MATHEMATICS (BS)

Department Website (https://engineering.nyu.edu/academics/departments/mathematics/)

NYSED: 08862 **HEGIS:** 1701.00 **CIP:** 27.0301

Program Description

The BS in Mathematics at the Tandon School of Engineering is a degree in mathematics with an applied focus and a science and engineering component. Students in this program have the opportunity to pursue additional coursework in fields such as Computer Science, Robotics, Computer Engineering, Mechanical Engineering, Civil Engineering, Chemical & Biomolecular Engineering, and Electrical Engineering as part of their degree requirements.

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
Core Mathematics Requirements		
MA-UY 1024	Calculus I for Engineers	4
MA-UY 1124	Calculus II for Engineers	4
MA-UY 1044	Linear Algebra	4
or MA-UY 3054	Honors Linear Algebra	
MA-UY 2114	Calculus III: Multi-Dimensional Calculus	4
or MA-UY 2514	Honors Calculus III	
MA-UY 3014	Applied Probability	4
or MA-UY 3514	Honors Probability	
MA-UY 4114	Applied Statistics	4
MA-UY 4204	Ordinary Diff Equations	4
or MA-UY 4254	Honors Ordinary Differential Equations	
MA-UY 4414	Applied Partial Differential Equations	4
MA-UY 4424	Intro Numerical Analysis	4
or MA-UY 4524	Honors Numerical Analysis	
MA-UY 4434	Applied Complex Variables	4
MA-UY 4444	Intro to Math Modeling	4
MA-UY 4614	Applied Analysis	4
or MA-UY 4644	Honors Analysis I	
Other Required Courses		
CM-UY 1003 & CM-UY 1001	General Chemistry for Engineers and General Chemistry for Engineers Laboratory	4
CS-UY 1114	Intro To Programming & Problem Solving	4
EXPOS-UA 1	Writing as Inquiry	4
EXPOS-UA 22	Advanced Writing for Engineers	4
PH-UY 1013	Mechanics	3
PH-UY 2023	Electricity, Magnetism, & Fluids	3
PH-UY 2121	General Physics Laboratory I	1
PH-UY 2033	Waves, Optics, & Thermodynamics	3
PH-UY 2131	General Physics Laboratory II	1
Math Electives		
Select two math elective courses totaling at least 8 credits		8
Other Electives		
Select 16 credits in the humanities and social sciences [1]		16
Select 12 credits of free electives, with adviser's approval		12
Required Engineering Components		
Select four to six engineering courses totaling at least 15 credits in Engineering Components from at least one of the following disciplines: [2]		15
Chemical and Biomolecular Engineering		
Civil Engineering		
Computer Engineering		
Computer Science		
Electrical Engineering		
Mechanical Engineering		
Quantum Technology		
Robotics		
Total Credits		**126**

[1] Please see General Education Requirements (https://engineering.nyu.edu/academics/departments/technology-culture-and-society/general-education-requirements/) for additional information. Note that EXPOS-UA 1 Writing as Inquiry and EXPOS-UA 22 Advanced Writing for Engineers do not count toward the Humanities and Social Sciences Elective requirement of 16 credits.

[2] Interdisciplinary components involving two or more of the fields above will be considered. The courses comprising a math major's engineering component must be approved in advance by an official Mathematics Department adviser. Please note that the courses listed in the sample engineering components are just samples of what can be taken. Students may choose to take alternate courses based on the other department's advisement for minor requirements.

Sample Engineering Components

Chemical and Biomolecular Engineering

Course	Title	Credits
CBE-UY 1002	Introduction to Chemical & Biomolecular Engineering	2
CBE-UY 2124	Analysis of Chemical and Biomolecular Processes	4
CBE-UY 3153	Chemical and Biomolecular Engineering Thermodynamics	3
CBE-UY 3313	Transport I	3
CBE-UY 3323	Transport II	3

Civil Engineering

Course	Title	Credits
CE-UY 2133		3
CE-UY 2213	Fluid Mechanics and Hydraulics	3
CE-UY 3133	Structural Analysis	3
CE-UY 2343	Transportation Engineering	3

Computer Engineering

Course	Title	Credits
ECE-UY 2004	Fund. Of Electric Circuits	4
ECE-UY 2204	Digital Logic and State Machine Design	4
ECE-UY 3114	Fundamentals of Electronics I	4
ECE-UY 4144	Introduction to Embedded Systems Design	4

