1st Semester		
ECE 333	Signals and Systems	3
ECE 361	Electromagnetic Fields	3
ECE 371	Electronic Circuits Design	4
ECE 395	Microprocessor Laboratory	2
Select one of the following:		3
MGMT 390	Principles of Business	
IE 492	Engineering Management	
ECON 201	Economics	
ECON 265	Microeconomics	
ECON 266	Macroeconomics	
	Term Credits	**15**

2nd Semester

ECE 321	Random Signals and Noise	3
PHIL 334	Engineering Ethics and Technological Practice: Philosophical Perspectives on Engineering	3
ECE 381	Introduction to Applied Machine Learning	3
ECE 342	Energy Conversion	4
ECE 375	Introduction to Semiconductor Devices	4
	Term Credits	**17**

Fourth Year

1st Semester

ECE 414	Electrical and Computer Engineering Project I	1
ECE Track Elective I		3
ECE Track Elective II		3
Technical Elective		3
History and Humanities GER 300+ level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-300-level/)		3
	Term Credits	**13**

2nd Semester

ECE 416
  or ECE 417
	Electrical and Computer Engineering Project II
	    or Electrical & Computer Engineering Project II
		3

ECE Track Laboratory Elective		2
Technical Elective		3
Technical Elective		3
Humanities and Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/)		3
	Term Credits	**14**
	Total Credits	**120**

Electrical Engineering Track and Track Laboratory

Students should select one track. Courses are listed below. Students may take alternatives courses but must see their academic advisor for approval.

Code	Title	Credits
Electrical Engineering Tracks - Select one of the following:		
1. Computer Systems Track		
ECE 353	Computer Organization and Architecture	
ECE 451	Advanced Computer Architecture	
ECE 495	Computer Engineering Design Lab	
2. Controls Track		
ECE 431	Introduction to Feedback Control Systems [*]	
ECE 432	Advanced Control Systems and Robotics	
ECE 439	Control Systems Laboratory	
3. Electronic, Microwave and Photonic Devices Track		
ECE 461	High-Speed Devices: From RF to Optical Frequencies	
ECE 462	RF/Fiber Optics Systems Elective [**]	
ECE 469	RF/Microwave and Fiber Optics Systems Laboratory	
4. Power Track		
ECE 443	Renewable Energy Systems	
ECE 442	Power Systems [**]	
ECE 449	Power Systems Laboratory	
5. Telecommunications & Networking Track		
ECE 421	Digital Data Communication	3
ECE 422 or ECE 425	Computer Communications Networks [*] Wireless Communication Systems	
Telecommunications & Networking Track Lab		

| ECE 429 | Computer Communications Lab |
| or ECE 489 | Communications Systems Laboratory |

*   Prerequisite for track lab
**   Co-requisite for track lab

Electrical 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 ECE courses taken by the student. For example Math 333 is not allowed as an elective since ECE 321, covering similar topics, is in the EE curriculum. Similarly ECE 368 and ECE 421 are not electives in the EE program. Courses from the Engineering Technology Department are generally not approved as ECE electives.

Co-op

Co-op courses bearing degree credit replace an elective or another course approved by the faculty advisor in the student's major department. In electrical 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.

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
	Term Credits	**16**

2nd Semester

CS 115	Introduction to Computer Science I in C++	3
MATH 112	Calculus II	4
PHYS 122	Electricity & Magntsm 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
	Term Credits	**14**

Second Year

1st Semester

PHYS 234	Physics III	3
ECE 231	Circuits and Systems I	3
ECE 251	Digital Design	3
MATH 222	Differential Equations	4
History and Humanities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/)		3
	Term Credits	**16**

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
	Term Credits	**16**

Summer

CO-OP I

	Term Credits	0

Third Year

1st Semester

ENGR 310	Co-op Work Experience I	12
	Term Credits	**12**

2nd Semester

ECE 333	Signals and Systems	3
ECE 361	Electromagnetic Fields	3
ECE 395	Microprocessor Laboratory	2
ECE 371	Electronic Circuits Design	4
Select one of the following:		3
MGMT 390	Principles of Business	
IE 492	Engineering Management	
ECON 201	Economics	
ECON 265	Microeconomics	
ECON 266	Macroeconomics	
	Term Credits	**15**

Summer

CO-OP II

	Term Credits	**0**

Fourth Year

1st Semester

ENGR 410	Co-op Work Experience II	12
	Term Credits	**12**

2nd Semester

ECE 321	Random Signals and Noise	3
PHIL 334	Engineering Ethics and Technological Practice: Philosophical Perspectives on Engineering	3
ECE 381	Introduction to Applied Machine Learning	3
ECE 342	Energy Conversion	4
ECE 375	Introduction to Semiconductor Devices	4
	Term Credits	**17**

Fifth Year

1st Semester

ECE 414	Electrical and Computer Engineering Project I	1
ECE Track Elective I		3
ECE Track Elective II		3
Technical Elective		3
History and Humanities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/)		3
	Term Credits	**13**

2nd Semester

ECE 416 or ECE 417	Electrical and Computer Engineering Project II or Electrical & Computer Engineering Project II	3
ECE Track Laboratory Elective		2
Technical Elective		3
Technical Elective		3
Humanities and Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/social-science-ger/)		3
	Term Credits	**14**
	Total Credits	**145**

Electrical Engineering Track and Track Laboratory

Students should select one track. Courses are listed below. Students may take alternatives courses but must see their academic advisor for approval.

