MECHATRONICS AND ROBOTICS (MS)

Mechanical and Aerospace Engineering Department (https://engineering.nyu.edu/academics/departments/mechanical-and-aerospace-engineering/)

NYSED: 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

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

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
Required Courses		
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
Specialty Courses		
Select two courses from one of the following specialty areas:		6
Assistive Mechatronic and Robotic Technologies		
ROB-GY 6313	Robotic Gait and Manipulation	
ROB-GY 6413	Robots for Disability	
ROB-GY 6423	Interactive Medical Robotics	
Mobile Robotics		
ROB-GY 6203	Robot Perception	
ROB-GY 6213	Robot Localization and Navigation	
ROB-GY 6323	Reinforcement Learning and Optimal Control for Autonomous Systems I	
ROB-GY 6333	Networked Robotics Systems, Cooperative Control and Swarming	
Project Courses		
Select 6 credits of project courses from the following options:		6
CP-GY 9911	Internship for MS I	
CP-GY 9921	Internship for MS II	
VIP-GY 5001	Vertically Integrated Projects	
ME-GY 996X	MS Project	
ROB-GY 996X	MS Project	
ME-GY 997X	MS Thesis in Mechanical Engineering	
ROB-GY 997X	MS Thesis in Mechatronics and Robotics	
Free Elective		
For the free elective, students may choose an additional speciality or project course from the lists above or choose another course in consultation with the academic adviser. [1]		3
Total Credits		**30**

[1] Courses may not be selected from the School of Professional Studies.

[2] Students who normally select a project or thesis option will work on the same project or thesis across several semesters, usually two semesters, and enroll in 3 credits of project or 3 credits of thesis each term. Once the project or thesis is complete, one grade is given for all enrollments of the selected course. Students may begin in a project course and then upgrade to a thesis course in the next term if the project is of exceptional quality. This will be determined by the professor overseeing the student's project.

Sample Plan of Study

Course	Title	Credits
1st Semester/Term		
ROB-GY 5103	Mechatronics	3
ROB-GY 6003	Foundations of Robotics	3
ROB-GY 6013	Mathematics for Robotics	3
	Credits	**9**
2nd Semester/Term		
ROB-GY 6103	Advanced Mechatronics	3
MG-GY 7703	Entrepreneurship	3
Specialty Course		3
	Credits	**9**
3rd Semester/Term		
ROB-GY 996X	MS Project	3
Specialty Course		3
Free Elective		3
	Credits	**9**

4th Semester/Term

ROB-GY 996X	MS Project	3
	Credits	**3**
	Total Credits	**30**

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/).