Computer Science

Course	Title	Credits
CS-UY 1134	Data Structures and Algorithms	4
CS-UY 2124	Object Oriented Programming	4
CS-UY 2413	Design & Analysis of Algorithms	3
CS-UY 2XXX or Upper Level Elective		4

Electrical Engineering

Course	Title	Credits
ECE-UY 2004	Fund. Of Electric Circuits	4
ECE-UY 3054	Signals and Systems	4
ECE-UY 3114	Fundamentals of Electronics I	4
ECE-UY 3124	Fundamentals Of Electronics II	4

Mechanical Engineering

Course	Title	Credits
ME-UY 2813	Introduction to Materials Science	3
ME-UY 2213	Statics	3
ME-UY 3333	Thermodynamics	3
ME-UY 3213	Mechanics of Materials	3
ME-UY 3313	Fluid Mechanics	3

Quantum Technology

Course	Title	Credits
PH-UY 2002	Introduction to Quantum Science	2
PH-UY 2012	Introduction to Quantum Programming	2
PH-UY 3613	Mathematical Foundations for Quantum Computing	3
PH-UY 4553	Introduction to the Physics of Quantum Computing	3
PH-UY 3614	Computational Physics	4
PH-GY 5553	Physics of Quantum Computing	3

Robotics

Course	Title	Credits
ROB-UY 2004	Robotic Manipulation and Locomotion	4
ROB-UY 3203	Robot Vision	3
ROB-UY 3303	Robot Motion and Planning	3
ROB-UY 3404	Introduction To Haptics and Telerobotics in Medicine	4
Engineering Elective (with adviser approval)		1-4

Sample Plan of Study

Course	Title	Credits
1st Semester/Term		
MA-UY 1024	Calculus I for Engineers	4
CM-UY 1003 & CM-UY 1001	General Chemistry for Engineers and General Chemistry for Engineers Laboratory	4
CS-UY 1114	Intro To Programming & Problem Solving	4
EXPOS-UA 1	Writing as Inquiry	4
	Credits	**16**
2nd Semester/Term		
MA-UY 1124	Calculus II for Engineers	4
MA-UY 1044 or MA-UY 3054	Linear Algebra or Honors Linear Algebra	4
EXPOS-UA 22	Advanced Writing for Engineers	4
PH-UY 1013	Mechanics	3
	Credits	**15**
3rd Semester/Term		
MA-UY 2114 or MA-UY 2514	Calculus III: Multi-Dimensional Calculus or Honors Calculus III	4
PH-UY 2023	Electricity, Magnetism, & Fluids	3
PH-UY 2121	General Physics Laboratory I	1
Engineering Course #1		4
Humanities and Social Sciences Elective #1		4
	Credits	**16**
4th Semester/Term		
MA-UY 4204 or MA-UY 4254	Ordinary Diff Equations or Honors Ordinary Differential Equations	4
Math Elective #1		4
PH-UY 2033	Waves, Optics, & Thermodynamics	3
PH-UY 2131	General Physics Laboratory II	1
Humanities and Social Sciences Elective #2		4
	Credits	**16**
5th Semester/Term		
MA-UY 3014 or MA-UY 3514	Applied Probability or Honors Probability	4
MA-UY 4414	Applied Partial Differential Equations	4
Engineering Course #2		4
Humanities and Social Sciences Elective #3		4
	Credits	**16**
6th Semester/Term		
MA-UY 4114	Applied Statistics	4
MA-UY 4434	Applied Complex Variables	4
Engineering Course #3		4
Humanities and Social Sciences Elective #4		4
	Credits	**16**
7th Semester/Term		
MA-UY 4614 or MA-UY 4644	Applied Analysis or Honors Analysis I	4
MA-UY 4444	Intro to Math Modeling	4
Engineering Course #4		4
Free Elective #1		4
	Credits	**16**
8th Semester/Term		
MA-UY 4424 or MA-UY 4524	Intro Numerical Analysis or Honors Numerical Analysis	4
Math Elective #2		4
Free Elective #2		4
Free Elective #3		3
	Credits	**15**
	Total Credits	**126**

Learning Outcomes

Upon successful completion of the program, graduates will:

1. Gain a command of core areas in both pure and applied mathematics, including but not limited to real and complex analysis, linear algebra, ordinary and partial differential equations.

2. Achieve mastery of a particular applied or engineering field and how mathematics is used in that field.
3. Be ready for a variety of career options following graduation, including, but not limited to graduate study in applied mathematics, engineering, medicine, as well as professional careers in consulting, business & finance, and technology.

Policies

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/).