

# MECHATRONICS AND ROBOTICS (MS)

NYS ED: 37757 HEGIS: 4904.00 CIP: 14.4201

## Program Description

The M.S. degree in Mechatronics and Robotics will provide an interdisciplinary education to students through coursework, experiential learning, and project (or thesis) work. Students will learn fundamental theory, modeling methods, hardware components, interfacing requirements, simulation and programming tools, and practical applications of mechatronics and robotics. Specifically, real-world mechatronics and robotics systems will provide an avenue for physics-based system modeling. In addition to mechanical aspects, students will learn about building-blocks of mechatronics and robotics, i.e., sensing, actuation, computing technologies, and algorithms, thus being introduced to real-world tools used by practicing professionals. Having learned the fundamental theory, modeling, hardware, and programming tools through core courses, students can specialize in one of three areas, namely, assistive mechatronic and robotic technologies; mobile robotics; or microrobotics. All students will also acquire fundamentals of entrepreneurship through formal course work. All courses as well as project (or thesis) work will engage students in hands-on learning and explorations that will provide them with a comprehensive experience in systems integration and product development. Finally, the entrepreneurship activities will allow students to envision and gain an appreciation of the pathway from education to careers.

## Admissions

Admission to graduate programs in the Tandon School of Engineering requires the following minimum components:

- Résumé/CV
- Statement of Purpose
- Letters of Recommendation
- Transcripts
- Proficiency in English

The NYU Tandon Graduate Admissions website (<https://engineering.nyu.edu/admissions/graduate/apply/requirements/>) has additional information on school-wide admission.

Some programs may require additional components for admissions.

See the program's How to Apply (<https://engineering.nyu.edu/admissions/graduate/how-apply/>) for department-specific admission requirements and instructions.

## Requirements

A bachelor's degree and a good academic record in mechanical, electrical, or electronics engineering from a reputable college or university are generally required for admission to this program. Applicants with degrees from other fields may be admitted but may have to complete additional studies to achieve a comparable background. Courses required to achieve this status are specified as part of the admission evaluation. Undergraduate courses specified for this purpose cannot count toward credits for the graduate degree. Graduate programs are subject to prior approval of a graduate adviser designated by the department.

## Program Requirements

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

Course	Title	Credits
<b>Required Courses</b>		
MG-GY 7703	ENTREPRENEURSHIP	3
ROB-GY 5103	Mechatronics	3
ROB-GY 6003	FOUNDATIONS OF ROBOTICS	3
ROB-GY 6013	Mathematics for Robotics	3
ROB-GY 6103	Advanced Mechatronics	3
<b>Specialty Courses</b>		
Select two courses from one of the following specialty areas:		6
<i>Assistive Mechatronic and Robotic Technologies</i>		
ROB-GY 6313	Robotic Gait and Manipulation	
ROB-GY 6413	Robots for Disability	
ROB-GY 6423	INTERACTIVE MEDICAL ROBOTICS	
<i>Mobile Robotics</i>		
ROB-GY 6203	ROBOT PERCEPTION	
ROB-GY 6213	ROBOT LOCALIZATION AND NAVIGATION	
ROB-GY 6323	REINFORCEMENT LEARNING AND OPTIMAL CONTROL FOR ROBOTICS	
ROB-GY 6333	NETWORKED ROBOTICS SYSTEMS, COOPERATIVE CONTROL AND SWARMING	
<b>Free Elective</b>		
Select three credits of free electives: <sup>1</sup>		3
MG-GY 7743	ADVANCED TRENDS IN TECHNOLOGY MANAGEMENT & INNOVATION	
MG-GY 7861	High-Technology Entrepreneurship	
MG-GY 7871	INTRODUCTION TO MANAGING INTELLECTUAL PROPERTY	
MG-GY 8653	MANAGING TECHNOLOGICAL CHANGE & INNOVATION	
CP-GY 9911	Internship for MS I	
CP-GY 9921	Internship for MS II	
<b>Project Courses</b>		
Select one of the following: <sup>2</sup>		6
Two 3-credit project courses		
Two 1.5-credit internships and one 3-credit project course		
One 6-credit thesis course		
<b>Total Credits</b>		<b>30</b>

<sup>1</sup>

Free elective suggestions

<sup>2</sup>

The 6-credit thesis may be spread across 2 semesters – 3-credit thesis plus 3-credit thesis – but both sections must comprise one thesis. Students may also begin in a project in one term and finish it as a thesis if the project is of exceptionally high quality – 3-credit project plus 3-credit thesis. Note: students may not start in a thesis in one semester and then later convert their thesis into a project.

## Sample Plan of Study

Course	Title	Credits
<b>1st Semester/Term</b>		
ROB-GY 5103	Mechatronics	3
ROB-GY 6003	FOUNDATIONS OF ROBOTICS	3
ROB-GY 6013	Mathematics for Robotics	3
<b>Credits</b>		<b>9</b>
<b>2nd Semester/Term</b>		
ROB-GY 6103	Advanced Mechatronics	3
MG-GY 7703	ENTREPRENEURSHIP	3
Specialty Course		3
<b>Credits</b>		<b>9</b>
<b>3rd Semester/Term</b>		
ROB-GY 996X	MS Project	3
Specialty Course		3
Free Elective		3
<b>Credits</b>		<b>9</b>
<b>4th Semester/Term</b>		
ROB-GY 996X	MS Project	3
<b>Credits</b>		<b>3</b>
<b>Total Credits</b>		<b>30</b>

## Learning Outcomes

1. Students will demonstrate an understanding of theory, models, hardware, and software tools used in mechatronics and robotics systems.
2. Students will demonstrate proficiency in applying newly acquired knowledge and skills through experience with practical applications.
3. Students will acquire experience in systems integration and product development through projects involving hands-on learning and explorations.
4. Students will develop an appreciation of the pathway from education to careers through entrepreneurship activities.

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