MATHEMATICS/MECHANICAL ENGINEERING (BS/BS)

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

NYSED: 33282 **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 The Essay:	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 121	Calculus I	4
MATH-UA 122	Calculus II	4
MATH-UA 123	Calculus III	4
MATH-UA 140	Linear Algebra	4
MATH-UA 235	Probability & Statistics	4
MATH-UA 262	Ordinary Diff Equations	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 1113	PROBLEM SOLVING AND PROGRAMMING I	3
EG-UY 1004	Introduction to Engineering and Design	4
ME-UY 1012	Introduction to Mechanical Engineering	2
ME-UY 2112	COMPUTER AIDED DESIGN	2
ME-UY 2213	Statics	3
ME-UY 2211		1
ME-UY 3333	THERMODYNAMICS	3
MT-UY 2813		3
MT-UY 2811		1
ME-UY 3213	Mechanics of Materials	3
ME-UY 3211		1
ME-UY 3223		3
ME-UY 3513	Measurement Systems	3
ME-UY 3511	Measurement Systems Laboratory	1
ME-UY 3233	Machine Design	3
ME-UY 3313	Fluid Mechanics	3
ME-UY 3311	Fluid Mechanics Laboratory	1
ME-UY 3413	Automatic Control	3
ME-UY 3411	Automatic Control Laboratory	1
ME-UY 4112		2
ME-UY 4113	Senior Design II	3
ME-UY 4214	Finite Element Modeling, Design and Analysis	4
ME-UY 4313	Heat Transfer	3
ME-UY 4311	Heat Transfer Laboratory	1
CM-UY 1003/1001		4
Electives		
Humanities/Social Science Electives		8
Mathematics Electives (2)		8

STEM Electives	6
Total Credits	**162**

Sample Plan of Study

Course	Title	Credits
1st Semester/Term		
MATH-UA 121	Calculus I	4
PHYS-UA 91	Physics I	3
PHYS-UA 71	Introductory Experimental Physics I	2
EXPOS-UA 1	Writing The Essay:	4
First-Year Seminar		4
	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
MATH-UA 140	Linear Algebra	4
Texts and Ideas		4
	Credits	**17**
3rd Semester/Term		
MATH-UA 123	Calculus III	4
PHYS-UA 95	Physics III	3
PHYS-UA 73	Intermediate Experimental Physics I	2
CSCI-UA 101	Intro to Computer Science	4
EG-UY 1004	Introduction to Engineering and Design	4
	Credits	**17**
4th Semester/Term		
MATH-UA 262	Ordinary Diff Equations	4
CSCI-UA 102	Data Structures	4
Cultures and Contexts		4
CM-UY 1003 & CM-UY 1001	General Chemistry for Engineers and General Chemistry for Engineers Laboratory	4
	Credits	**16**
5th Semester/Term		
MATH-UA 325	Analysis	4
Mathematics Elective		4
CS-UY 1113	PROBLEM SOLVING AND PROGRAMMING I	3
ME-UY 1012	Introduction to Mechanical Engineering	2
MT-UY 2813		3
MT-UY 2811		1
	Credits	**17**
6th Semester/Term		
MATH-UA 343	Algebra	4
MATH-UA 235	Probability & Statistics	4
Mathematics Elective		4
ME-UY 2213	Statics	3
ME-UY 2211		1
ME-UY 2112	COMPUTER AIDED DESIGN	4
	Credits	**20**
7th Semester/Term		
Expressive Culture		4
ME-UY 3333	THERMODYNAMICS	3
ME-UY 3213	Mechanics of Materials	3
ME-UY 3211		1
ME-UY 3223		3
ME-UY 3513	Measurement Systems	3
ME-UY 3511	Measurement Systems Laboratory	1
	Credits	**18**
8th Semester/Term		
Societies and the Social Sciences		4
ME-UY 3233	Machine Design	3
ME-UY 3313	Fluid Mechanics	3
ME-UY 3311	Fluid Mechanics Laboratory	1
ME-UY 3413	Automatic Control	3
ME-UY 3411	Automatic Control Laboratory	1
	Credits	**15**
9th Semester/Term		
ME-UY 4112		2
ME-UY 4214	Finite Element Modeling, Design and Analysis	4
ME-UY 4313	Heat Transfer	3
ME-UY 4311	Heat Transfer Laboratory	1
STEM Elective		3
	Credits	**13**
10th Semester/Term		
ME-UY 4113	Senior Design II	3
STEM-UY Elective		3
HU/SS Elective		4
HU/SS Elective		4
	Credits	**14**
	Total Credits	**164**

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/).