## B.S. in Computer Engineering

(129 credit minimum)

### First Year

<table>
<thead>
<tr>
<th>1st Semester</th>
<th>Term Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 125 General Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>FED 101 Fundamentals of Engineering Design</td>
<td>2</td>
</tr>
<tr>
<td>HUM 101 English Composition: Writing, Speaking, Thinking I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 111 Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 111 Physics I</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 111A Physics I Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>FRSH SEM Freshman Seminar</td>
<td>0</td>
</tr>
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</table>

**Term Credits** 16

<table>
<thead>
<tr>
<th>2nd Semester</th>
<th>Term Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 115 Intro. to CS I in C++</td>
<td>3</td>
</tr>
<tr>
<td>MATH 112 Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 121 Physics II</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 121A Physics II Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>ECE 101 Introduction to Electrical and Computer Engineering</td>
<td>0</td>
</tr>
<tr>
<td>HUM 102 English Composition: Writing, Speaking, Thinking II</td>
<td>3</td>
</tr>
<tr>
<td>Physical Education:GUR Elective</td>
<td>1</td>
</tr>
</tbody>
</table>

**Term Credits** 15

### Second Year

<table>
<thead>
<tr>
<th>1st Semester</th>
<th>Term Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 116 Intro. to Computer Science II/C++</td>
<td>3</td>
</tr>
<tr>
<td>ECE 231 Circuits and Systems I</td>
<td>3</td>
</tr>
<tr>
<td>ECE 251 Digital Design</td>
<td>3</td>
</tr>
<tr>
<td>MATH 222 Differential Equations</td>
<td>4</td>
</tr>
</tbody>
</table>

Select one of the following English Composition and Cultural History (lower-level) GUR electives:

- HUM 211 The Pre-Modern World
- HUM 212 The Modern World (Cultural History)
- HIST 213 The Twentieth-Century World

**Term Credits** 17

<table>
<thead>
<tr>
<th>2nd Semester</th>
<th>Term Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 232 Circuits and Systems II</td>
<td>3</td>
</tr>
<tr>
<td>ECE 252 Microprocessors</td>
<td>3</td>
</tr>
<tr>
<td>ECE 271 Electronic Circuits I</td>
<td>3</td>
</tr>
<tr>
<td>ECE 291 Electrical Engineering Laboratory I</td>
<td>1</td>
</tr>
<tr>
<td>MATH 213 Calculus III B</td>
<td>4</td>
</tr>
<tr>
<td>ECON 201 Economics</td>
<td>3</td>
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</tbody>
</table>

**Term Credits** 17

### Third Year

<table>
<thead>
<tr>
<th>1st Semester</th>
<th>Term Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 280 Programming Language Concepts</td>
<td>3</td>
</tr>
<tr>
<td>ECE 368 Signal Transmission</td>
<td>2</td>
</tr>
<tr>
<td>ECE 395 Microprocessor Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>MATH 326 Discrete Analysis for Computer Engineers</td>
<td>3</td>
</tr>
<tr>
<td>MATH 333 Probability and Statistics</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following:

- EPS 202 Society, Technology, and the Environment

**Term Credits** 3
### 2nd Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 332</td>
<td>Principles of Operating Systems</td>
<td>3</td>
</tr>
<tr>
<td>MATH 340</td>
<td>Applied Numerical Methods or MATH 337 Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>ECE 353</td>
<td>Computer Organization and Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ECE 394</td>
<td>Digital Systems Lab</td>
<td>1</td>
</tr>
<tr>
<td>PHIL 334</td>
<td>Engineering Ethics and Technological Practice: Philosophical Perspectives on Engineering</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 390</td>
<td>Principles of Management or IE 492 Engineering Management</td>
<td>3</td>
</tr>
</tbody>
</table>

**Term Credits:** 16

### Fourth Year

#### 1st Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 354</td>
<td>Digital Test</td>
<td>2</td>
</tr>
<tr>
<td>ECE 414</td>
<td>Electrical and Computer Engineering Project I</td>
<td>1</td>
</tr>
<tr>
<td>ECE 495</td>
<td>Computer Engineering Design Lab</td>
<td>3</td>
</tr>
<tr>
<td>COE Track Elective I</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>COE Track Elective II</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Open GUR:ENG, LIT, PHIL, STS, THTR 300 level</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Term Credits:** 15

#### 2nd Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 416</td>
<td>Electrical and Computer Engineering Project II</td>
<td>3</td>
</tr>
<tr>
<td>or ECE 417</td>
<td>or Independent Study</td>
<td></td>
</tr>
<tr>
<td>COE Track Elective III</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>COE Track Laboratory Elective</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Capstone Seminar in Humanities and Social Sciences (upper-level):GUR Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ECE Technical Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ECE Technical Elective</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Term Credits:** 17

**Total Credits:** 129

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2  Fulfills Humanities and Social Sciences (upper-level) GUR

3  Students may also take approved introductory courses in basic social sciences at Rutgers-Newark to fulfill this requirement.

### 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.

#### Computer Engineering Tracks - Select one of the following:

1. Advanced Computer Systems Track

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 451</td>
<td>Advanced Computer Architecture</td>
</tr>
<tr>
<td>ECE 452</td>
<td>Advanced Computer Architecture II</td>
</tr>
<tr>
<td>ECE 453</td>
<td>Introduction to Discrete Event Systems</td>
</tr>
<tr>
<td>or IS 461</td>
<td>Systems Simulation</td>
</tr>
<tr>
<td>ECE 459</td>
<td>Advanced Computer Systems Design Lab</td>
</tr>
</tbody>
</table>

2. Computer Communications Track

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 421</td>
<td>Digital Data Communications</td>
</tr>
<tr>
<td>ECE 422</td>
<td>Computer Communications Networks</td>
</tr>
<tr>
<td>ECE 425</td>
<td>Wireless Communication Systems</td>
</tr>
<tr>
<td>ECE 429</td>
<td>Computer Communications Lab</td>
</tr>
</tbody>
</table>
In addition to the above track courses, students in each track take two COE technical elective courses. The COE technical elective must be a 300 or 400 level ECE course or advisor approved upper level engineering, science or mathematics course. Elective courses from other departments cannot cover the same material as ECE courses taken by the student. For example some CS courses may cover similar material as other courses in the COE program and are not allowed as electives. Courses from the Engineering Technology Department are generally not approved as ECE electives.

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

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.