MECHANICAL ENGINEERING (MS)

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

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 Tandon School of Engineering, we groom our students to become the inventors and innovators of tomorrow, to jump-start the next generation of entrepreneurial ventures. In short, we help students 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 PhD degree. Many enter such fields as computer engineering, nanotechnology, software development, and financial engineering. They also occupy positions in bioengineering, manufacturing, astronautics, systems engineering, 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

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

Required Background Knowledge

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 courses are subject to the 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	
ROB-GY 5103	Mechatronics	
ROB-GY 6203	Robot Perception	
Mechanical Engineering Electives		
Select 6 credits of ME-GY and/or ROB-GY courses. [1]		6
Free Electives		
Select 6 credits of courses of your choosing. [2]		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 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	
Mechanical Engineering Electives		
Select 6 credits of ME-GY and/or ROB-GY courses. [1]		6
Free Electives		
Select 6 credits of courses of your choosing. [2]		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 5443	Vibrations	
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 7333	Non-Destructive Evaluation	
Mechanical Engineering Electives		

Select 6 credits of ME-GY and/or ROB-GY courses. [1]	6
Free Electives	
Select 6 credits of courses of your choosing. [2]	6
Total Credits	**30**

1 Mechanical Engineering Electives can be additional courses from the student's chosen specialty, or courses from another specialty, or any other ME-GY or ROB-GY courses.

2 These cannot be courses offered by the School of Professional Studies.

MS Thesis Credit Distribution

If students decide to do a thesis (ME-GY 997X MS Thesis in Mechanical Engineering), the credits will be distributed across the Specialty, Mechanical Engineering Electives, and Free Electives, such that no more than 3 credits of thesis will count toward any one requirement. For example, if a student completes a 9-credit thesis, 3 thesis credits will count toward the Specialty, 3 thesis credits will count toward the Mechanical Engineering Electives, and the remaining 3 credits will count toward the Free Electives.

5000-level Courses

Students are not allowed to count more than three 5000-level courses (9 credits) toward MS degree requirements. All courses and program details are subject to graduate adviser 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
Mechanical Engineering 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
Specialty Course		3
	Credits	**9**
3rd Semester/Term		
Specialty Course		3
Mechanical Engineering 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/).