# MATHEMATICS/ELECTRICAL ENGINEERING (BS/BS)

Department Website (http://cas.nyu.edu/engineering/)

**NYSED:** 33281 **HEGIS:** 1701.00 **CIP:** 27.0101

## Program Description

Since the fall of 2010, the College's dual degree program with the NYU Tandon School of Engineering, formerly known as the Polytechnic School of Engineering, has offered highly qualified and motivated students who are technically oriented the opportunity to pursue both a liberal arts program with a major in science, mathematics, or computer science and a traditional engineering program. Upon completion of this five-year program, students receive both a BS degree from the College of Arts and Science and a BS degree from the NYU Tandon School of Engineering. Students with this combination of degrees are likely to find excellent employment opportunities.

It is crucial that students begin the required dual-degree coursework in their first year.

The available dual degree combinations are as follows:

- BS in Biology/BS in Chemical and Biomolecular Engineering
- BS in Chemistry/BS in Chemical and Biomolecular Engineering
- BS in Computer Science/BS in Computer Engineering
- BS in Computer Science/BS in Electrical Engineering
- BS in Mathematics/BS in Civil Engineering
- BS in Mathematics/BS in Computer Engineering
- BS in Mathematics/BS in Electrical Engineering
- BS in Mathematics/BS in Mechanical Engineering
- BS in Physics/BS in Civil Engineering
- BS in Physics/BS in Computer Engineering
- BS in Physics/BS in Electrical Engineering
- BS in Physics/BS in Mechanical Engineering

Students in the program complete all of the CAS College Core Curriculum requirements, with the exception of the foreign language requirement, from which they are exempted. (Their required mathematics and science courses automatically satisfy the Core's Foundations of Scientific Inquiry requirements.) There is usually some flexibility concerning the semester in which a given course can be taken. Detailed programs of study for each of the degree combinations are available on the program website for reference.

## 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

| Course | Title | Credits |
|---|---|---|
| **CAS Core + Tandon General Education Requirements** | | |
| EXPOS-UA 1 | Writing as Inquiry | 4 |
| First-Year Seminar | | 4 |
| Texts and Ideas | | 4 |
| Cultures and Contexts | | 4 |
| Societies and the Social Sciences | | 4 |
| Expressive Culture | | 4 |
| **Major Requirements** | | |
| MATH-UA 120 | Discrete Mathematics | 4 |
| MATH-UA 121 | Calculus I | 4 |
| MATH-UA 122 | Calculus II | 4 |
| MATH-UA 123 | Calculus III | 4 |
| MATH-UA 140 | Linear Algebra | 4 |
| MATH-UA 262 | Ordinary Diff Equations | 4 |
| MATH-UA 325 | Analysis | 4 |
| MATH-UA 333 | Theory of Probability | 4 |
| MATH-UA 343 | Algebra | 4 |
| MATH-UA 382 | Functions of a Complex Variable | 4 |
| CSCI-UA 101 | Intro to Computer Science | 4 |
| CSCI-UA 102 | Data Structures | 4 |
| PHYS-UA 91 | Physics I | 3 |
| PHYS-UA 93 | Physics II | 3 |
| PHYS-UA 95 | Physics III | 3 |
| PHYS-UA 71 | Introductory Experimental Physics I | 2 |
| PHYS-UA 72 | Introductory Experimental Physics II | 2 |
| PHYS-UA 73 | Intermediate Experimental Physics I | 2 |
| CS-UY 2163 | Introduction to Programming in C | 3 |
| CS-UY 2204 | Digital Logic and State Machine Design | 4 |
| EG-UY 1004 | Introduction to Engineering and Design | 4 |
| ECE-UY 2004 | Fund. Of Electric Circuits | 4 |
| ECE-UY 3114 | Fundamentals of Electronics I | 4 |
| ECE-UY 3054 | Signals and Systems | 4 |
| ECE-UY 3604 | Electromagnetic Waves | 4 |
| ECE-UY 4001 | ECE Professional Development & Presentation | 1 |
| Design Project I | | 3 |
| Design Project II | | 3 |
| CM-UY 1003 | General Chemistry for Engineers | 3 |
| CM-UY 1001 | General Chemistry for Engineers Laboratory | 1 |
| **Electives** | | |
| Electrical Engineering Restricted Electives (4) | | 12 |
| Electrical Engineering Electives (3) | | 9 |
| Electrical Engineering or Computer Science Elective | | 3 |
| Humanities/Social Science Electives (2) | | 8 |
| Mathematics Advanced Elective | | 4 |
| **Total Credits** | | **161** |