Code	Title	Credits
Electrical Engineering Tracks - Select one of the following:		
1. Computer Systems Track		
ECE 353	Computer Organization and Architecture	
ECE 451	Advanced Computer Architecture	
ECE 495	Computer Engineering Design Lab	
2. Controls Track		
ECE 431	Introduction to Feedback Control Systems [*]	
ECE 432	Advanced Control Systems and Robotics	
ECE 439	Control Systems Laboratory	
3. Electronic, Microwave and Photonic Devices Track		
ECE 461	High-Speed Devices: From RF to Optical Frequencies	
ECE 462	RF/Fiber Optics Systems Elective [**]	
ECE 469	RF/Microwave and Fiber Optics Systems Laboratory	
4. Power Track		
ECE 443	Renewable Energy Systems	
ECE 442	Power Systems [**]	
ECE 449	Power Systems Laboratory	
5. Telecommunications & Networking Track		
ECE 421	Digital Data Communication	3
ECE 422	Computer Communications Networks [*]	
or ECE 425	Wireless Communication Systems	
Telecommunications & Networking Track Lab		
ECE 429	Computer Communications Lab	
or ECE 489	Communications Systems Laboratory	

[*]   Prerequisite for track lab
[**]   Co-requisite for track lab

Electrical 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 ECE courses taken by the student. For example, Math 333 is not allowed as an elective since ECE 321, covering similar topics, is in the EE curriculum. Similarly, ECE 368 is not an elective in the EE program. 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
	Term Credits	**16**

2nd Semester		
CS 115	Introduction to Computer Science I in C++	3

MATH 112	Calculus II	4
PHYS 122	Electricity & Magntsm 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
	Term Credits	**14**
Second Year		
1st Semester		
PHYS 234	Physics III	3
ECE 231	Circuits and Systems I	3
ECE 251	Digital Design	3
MATH 222	Differential Equations	4
History and Humanities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/)		3
	Term Credits	**16**
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
	Term Credits	**15**
Third Year		
1st Semester		
ECE 333	Signals and Systems	3
ECE 361	Electromagnetic Fields	3
ECE 395	Microprocessor Laboratory	2
ECE 371	Electronic Circuits Design	4
Select one of the following:		3
MGMT 390	Principles of Business	
IE 492	Engineering Management	
ENGR 211	Professional Skills for Engineers I	1
	Term Credits	**16**
2nd Semester		
ENGR 310	Co-op Work Experience I	12
	Term Credits	**12**
Summer		
CO-OP I		
	Term Credits	**0**
Fourth Year		
1st Semester		
ECE 342	Energy Conversion	4
ECE 381	Introduction to Applied Machine Learning	3
ECE 375	Introduction to Semiconductor Devices	4
PHIL 334	Engineering Ethics and Technological Practice: Philosophical Perspectives on Engineering	3
ECE 321	Random Signals and Noise	3
	Term Credits	**17**
2nd Semester		
ENGR 410	Co-op Work Experience II	12
	Term Credits	**12**

Summer

CO-OP II

	Term Credits	0

Fifth Year

1st Semester

ECE 414	Electrical and Computer Engineering Project I	1
ECE Track Elective I		3
ECE Track Elective II		3
Technical Elective		3
History and Humanities GER 300+ level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-300-level/)		3
	Term Credits	**13**

2nd Semester

ECE 416	Electrical and Computer Engineering Project II	3
or ECE 417	or Electrical & Computer Engineering Project II	
ECE Track Laboratory Elective		2
Technical Elective		3
Technical Elective		3
Humanities and Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/)		3
	Term Credits	**14**
	Total Credits	**145**

Electrical Engineering Track and Track Laboratory

Students should select one track. Courses are listed below. Students may take alternatives courses but must see their academic advisor for approval.

Code	Title	Credits
Electrical Engineering Tracks - Select one of the following:		
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ECE 353	Computer Organization and Architecture	
ECE 451	Advanced Computer Architecture	
ECE 495	Computer Engineering Design Lab	
2. Controls Track		
ECE 431	Introduction to Feedback Control Systems [*]	
ECE 432	Advanced Control Systems and Robotics	
ECE 439	Control Systems Laboratory	
3. Electronic, Microwave and Photonic Devices Track		
ECE 461	High-Speed Devices: From RF to Optical Frequencies	
ECE 462	RF/Fiber Optics Systems Elective [**]	
ECE 469	RF/Microwave and Fiber Optics Systems Laboratory	
4. Power Track		
ECE 443	Renewable Energy Systems	
ECE 442	Power Systems [**]	
ECE 449	Power Systems Laboratory	
5. Telecommunications & Networking Track		
ECE 481	Digital Communications Systems [*]	
ECE 422	Computer Communications Networks [*]	
or ECE 425	Wireless Communication Systems	
Telecommunications & Networking Track Lab		
ECE 429	Computer Communications Lab	
or ECE 489	Communications Systems Laboratory	

*   Prerequisite for track lab

Electrical 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 ECE courses taken by the student. For example, Math 333 is not allowed as an elective since ECE 321, covering similar topics, is in the EE curriculum. Similarly, ECE 368 is not an elective in the EE program. Courses from the Engineering Technology Department are generally not approved as ECE 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.