MECHANICAL ENGINEERING (MS)

NYSED: 08826 **HEGIS:** 0910.00 **CIP:** 14.1901

Program Description

Mechanical engineers create the physical systems and devices that define modern society — everything from automobiles to air conditioning, robots to power plants, people movers to artificial limbs, and rocket engines to satellites. At the School of Engineering, we groom our students to become the inventors and innovators of tomorrow, to jumpstart the next generation of entrepreneurial ventures. In short, we help them transform our philosophy of invention, innovation, and entrepreneurship — or i2e — into action.

The MS in Mechanical Engineering program is flexible enough for our students to pursue it as a terminal degree or as a stepping stone towards a Ph.D. degree. Many enter such fields as computer engineering, nanotechnology, software development, and financial engineering. They also occupy positions in bioengineering, manufacturing, astronautics, systems engineering, and corporate management and law. Others become leading stewards of the natural environment by advancing resource conservation, more efficient energy consuming devices, and new energy sources.

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 engineering from a reputable college or university are generally required for admission to this program. Applicants with degrees from fields other than mechanical engineering 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, and students choose one of the following specialties:

Controls and Dynamic Systems

Course	Title	Credits
Required Courses		
ME-GY 6003	Applied Mathematics in Mechanical Engineering	3
ME-GY 6043	Thermal Engineering Fundamentals	3
ME-GY 6213	Introduction to Solid Mechanics	3
ME-GY 6703	LINEAR CONTROL THEORY AND DESIGN I	3
Controls and Dynamic Systems Specialty		
Select two of the following:		6
ME-GY 6513	Advanced Dynamics	
ME-GY 6713	LINEAR CONTROL THEORY AND DESIGN II	
ME-GY 7613	NON-LINEAR SYSTEMS: ANALYSIS & CONTROL	
ME-GY 7623	CO-OPERATIVE CONTROL	
ME-GY 7703	OPTIMAL ROBUST CONTROL	
ROB-GY 5103	Mechatronics	
ROB-GY 6203	ROBOT PERCEPTION	
Electives		
Select six credits of ME/ROB-GY XXXX Electives, approved by graduate advisor		6
Select six credits of Free Electives		6
Total Credits		**30**

Fluids and Energy Engineering

Course	Title	Credits
Required Courses		
ME-GY 6003	Applied Mathematics in Mechanical Engineering	3
ME-GY 6043	Thermal Engineering Fundamentals	3
ME-GY 6213	Introduction to Solid Mechanics	3
ME-GY 6703	LINEAR CONTROL THEORY AND DESIGN I	3
Fluids and Energy Engineering Specialty		
Select two of the following:		6
ME-GY 6153	THERMODYNAMICS OF HVAC SYSTEMS	
ME-GY 6163	FLUID MECHANICS FOR HVAC SYSTEMS	
ME-GY 6173	HEAT TRANSFER FOR HVAC SYSTEMS	
ME-GY 6183	DESIGN OF HVAC SYSTEMS	
ME-GY 6813	Energy Conversion Systems	
ME-GY 6823	Energy Policy, Regulations, and Incentives	
ME-GY 6833	Energy Project Financing	
ME-GY 7063	Convective Heat Transfer	
ME-GY 7073	Conductive Heat Transfer	
ME-GY 7083	Radiative Heat Transfer	
ME-GY 7113	Viscous Flow and Boundary Layers	
ME-GY 7133	Compressible Flow	
ME-GY 7153	COMPUTATIONAL FLUID MECHANICS AND HEAT TRANSFER	
Electives		
Select six credits of ME/ROB-GY XXXX Electives, approved by graduate advisor		6

Select six credits of Free Electives	6
Total Credits	**30**

Mechanics and Structural Systems

Course	Title	Credits
Required Courses		
ME-GY 6003	Applied Mathematics in Mechanical Engineering	3
ME-GY 6043	Thermal Engineering Fundamentals	3
ME-GY 6213	Introduction to Solid Mechanics	3
ME-GY 6703	LINEAR CONTROL THEORY AND DESIGN I	3
Mechanics and Structural Systems Specialty		
Select two of the following:		6
ME-GY 5243	COMPOSITE MATERIALS	
ME-GY 5443	Vibrations	
ME-GY 6223	Advanced Mechanics of Materials	
ME-GY 6413	Additive Manufacturing Fundamentals	
ME-GY 6423	Additive Manufacturing of Metallic Materials	
ME-GY 6513	Advanced Dynamics	
ME-GY 7243	Advanced Composite Materials	
ME-GY 7323	FAILURE MECHANCIS	
ME-GY 7333	NON-DESTRUCTIVE EVALUATION	
ME-GY 7443	Advanced Vibrations	
ME-GY 8213	ELASTICITY II	
Electives		
Select six credits of ME/ROB-GY XXXX Electives, approved by graduate advisor		6
Select six credits of Free Electives		6
Total Credits		**30**

Note for all Specialties

If students decide to do a ME-GY 997X MS THESIS IN MECHANICAL ENGINEERING as part of their work for the degree, these 9 credits will be counted against 3 credits out of the 6 credits in ME electives, 3 credits out of the 6 credits in ME Required for the Specialty Area credits and 3 credits out of the 6 credits of Free Electives. Students are not allowed to count more than three 5000-level courses (9 credits) toward M.S. degree requirements. Departmental electives include courses with a mechanical (ME) or robotics (ROB) prefix, plus departmental thesis or project credits. All courses and program details are subject to advisor approval.

Sample Plan of Study

Course	Title	Credits
1st Semester/Term		
ME-GY 6043	Thermal Engineering Fundamentals	3
ME-GY 6213	Introduction to Solid Mechanics	3
ME-GY/ROB-GY Elective		3
	Credits	**9**
2nd Semester/Term		
ME-GY 6003	Applied Mathematics in Mechanical Engineering	3
ME-GY 6703	LINEAR CONTROL THEORY AND DESIGN I	3
ME-GY Specialty Course		3
	Credits	**9**
3rd Semester/Term		
ME-GY Specialty Course		3
ME-GY/ROB-GY Elective		3
Free Elective		3
	Credits	**9**
4th Semester/Term		
Free Elective		3
	Credits	**3**
	Total Credits	**30**

Learning Outcomes

Upon successful completion of the program, graduates will:

1. Understand basic principles and solve vector algebra problems.
2. Understand matrix theory, eigenvalues and eigenvectors.
3. Learn basic methods for solving ODE's.
4. Apply Laplace and Fourier transforms to mathematical problems.
5. Learn basic methods for solving PDE's.
6. Be able to formulate and solve problems related to the thermodynamics of energy systems and components.
7. Be able to formulate and solve problems fundamental problems in fluid mechanics both in differential and control volume formulations.
8. Be able to formulate and solve problems fundamental problems in heat transfer both in differential and control volume formulations.
9. Learn the concept of stress and strain in three-dimensional continua.
10. Learn the use of energy methods to compute displacements in structures.
11. Understand the phenomenon of buckling and learn design elements of slender columns.
12. Understand the phenomena of beams on elastic foundations.
13. Understand the phenomena of curved beams and effect of curvature on load bearing ability.
14. Learn to model mechanical systems in space-state.
15. Learn to descript and analyze of linear mechanical systems.
16. Learn about application of transform and transition matrix methods.
17. Understand and investigated systems' structural properties: stability, controllability, observability.

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/).