## Sample Plan of Study

| Course | Title | Credits |
|---|---|---|
| **1st Semester/Term** | | |
| MATH-UA 121 | Calculus I | 4 |
| EXPOS-UA 1 | Writing as Inquiry | 4 |
| First-Year Seminar | | 4 |
| PHYS-UA 91 | Physics I | 3 |
| PHYS-UA 71 | Introductory Experimental Physics I | 2 |
| | **Credits** | **17** |

| | | |
|---|---|---|
| **2nd Semester/Term** | | |
| MATH-UA 122 | Calculus II | 4 |
| PHYS-UA 93 | Physics II | 3 |
| PHYS-UA 72 | Introductory Experimental Physics II | 2 |
| CSCI-UA 101 | Intro to Computer Science | 4 |
| MATH-UA 140 | Linear Algebra | 4 |
| | **Credits** | **17** |
| **3rd Semester/Term** | | |
| CSCI-UA 102 | Data Structures | 4 |
| MATH-UA 123 | Calculus III | 4 |
| PHYS-UA 95 | Physics III | 3 |
| PHYS-UA 73 | Intermediate Experimental Physics I | 2 |
| EG-UY 1004 | Introduction to Engineering and Design | 4 |
| | **Credits** | **17** |
| **4th Semester/Term** | | |
| Texts and Ideas | | 4 |
| MATH-UA 120 | Discrete Mathematics | 4 |
| MATH-UA 262 | Ordinary Diff Equations | 4 |
| MATH-UA 382 | Functions of a Complex Variable | 4 |
| | **Credits** | **16** |
| **5th Semester/Term** | | |
| MATH-UA 325 | Analysis | 4 |
| MATH-UA 333 | Theory of Probability | 4 |
| Cultures and Contexts | | 4 |
| ECE-UY 2004 | Fund. Of Electric Circuits | 4 |
| | **Credits** | **16** |
| **6th Semester/Term** | | |
| Mathematics Advanced Elective | | 4 |
| MATH-UA 343 | Algebra | 4 |
| ECE-UY 3114 | Fundamentals of Electronics I | 4 |
| CS-UY 2204 | Digital Logic and State Machine Design | 4 |
| | **Credits** | **16** |
| **7th Semester/Term** | | |
| ECE Elective | | 3 |
| ECE-UY 3054 | Signals and Systems | 4 |
| ECE-UY 3604 | Electromagnetic Waves | 4 |
| ECE Elective | | 3 |
| | **Credits** | **14** |
| **8th Semester/Term** | | |
| ECE Restricted Elective | | 4 |
| ECE Elective | | 3 |
| CS-UY 2163 | Introduction to Programming in C | 3 |
| Expressive Culture | | 4 |
| CM-UY 1003 & CM-UY 1001 | General Chemistry for Engineers and General Chemistry for Engineers Laboratory | 4 |
| | **Credits** | **18** |
| **9th Semester/Term** | | |
| Design Project I | | 3 |
| ECE-UY 4001 | ECE Professional Development & Presentation | 1 |
| Societies and the Social Sciences | | 4 |
| ECE or CS Elective | | 3 |
| HU/SS Elective | | 4 |
| | **Credits** | **15** |
| **10th Semester/Term** | | |
| Design Project II | | 3 |
| ECE Restricted Elective | | 4 |
| ECE Restricted Elective | | 4 |
| HU/SS Elective | | 4 |
| | **Credits** | **15** |
| | **Total Credits** | **161** |

# Learning Outcomes

## College of Arts and Science

1. Proficiency in the foundations of modern mathematics, including discrete mathematics, calculus, analysis, and algebra.
2. The ability to communicate mathematically, including understanding, developing, and critiquing mathematical arguments and rigorous proofs.
3. The ability to apply mathematical ideas and methods to questions and problems both within and outside of the mathematical sciences.
4. Advanced knowledge in some specific areas of mathematics, such as differential equations, geometry and topology, complex analysis, probability and statistics, number theory, or numerical analysis.
5. Experience in using appropriate technology to calculate, visualize, and model problems.

## Tandon School of Engineering

Students will be able to demonstrate the following (per ABET):

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

Students may elect to withdraw from the dual-degree program in Engineering and complete only the College of Arts and Science Core and major requirements, thus earning one undergraduate degree from CAS. If students elect to withdraw from the dual-degree program and remain in CAS, they are no longer exempt from the CAS foreign language requirement and must factor this into their academic planning.

Also, if students elect to withdraw from the dual degree program and remain in CAS, any Tandon courses taken will count against each student's 16-credit allowance in the other divisions of NYU, and also cannot be applied toward the 64-credit UA residency requirement.

## NYU Policies

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

## College of Arts and Science Policies

A full list of relevant academic policies can be found on the CAS Academic Policies page (https://bulletins.nyu.edu/undergraduate/arts-science/academic-policies/).