

M.S. in Mechanical Engineering

Degree Requirements

Students who lack appropriate undergraduate preparation may be admitted and are asked to make up deficiencies by taking a program of bridge courses that is designed in consultation with the graduate advisor. These courses are taken in addition to the degree requirements and may include undergraduate courses.

The Master of Science in Mechanical Engineering program offers three areas of specialization.

1. *CAD/CAM, Mechanisms & Control* - computer aided engineering, mechanisms, biomechanical & medical devices, robotics and controls.
2. *Mechanics & Material Processing* - tissues & biomechanics, continuum mechanics, plastics, micro/nano materials, particle technology.
3. *Thermo-Fluid Systems & Energy* - biofluids, computational & multiphase fluid dynamics, granular science, HVAC, energy.

The student consults the graduate advisor to plan and develop an individualized and cohesive sequence of courses that meet program requirements of at least 30 degree credits. The MS degree students opting for the project or thesis option must make an arrangement with a faculty member for supervision and obtain the departmental approval in order to receive permits to register for the proper section. Students opting for a project must register for the M.S. project (ME 700) for 3 credits. Students opting for a thesis must register for the M.S. thesis (ME 701) or the combination of M.S. project (ME 700) and thesis (ME 701) for 6 credits and successfully defend the thesis before graduation. Thesis option is required of all students who receive departmental or research-based awards.

Seminar: In addition to the minimum 30 degree credits required, every student must take a minimum of two semesters of ME 791 Mechanical Engineering Colloquium. Students who receive departmental or research-based awards must enroll every semester in ME 791 Mechanical Engineering Colloquium.

M.S. in Mechanical Engineering (courses only)

Code	Title	Credits
Required Courses		
ME 616 or MATH 651	Matrix Methods in Mechanical Engineering Methods of Applied Mathematics I	3
Select at least three of the following or more: ¹		9
ME 610	Applied Heat Transfer	
ME 611	Dynamics of Incompressible Fluids	
ME 614	Continuum Mechanics	
ME 620	Mechanics of Materials	
ME 632	Mechanical Engineering Measurements	
ME 635	Computer-Aided Design	
Elective ME Graduate Courses		
Select three or more of the following:		9
ME 607	Advanced Thermodynamics	
ME 618	Selected Topics in Mechanical Engineering	
ME 621	Advanced Mechanics of Material	
ME 622	Finite Element Methods in Mechanical Engineering	
ME 624	Microlevel Modeling in Particle Technology	
ME 625	Introduction to Robotics	
ME 630	Analytical Methods in Machine Design	
ME 636	Mechanism Design: Analysis and Synthesis	
ME 637	Kinematics of Spatial Mechanisms	
ME 655	Introduction to Modern Control Methods	
ME 670	Introduction to Biomechanical Engineering	
ME 678	Engineering Design of Plastic Products	
ME 679	Polymer Processing Techniques	
ME 712	Mechanics of Viscous Fluids	
ME 713	Non-Newtonian Fluid Dynamics	
ME 714	Principles of Particulate Multiphase Flows	

ME 717	Selected Topics in Mechanical Engineering I	
ME 718	ST: (Selected Topics in Mechanical Engineering II)	
ME 735	Advanced Topics in Robotics	
ME 736	Advanced Mechanism Design	
ME 738	Computer Aided Engineering	
Optional General Elective Courses		
Graduate courses from other departments or programs 9 credits or less		9
Seminar		
ME 791	Mechanical Engineering Colloquium ²	0
Total Credits		30

¹ If more than 9 credits are taken from this list, then the extra will be counted as credits in Elective ME Graduate Courses.

² Required for two semesters.

