# COMPUTER ENGINEERING (BS)

Department Website (https://engineering.nyu.edu/academics/departments/electrical-and-computer-engineering/)

**NYSED:** 90109 **HEGIS:** 0909.00 **CIP:** 14.0901

## Program Description

Products of computer engineering touch nearly every part of our lives. They let us chat via webcams, send e-mails from cell phones, and withdraw cash from ATMs. But computer-based devices and information networks aren't the only products computer engineers develop; they reconstruct genomes, design robots, and develop software to make businesses more efficient. That's just the kind of invention, innovation, and entrepreneurship that the School of Engineering encourages.

Our BS program in Computer Engineering is accredited by the Engineering Accreditation Commission of ABET (http://www.abet.org/). The program has a comprehensive analysis and design curriculum that provides an outstanding, cutting-edge education in computer systems with emphasis on hardware and software, The program incorporates the latest market and technology trends and combines the traditional disciplines of electronics, communications, control and computer programming with newer courses, such as Cyber Security, Nanoscale Circuit Design, Parallel Computers, Image Processing, Biomedical Instrumentation, Web Search Engines, Wireless Networks, Peer-to-Peer Networks, SoC (System-on-a-Chip), VLSI (Very Large Scale Integration) and Game Development.

Recognizing the need for well-rounded engineers, we also emphasize strong communication and interpersonal skills. Our students develop these skills not only through required courses in the humanities and social sciences but also during team projects in design classes. Sponsored research and affiliate programs at our Center for Advanced Technology in Telecommunications (CATT) (http://catt.nyu.edu/), and Offensive Security, Incident Response, and Internet Security Lab (https://www.osiris.cyber.nyu.edu/) also put you in constant contact with alumni and instructors whose experience in the industry you can draw upon.

Graduates of our program have gone on to design microchips and computer graphics, monitor and control industrial plants, and develop embedded hardware/software systems. They also occupy positions in manufacturing, research, financial services, health, and government, or create their own companies.

With departmental permission, you may earn a single bachelor's degree in electrical and computer engineering. This degree requires a minimum of 142 credits rather than the typical 128 required for individual bachelor's degrees.

## Admissions

New York University's Office of Undergraduate Admissions supports the application process for all undergraduate programs at NYU. For additional information about undergraduate admissions, including application requirements, see How to Apply (https://www.nyu.edu/admissions/undergraduate-admissions/how-to-apply.html).

## Program Requirements

The program requires the completion of 128 credits, comprised of the following:

| Course | Title | Credits |
|---|---|---|
| **General Education Requirements** | | |
| EXPOS-UA 1 | Writing as Inquiry | 4 |
| EXPOS-UA 22 | Advanced Writing for Engineers | 4 |
| Humanities and Social Sciences Electives (four 4-credit courses, for a total of 16 credits) | | 16 |
| **Major Requirements** | | |
| MA-UY 1024 | Calculus I for Engineers | 4 |
| EG-UY 1004 | Introduction to Engineering and Design | 4 |
| CS-UY 1114 | Intro To Programming & Problem Solving | 4 |
| MA-UY 1124 | Calculus II for Engineers | 4 |
| PH-UY 1013 | Mechanics | 3 |
| CS-UY 1134 | Data Structures and Algorithms | 4 |
| MA-UY 2034 | Linear Algebra and Differential Equations | 4 |
| ECE-UY 1002 | Introduction to Electrical and Computer Engineering | 2 |
| PH-UY 2023 | Electricity, Magnetism, & Fluids | 3 |
| PH-UY 2121 | General Physics Laboratory I | 1 |
| CS-UY 2124 | Object Oriented Programming | 4 |
| ECE-UY 2004 | Fund. Of Electric Circuits | 4 |
| MA-UY 2314 | Discrete Mathematics | 4 |
| ECE-UY 3114 | Fundamentals of Electronics I | 4 |
| ECE-UY 2204 | Digital Logic and State Machine Design | 4 |
| MA-UY 2114 | Calculus III: Multi-Dimensional Calculus | 4 |
| CS-UY 2214 | Computer Architecture and Organization | 4 |
| ECE-UY 4001 | ECE Professional Development & Presentation | 1 |
| MA-UY 2224 | Probability and Statistics for Engineers | 4 |
| ECE-UY 4144 | Introduction to Embedded Systems Design | 4 |
| **Design Project** | | |
| ECE/CS 4XX3 | Design Project I | 3 |
| ECE-CS 4XX3 | Design Project II | 3 |
| **Electives** | | |
| Free Electives | | 15 |
| Math/Science Electives (two 3-credit courses, for a total of 6 credits) | | 6 |
| ECE/CS Electives (two 3- to 4-credit courses, for a minimum of 6 credits) | | 6-8 |
| **Total Credits** | | **128** |

## Program Notes

1. For transfer students and students changing major, ECE-UY 1002 Introduction to Electrical and Computer Engineering is not required. EG-UY 1004 Introduction to Engineering and Design may also be excused depending upon transfer credits. In these cases, additional major elective credit will replace these classes.
2. Grades of at least C- are required in CS-UY 1114 (http://bulletin.engineering.nyu.edu/preview_program.php?catoid=11&poid=3569&returnto=990#tt7782), CS-UY 1134 (http://bulletin.engineering.nyu.edu/preview_program.php?catoid=11&poid=3569&returnto=990#tt9036), CS-UY 2124 (http://bulletin.engineering.nyu.edu/preview_program.php?

catoid=11&poid=3569&returnto=990#tt5177), CS-UY 2204 (http://bulletin.engineering.nyu.edu/preview_program.php?catoid=11&poid=3569&returnto=990#tt2994), and ECE-UY 2004 (http://bulletin.engineering.nyu.edu/preview_program.php?catoid=11&poid=3569&returnto=990#tt7531). C if repeated twice.

