

MATHEMATICS (BS)

NYSED: 08862 HEGIS: 1701 CIP: 27.0301

Program Description

The B.S. 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
or MA-UY 1324	Integrated Calculus I for Engineers	
MA-UY 1124	Calculus II for Engineers	4
or MA-UY 1424	Integrated Calculus II for Engineers	
Select one of the following:		4
MA-UY 3044	Linear Algebra	
MA-UY 3034	APPLIED LINEAR ALGEBRA	
MA-UY 3054	Honors Linear Algebra	
MA-UY 2114	Calculus III: Multi-Dimensional Calculus	4
or MA-UY 2514	HONORS CALCULUS III	
MA-UY 4614	Applied Analysis	4
or MA-UY 4644	HONORS ANALYSIS I	
MA-UY 4204	Ordinary Diff Equations	4
or MA-UY 4214	Applied Ordinary Differential Equations	
MA-UY 3014	APPLIED PROBABILITY	4
or MA-UY 3514	Honors Probability	
MA-UY 4414	APPLIED PARTIAL DIFFERENTIAL EQUATIONS	4
MA-UY 4434	Applied Complex Variables	4
MA-UY 4114	Applied Statistics	4
MA-UY 4424	NUMERICAL ANALYSIS	4
MA-UY 4444	Intro to Math Modeling	4
Other Required Courses		
CS-UY 1114	INTRO TO PROGRAMMING & PROBLEM SOLVING	4
CM-UY 1003 & CM-UY 1001	General Chemistry for Engineers and General Chemistry for Engineers Laboratory	4
PH-UY 1013	MECHANICS	3
PH-UY 2023	ELECTRICITY, MAGNETISM, & FLUIDS	3
PH-UY 2033	WAVES, OPTICS, & THERMODYNAMICS	3
PH-UY 2121	General Physics Laboratory I	1
PH-UY 2131	General Physics Laboratory II	1
EXPOS-UA 1	Writing The Essay:	4

EXPOS-UA 2	THE ADVANCED COLLEGE ESSAY	4
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 advisor's approval		12
Required Engineering Components		
Select four to five 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		
Robotics		
Total Credits		126

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Please refer to the General Education Requirements website (<https://engineering.nyu.edu/academics/departments/technology-culture-and-society/general-education-requirements/>) for additional information.

Note: EXPOS-UA 1 Writing The Essay; and EXPOS-UA 2 THE ADVANCED COLLEGE ESSAY do not count toward the Humanities and Social Sciences Elective requirement of 16 credits.

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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 advisor.

Sample Engineering Components

Chemical & 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	ENGINEERING MECHANICS	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 2013	Fundamentals of Electric Circuits I	3
ECE-UY 2024	Fundamentals of Electric Circuits II	4

CS-UY 2204	DIGITAL LOGIC AND STATE MACHINE DESIGN	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 2013	Fundamentals of Electric Circuits I	3
ECE-UY 2024	Fundamentals of Electric Circuits II	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 3811	Materials Science Laboratory	1
ME-UY 2213	Statics	3
ME-UY 3333	THERMODYNAMICS	3
ME-UY 3213	Mechanics of Materials	3
ME-UY 3313	Fluid Mechanics	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 advisor approval)		1-4

Sample Plan of Study

Course	Title	Credits
1st Semester/Term		
MA-UY 1024 or MA-UY 1324	Calculus I for Engineers or Integrated Calculus I for Engineers	4
CM-UY 1003 & CM-UY 1001	General Chemistry for Engineers and General Chemistry for Engineers Laboratory	4
EXPOS-UA 1	Writing The Essay:	4
CS-UY 1114	INTRO TO PROGRAMMING & PROBLEM SOLVING	4
Credits		16
2nd Semester/Term		
MA-UY 1124 or MA-UY 1424	Calculus II for Engineers or Integrated Calculus II for Engineers	4
Select one of the following:		
MA-UY 3034	APPLIED LINEAR ALGEBRA	4
MA-UY 3044	Linear Algebra	4
MA-UY 3054	Honors Linear Algebra	4
PH-UY 1013	MECHANICS	3
EXPOS-UA 2	THE ADVANCED COLLEGE ESSAY	4
Credits		15

3rd Semester/Term		
MA-UY 2114	Calculus III: Multi-Dimensional Calculus	4
PH-UY 2121	General Physics Laboratory I	1
PH-UY 2023	ELECTRICITY, MAGNETISM, & FLUIDS	3
Humanities and Social Sciences Elective #1		4
Engineering Course #1		4
Credits		16

4th Semester/Term		
MA-UY 4204 or MA-UY 4214	Ordinary Diff Equations or Applied Ordinary Differential Equations	4
Math Elective #1		4
PH-UY 2033	WAVES, OPTICS, & THERMODYNAMICS	3
Humanities and Social Sciences Elective #2		4
PH-UY 2131	General Physics Laboratory II	1
Credits		16

5th Semester/Term		
MA-UY 3014	APPLIED PROBABILITY	4
MA-UY 4414	APPLIED PARTIAL DIFFERENTIAL EQUATIONS	4
Humanities and Social Sciences Elective #3		4
Engineering Course #2		4
Credits		16

6th Semester/Term		
MA-UY 4114	Applied Statistics	4
MA-UY 4434	Applied Complex Variables	4
Humanities and Social Sciences Elective #4		4
Engineering Course #4		4
Credits		16

7th Semester/Term		
MA-UY 4614	Applied Analysis	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	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/>).