

# 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
<b>CAS Core + Tandon General Education Requirements</b>		
EXPOS-UA 1	Writing The Essay:	4

First-Year Seminar		4
Texts and Ideas		4
Cultures and Contexts		4
Societies and the Social Sciences		4
Expressive Culture		4
<b>Major Requirements</b>		
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 233	Theory of Probability	4
MATH-UA 282	Functions of a Complex Variable	4
MATH-UA 325	Analysis	4
MATH-UA 343	Algebra	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 1003/1001		4
<b>Electives</b>		
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
<b>Total Credits</b>		<b>161</b>

## Sample Plan of Study

Course	Title	Credits
<b>1st Semester/Term</b>		
MATH-UA 121	Calculus I	4
EXPOS-UA 1	Writing The Essay:	4
First-Year Seminar		4
PHYS-UA 91	Physics I	3
PHYS-UA 71	Introductory Experimental Physics I	2
<b>Credits</b>		<b>17</b>

<b>2nd Semester/Term</b>		
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
<b>Credits</b>		<b>17</b>
<b>3rd Semester/Term</b>		
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
<b>Credits</b>		<b>17</b>
<b>4th Semester/Term</b>		
Texts and Ideas		4
MATH-UA 120	Discrete Mathematics	4
MATH-UA 282	Functions of a Complex Variable	4
MATH-UA 262	Ordinary Diff Equations	4
<b>Credits</b>		<b>16</b>
<b>5th Semester/Term</b>		
MATH-UA 233	Theory of Probability	4
MATH-UA 325	Analysis	4
Cultures and Contexts		4
ECE-UY 2004	FUND. OF ELECTRIC CIRCUITS	4
<b>Credits</b>		<b>16</b>
<b>6th Semester/Term</b>		
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
<b>Credits</b>		<b>16</b>
<b>7th Semester/Term</b>		
ECE Elective		3
ECE-UY 3054	Signals and Systems	4
ECE-UY 3604	Electromagnetic Waves	4
ECE Elective		3
<b>Credits</b>		<b>14</b>
<b>8th Semester/Term</b>		
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
<b>Credits</b>		<b>18</b>
<b>9th Semester/Term</b>		
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
<b>Credits</b>		<b>15</b>
<b>10th Semester/Term</b>		
Design Project II		3
ECE Restricted Elective		4
ECE Restricted Elective		4
HU/SS Elective		4
<b>Credits</b>		<b>15</b>
<b>Total Credits</b>		<b>161</b>

## Recommended Sequence for Majors in Mathematics

For students placing into Calculus I (MATH-UA 121):

- First semester: Calculus I (MATH-UA 121), possibly with Discrete Mathematics (MATH-UA 120)
- Second semester: Calculus II (MATH-UA 122), and Discrete Mathematics if not yet taken
- Third semester: Calculus III (MATH-UA 123) and Linear Algebra or Honors Linear Algebra (MATH-UA 140 or 148)
- Fourth semester: Analysis or Honors Analysis I (MATH-UA 325 or 328)

For students placing into Calculus II (MATH-UA 122):

- First semester: Calculus II (MATH-UA 122) and Discrete Mathematics (MATH-UA 120)
- Second semester: Calculus III or Honors Calculus III (MATH-UA 123 or 129), and Linear Algebra or Honors Linear Algebra (MATH-UA 140 or 148)
- Third semester: Analysis or Honors Analysis I (MATH-UA 325 or 328)

For students placing into Calculus III (MATH-UA 123):

- First semester: Calculus III or Honors Calculus III (MATH-UA 123 or 129), possibly with Discrete Mathematics (MATH-UA 120)
- Second semester: Linear Algebra or Honors Linear Algebra (MATH-UA 140 or 148), and Discrete Mathematics (MATH-UA 120) if not yet taken
- Third semester: Analysis or Honors Analysis I (MATH-UA 325 or 328)

## 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**

### **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/>).