3. Choice of Humanities and Social Sciences courses must conform to university requirements. Students must complete at least ONE Advanced Seminar and one Ethics requirement.

# Sample Plan of Study

| Course | Title | Credits |
|---|---|---|
| **1st Semester/Term** | | |
| MA-UY 1024 | Calculus I for Engineers | 4 |
| CS-UY 1114 | Intro To Programming & Problem Solving [1] | 4 |
| EG-UY 1004 | Introduction to Engineering and Design [2] | 4 |
| EXPOS-UA 1 | Writing as Inquiry | 4 |
| | **Credits** | **16** |
| **2nd Semester/Term** | | |
| MA-UY 1124 | Calculus II for Engineers | 4 |
| PH-UY 1013 | Mechanics | 3 |
| CS-UY 1134 | Data Structures and Algorithms [1] | 4 |
| ECE-UY 1002 | Introduction to Electrical and Computer Engineering [3] | 2 |
| EXPOS-UA 22 | Advanced Writing for Engineers | 4 |
| | **Credits** | **17** |
| **3rd Semester/Term** | | |
| MA-UY 2034 | Linear Algebra and Differential Equations [2] | 4 |
| PH-UY 2023 | Electricity, Magnetism, & Fluids | 3 |
| PH-UY 2121 | General Physics Laboratory I | 1 |
| CS-UY 2124 | Object Oriented Programming [1] | 4 |
| ECE-UY 2004 | Fund. Of Electric Circuits [1] | 4 |
| | **Credits** | **16** |
| **4th Semester/Term** | | |
| MA-UY 2314 | Discrete Mathematics | 4 |
| Math/Science Elective | | 3 |
| ECE-UY 2204 | Digital Logic and State Machine Design [1] | 4 |
| ECE-UY 3114 | Fundamentals of Electronics I | 4 |
| | **Credits** | **15** |
| **5th Semester/Term** | | |
| MA-UY 2114 | Calculus III: Multi-Dimensional Calculus | 4 |
| Math/Science Elective | | 3 |
| CS-UY 2214 | Computer Architecture and Organization | 4 |
| ECE/CS Elective [4] | | 3-4 |
| ECE-UY 4001 | ECE Professional Development & Presentation | 1 |
| | **Credits** | **15** |
| **6th Semester/Term** | | |
| MA-UY 2224 | Probability and Statistics for Engineers | 4 |
| ECE-UY 4144 | Introduction to Embedded Systems Design | 4 |
| Humanities and Social Sciences Elective Course [5] | | 4 |
| Free Elective [6] | | 3-4 |
| | **Credits** | **15** |
| **7th Semester/Term** | | |
| ECE/CS 4XX3 | Design Project | 3 |
| ECE/CS Elective [4] | | 3-4 |
| Humanities and Social Sciences Elective Course [5] | | 4 |
| Free Elective [6] | | 3-4 |
| Free Elective [6] | | 3-4 |
| | **Credits** | **16** |
| **8th Semester/Term** | | |
| ECE/CS 4XX3 | Design Project II | 3 |
| Humanities and Social Sciences Elective Course [5] | | 4 |
| Humanities and Social Sciences Elective Course [5] | | 4 |
| Free Elective [6] | | 3-4 |
| Free Elective [6] | | 3-4 |
| | **Credits** | **18** |
| | **Total Credits** | **128** |

1. Grades of at least C- is required in CS-UY 1114 Intro To Programming & Problem Solving, CS-UY 1134 Data Structures and Algorithms, CS-UY 2124 Object Oriented Programming, ECE-UY 2204 Digital Logic and State Machine Design, and ECE-UY 2004 Fund. Of Electric Circuits.
2. Students may replace MA-UY 2034 Linear Algebra and Differential Equations with MA-UY 1044 Linear Algebra and MA-UY 4204 Ordinary Diff Equations, in which case one of these classes will be used as a MA/SCI elective.
3. For transfer students and students changing major, ECE-UY 1002 Introduction to Electrical and Computer Engineering is not required. EG-UY 1004 Introduction to Engineering and Design may also be excused depending upon transfer credits. Missing credit will be substituted with upper level engineering credit.
4. ECE/CS electives can be chosen from any ECE-UY or CS-UY prefixed course not already required by the major. The following ROB-UY courses count as ECE Electives:
   - ROB-UY 2004 Robotic Manipulation and Locomotion
   - ROB-UY 3203 Robot Vision
   - ROB-UY 3303 Robot Motion and Planning
   - ROB-UY 3404 Introduction To Haptics and Telerobotics in Medicine
5. Choice of Humanities and Social Sciences courses must conform to university requirements. Students must complete at least **one** Advanced Seminar and one Ethics Requirements.
6. Students may take up to 15 credits of free electives to count towards their degree.

# Learning Outcomes

Upon successful completion of the program, graduates will have:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

# Policies

## Program Policies

### GPA Policy

A GPA (Technical) of at least 2.0 is required in all ECE-UY, CS-UY and ECE-GY courses.

## NYU Policies

University-wide policies can be found on the New York University Policy pages (https://bulletins.nyu.edu/nyu/policies/).

## Tandon Policies

Additional academic policies can be found on the Tandon academic policy page (https://bulletins.nyu.edu/undergraduate/engineering/academic-policies/).