

# BIOMEDICAL ENGINEERING (MS)

Biomedical Engineering Department (<https://engineering.nyu.edu/academics/departments/biomedical-engineering/>)

**NYSED:** 08793 **HEGIS:** 0905.00 **CIP:** 14.0501

## Program Description

Biomedical Engineering (BME), a multi-disciplinary field, is behind some of the most important medical breakthroughs today. Working closely together, engineers, scientists, mathematicians, and physicians have developed artificial organs, internal and external prosthetics, multiple imaging modalities, and diagnostic and therapeutic devices. Biomedical Engineering has significantly contributed to improved health care and quality of life.

The MS program in Biomedical Engineering merges coursework from Tandon's engineering departments along with research opportunities with Biomedical Engineering faculty from across NYU to create a degree path that matches a student's BME career objectives.

## Admissions

To apply for admission to any Tandon graduate program, please contact the Office of Graduate Admissions (<https://engineering.nyu.edu/admissions/graduate/>).

## Program Requirements

The program requires the completion of 30 credits, comprised of the following:

Course	Title	Credits
<b>Core Requirements</b>		
BE-GY 6103	Anatomy, Physiology, & Biophysics I	3
BE-GY 6473	Applied Mathematics and Statistics for Biomedical Engineering <sup>1</sup>	3
or BE-GY 8103	Systems & Computational Simulation for Biomedical Engineering	
BE-GY 6503	Biomedical Instrumentation <sup>1</sup>	3
or BE-GY 6783	Biomechanics for Biomedical Engineers	
<b>Biomedical Engineering (BME) Electives</b>		
Select 9 credits of the following:		9
BE-GY 6113	Anatomy, Physiology, & Biophysics II	
BE-GY 6203	Biomedical Imaging I	
BE-GY 6303	Bio-optics	
BE-GY 6353	Special Topics in Biomedical Engineering	
BE-GY 6403	Digital Signal Processing I	
BE-GY 6453	Probability and Stochastic Processes	
BE-GY 6513	Biomedical Device Design and Development	
BE-GY 6523	Biomems and Microfluidics	
BE-GY 6723	Natural Polymers and Materials	
BE-GY 6763	Rehabilitation Engineering	
BE-GY 6803	Biomaterials: Engineering Principles and Design Consideration	
BE-GY 8203	Biomedical Modeling, Estimation and Control	

BE-GY 9443	Tissue Engineering
BE-GY 9453	Engineering Tissue Regeneration
BE-GY 9603	Neural and Physiological Signal Processing
BE-GY 9753	Bioethics Seminar

### Flexible Electives

Select 6 credits of flexible electives. Flexible electives can be from the BME electives list above or the out-of-department list below.<sup>2</sup> 6

#### Out-of-Department Courses

BT-GY 6063	Immunology: Concepts, Mechanisms and Applications in Biotechnology
BT-GY 9433	Protein Engineering
ECE-GY 6123	Image and Video Processing
ECE-GY 6143	Machine Learning
ECE-GY 6483	Real Time Embedded Systems
ROB-GY 6423	Interactive Medical Robotics

### Experiential Learning Tracks

Each student must complete one of the following Experiential Learning Tracks.<sup>3</sup> 6

#### Guided Studies Track

The Guided Studies Track requires 6 credits of the Guided Studies course, 3 credits per term for two consecutive terms.

BE-GY 871X	Guided Studies in Biomedical Engineering
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#### Research Track

The Research Track requires 6 credits of the Research course, 3 credits per term for two consecutive terms.

BE-GY 873X	Research in Biomedical Engineering
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#### Thesis Track

The Thesis Track requires 6 credits of the MS Thesis course, 3 credits per term for two consecutive terms.

BE-GY 997X	MS Thesis in Biomedical Engineering
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### Colloquium and Seminar

Students must enroll in and attend the colloquium lecture series with distinguished invited speakers at least two semesters.

BE-GY 9730	Colloquium in Biomedical Engineering	0
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Students must participate and enroll in the seminar for professional development at least two semesters.

BE-GY 9740	Seminar in Biomedical Engineering	0
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**Total Credits** **30**

<sup>1</sup> If students take both options, the second will count toward the BME electives (or flexible electives if the BME electives are filled).

<sup>2</sup> With adviser approval, other courses not on this list may count as flexible electives. Note, however, that courses cannot be selected from the School of Professional Studies.

<sup>3</sup> See Policies (p. 2) for important details.

## Sample Plan of Study

Course	Title	Credits
<b>1st Semester/Term</b>		
BE-GY 6103	Anatomy, Physiology, & Biophysics I	3
BE-GY 6473	Applied Mathematics and Statistics for Biomedical Engineering	3
BE-GY 9730	Colloquium in Biomedical Engineering	0
BME Elective		3
<b>Credits</b>		<b>9</b>

2nd Semester/Term		
BE-GY 6503	Biomedical Instrumentation	3
BE-GY 9730	Colloquium in Biomedical Engineering	0
BME Elective		3
BME Elective		3
Credits		9
3rd Semester/Term		
BE-GY 871X	Guided Studies in Biomedical Engineering	3
BE-GY 9740	Seminar in Biomedical Engineering	0
Flexible Elective		3
Flexible Elective		3
Credits		9
4th Semester/Term		
BE-GY 871X	Guided Studies in Biomedical Engineering	3
BE-GY 9740	Seminar in Biomedical Engineering	0
Credits		3
Total Credits		30

### Mutually Exclusive Tracks

The EL tracks are mutually exclusive. Students may only choose one track. Students cannot combine BE-GY 871X, BE-GY 873X, and BE-GY 997X.

### 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/graduate/engineering/academic-policies/>).

## Learning Outcomes

Upon successful completion of the program, graduates will:

1. Have established a fundamental understanding of the biological sciences and advanced math principles, and various fields of biomedical engineering key concepts and applications.
2. Be provided with exposure to laboratory and practical research opportunities, and enable them to develop innovative problem solving techniques in the field of biomedical engineering.
3. Have oral and written presentation capabilities for professional preparation and career development.

## Policies

### Program Policies

#### Experiential Learning Policies

##### Internship Substitutions

##### Guided Studies Track

Students may count up to 3 credits of internship courses toward the Guided Studies Track. For example:

BE-GY 871X (3 credits) + CP-GY 9911 (1.5 credits) + CP-GY 9921 (1.5 credits) = 6 credits

##### Research Track

Students may count up to 3 credits of internship courses toward the Research Track. For example:

BE-GY 873X (3 credits) + CP-GY 9911 (1.5 credits) + CP-GY 9921 (1.5 credits) = 6 credits

### Credit Limitations

#### Per Term Limit

Only with prior approval from the academic adviser should a student enroll in more than 3 credits of either BE-GY 871X, BE-GY 873X, or BE-GY 997X in a single semester.

#### Overall Limit

Students may take no more than 6 credits of BE-GY 871X or BE-GY 873X.

Students may take no more than 9 credits of BE-GY 997X. No more than a total of 9 credits of Experiential Learning (EL) courses, including internship courses, may be taken. Additional EL credits, beyond the 6 credits required, will count either as BME or flexible electives.