# **MATHEMATICS (BS)**

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

NYSED: 08862 HEGIS: 1701 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	s Requirements	
MA-UY 1024	Calculus I for Engineers	4
MA-UY 1124	Calculus II for Engineers	4
MA-UY 3044	(MA-UY 1044)	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 4614	Applied Analysis	4
or MA-UY 4644	HONORS ANALYSIS I	
MA-UY 4204	Ordinary Diff Equations	4
or MA-UY 4254	HONORS ORDINARY DIFFERENTIAL EQUATION	S
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
or MA-UY 4524	Honors Numerical Analysis	
MA-UY 4444	Intro to Math Modeling	4
Other Required Co	ourses	
CS-UY 1114	INTRO TO PROGRAMMING & PROBLEM SOLVIN	IG 4
CM-UY 1003	General Chemistry for Engineers	4
& CM-UY 1001	and General Chemistry for Engineers Laboratory	/
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 as Inquiry	4

Total Credits	126	
Robotics		
Mechanical Engineering		
Electrical Engineering		
Computer Science		
Computer Engineering		
Civil Engineering		
Chemical and Biomolecular Engineering		
Select four to five engineering courses totaling at least 15 credits in Engineering Components from at least one of the following disciplines: <sup>2</sup>	15	
Required Engineering Components		
Select 12 credits of free electives, with advisor's approval	12	
Select 16 credits in the humanities and social sciences <sup>1</sup>	16	
Other Electives		
Select two math elective courses totaling at least 8 credits	8	
Math Electives		
EXPOS-UA 22 Advanced Writing for Engineers	4	

- <sup>1</sup> Please refer to the General Education Requirements website (https:// engineering.nyu.edu/academics/departments/technology-culture-andsociety/general-education-requirements/) for additional information. Note: 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.
  <sup>2</sup> Interdiacial inclusion and expenses involving two arms of the fields above
- <sup>2</sup> 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.

# Sample Engineering Components

### **Chemical & Biomolecular Engineering**

Course	Title Cree	dits
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		3
ECE-UY 2024		4

CS-UY 2204	DIGITAL LOGIC AND STATE MACHINE DESIGN
ECE-UY 4144	Introduction to Embedded Systems Design

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#### **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 Up	oper Level Elective	4

#### **Electrical Engineering**

Course	Title	Credits
ECE-UY 2013		3
ECE-UY 2024		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 TELEROBOT IN MEDICINE	ICS 4
Engineering Electi	ve (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
EXPOS-UA 1	Writing as Inquiry	4
CS-UY 1114	INTRO TO PROGRAMMING & PROBLEM SOLVING	4
	Credits	16
2nd Semester/Term		
MA-UY 1124	Calculus II for Engineers	4
Select one of the following	μ.	
MA-UY 3044 or MA-UY 3054	MA-UY 1044 or Honors Linear Algebra	4
PH-UY 1013	MECHANICS	3
EXPOS-UA 22	Advanced Writing for Engineers	4
	Credits	15
3rd Semester/Term		
MA-UY 2114 or MA-UY 2514	Calculus III: Multi-Dimensional Calculus or HONORS CALCULUS III	4
PH-UY 2121	General Physics Laboratory I	1

PH-UY 2023	ELECTRICITY, MAGNETISM, & FLUIDS	Э
Humanities and Social	Sciences Elective #1	4
Engineering Course #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
Humanities and Social	Sciences Elective #2	4
PH-UY 2131	General Physics Laboratory II	1
	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
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 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	NUMERICAL ANALYSIS	4
or MA-UY 4524	or Honors Numerical Analysis	
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:

- 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/).