M.S. in Mechanical Engineering (Master's project)

Code	Title	Credits
Required Courses		
ME 616	Matrix Methods in Mechanical Engineering	3
or MATH 651	Methods of Applied Mathematics I	
Select at least three of the following or more: ¹		9
ME 610	Applied Heat Transfer	
ME 611	Dynamics of Incompressible Fluids	
ME 614	Continuum Mechanics	
ME 620	Mechanics of Materials	
ME 632	Mechanical Engineering Measurements	
ME 635	Computer-Aided Design	
Project		
ME 700B	Master's Project	3
Elective ME Graduate Courses		
Select two or more of the following:		6
ME 607	Advanced Thermodynamics	
ME 618	Selected Topics in Mechanical Engineering	
ME 621	Advanced Mechanics of Material	
ME 622	Finite Element Methods in Mechanical Engineering	
ME 624	Microlevel Modeling in Particle Technology	
ME 625	Introduction to Robotics	
ME 630	Analytical Methods in Machine Design	
ME 636	Mechanism Design: Analysis and Synthesis	
ME 637	Kinematics of Spatial Mechanisms	
ME 655	Introduction to Modern Control Methods	
ME 670	Introduction to Biomechanical Engineering	
ME 678	Engineering Design of Plastic Products	
ME 679	Polymer Processing Techniques	
ME 712	Mechanics of Viscous Fluids	
ME 713	Non-Newtonian Fluid Dynamics	
ME 714	Principles of Particulate Multiphase Flows	
ME 717	Selected Topics in Mechanical Engineering I	
ME 718	ST: (Selected Topics in Mechanical Engineering II)	
ME 735	Advanced Topics in Robotics	
ME 736	Advanced Mechanism Design	
ME 738	Computer Aided Engineering	
Optional General Elective Courses		

Graduate courses from other departments or programs 9 credits or less		9
Seminar		
ME 791	Mechanical Engineering Colloquium ²	0
Total Credits		30

¹ If more than 9 credits are taken from this list, then the extra will be counted as credits in Elective ME Graduate Courses.

² Required for two semesters.

M.S. in Mechanical Engineering (Master's thesis)

Code	Title	Credits
Required Courses		
ME 616 or MATH 651	Matrix Methods in Mechanical Engineering Methods of Applied Mathematics I	3
Select at least three of the following or more: ¹		9
ME 610	Applied Heat Transfer	
ME 611	Dynamics of Incompressible Fluids	
ME 614	Continuum Mechanics	
ME 620	Mechanics of Materials	
ME 632	Mechanical Engineering Measurements	
ME 635	Computer-Aided Design	
Thesis ²		
ME 700B & ME 701B or ME 701B & 701B or ME 701C Master's Thesis	Master's Project and Master's Thesis ³ Master's Thesis and Master's Thesis	6
Elective ME Graduate Courses		
Select one or more of the following:		3
ME 607	Advanced Thermodynamics	
ME 618	Selected Topics in Mechanical Engineering	
ME 621	Advanced Mechanics of Material	
ME 622	Finite Element Methods in Mechanical Engineering	
ME 624	Microlevel Modeling in Particle Technology	
ME 625	Introduction to Robotics	
ME 630	Analytical Methods in Machine Design	
ME 636	Mechanism Design: Analysis and Synthesis	
ME 637	Kinematics of Spatial Mechanisms	
ME 655	Introduction to Modern Control Methods	
ME 670	Introduction to Biomechanical Engineering	
ME 678	Engineering Design of Plastic Products	
ME 679	Polymer Processing Techniques	
ME 712	Mechanics of Viscous Fluids	
ME 713	Non-Newtonian Fluid Dynamics	
ME 714	Principles of Particulate Multiphase Flows	
ME 717	Selected Topics in Mechanical Engineering I	
ME 718	ST: (Selected Topics in Mechanical Engineering II)	
ME 735	Advanced Topics in Robotics	
ME 736	Advanced Mechanism Design	
ME 738	Computer Aided Engineering	
Optional General Elective Courses		
Graduate courses from other departments or programs 9 credits or less		9
Seminar		

ME 791	Mechanical Engineering Colloquium ⁴	0
Total Credits		30

- ¹ If more than 9 credits are taken from this list, then the extra will be counted as credits in Elective ME Graduate Courses.
- ² Required of all students who receive departmental or research-based awards.
- ³ With permission of their research advisor, students may first register in the 700B MS Project course. They must receive a satisfactory (S) grade in 700B before 701B MS Thesis registration in the immediate following semester with the same advisor. The MS thesis topic should be continuation of the work done in 700B.
- ⁴ Required for two semesters and every semester in which 700B or 701B or 701C is registered.