Summary of Graduate Courses Offered in Spring 2026 (1)

Course Number	Day	Time	Course Title	Concentration Area in the MSME program
MEGR5090-001	TR	1730-1845	Topics in Mech Engineering: Design for Safety in Machines	
MEGR5091-001	TR	0830-0945	Topics in Aerospace Engr.: Astromechanics	Dynamics and Controls (need petition)
MEGR5092-001	TR	1730-1845	Topics in Motorsports Engineer: Advanced Road Vehicle Dynamics	Motorsports and Automotive Engineering (need petition)
MEGR5092-090	MW	1730-1845	Topics in Motorsports Engineer: Hybrid and Alternative Fuels Automotive Powerplants	Motorsports and Automotive Engineering (need petition)
MEGR5094-001	TR	1430-1545	Topics in Energy Engineering: Integrated Energy Systems	
MEGR5094-002	MW	1600-1715	Topics in Energy Engineering: Energy Storage Systems	

Summary of Graduate Courses Offered in Spring 2026 (2)

Course Number	Day	Time	Course Title	Concentration Area in the MSME program
MEGR5098-001	MW	1600-1715	Topics in Precision Engineer: Geometric Specification and Verification	Metrology and Manufacturing (need petition)
MEGR5098-002	MWF	1010-1100	Topics in Precision Engineer: Virtual Machining for Part Quality	Metrology and Manufacturing (need petition)
MEGR5235-001	MW	1430-1545	Waves and Optics	
MEGR5237-001	TR	1000-1115	Introduction to Control Systems	Dynamics and Controls
MEGR5242-001	MW	1430-1545	Applied Vehicle Aerodynamics	Motorsports and Automotive Engineering
MEGR5272-001	TR	1600-1715	Mechanics of the Human Locomotor System	Interdisciplinary Biomedical Engineering Concentration

Summary of Graduate Courses Offered in Spring 2026 (3)

Course Number	Day	Time	Course Title	Concentration Area in the MSME program
MEGR5274-001	TR	1430-1545	Bioelectronic Medicine	Interdisciplinary Biomedical Engineering Concentration
MEGR5312-001	MW	1730-1845	Aerospace Propulsion	
MEGR7090/8090-001	TR	0830-0945	Topics in Mechanical Engineer: Machine Learning in Manufacturing and Materials	Metrology and Manufacturing (need petition)
MEGR7090/8090-002	TR	1300-1415	Topics in Mechanical Engineer: Advanced Numerical Methods for Compressible Flows	Thermal Science and Fluid Mechanics (need petition)
MEGR7090/8090-003	MWF	1220-1310	Topics in Mechanical Engineer: Multi-axis Machining	Metrology and Manufacturing (need petition)
MEGR7090/8090-004	MWF	1115-1205	Topics in Mechanical Engineer: Additive Manufacturing of Polymer-Based Composite Materials	Metrology and Manufacturing (need petition)

Summary of Graduate Courses Offered in Spring 2026 (4)

Course Number	Day	Time	Course Title	Concentration Area in the MSME program
MEGR7090-005/8090	TR	1600-1715	Topics in Mechanical Engineer: Computational Plasticity	Solid Mechanics and Materials Science (need petition)
MEGR7108/8108-001	TR	1000-1115	Finite Element Analysis & Applications	Solid Mechanics and Materials Science *or* capstone
MEGR7113/8113-001	MWF	1325-1415	Dynamics and Thermodynamics of Compressible Flow	Thermal Science and Fluid Mechanics
MEGR7175/8175-001	MW	1730-1845	Engineering Analysis II	
MEGR7182/8182-001	TR	1600-1715	Machine Tool Metrology	Metrology and Manufacturing
MEGR7186/8186-001	TR	1730-1845	Data Analysis and Uncertainty	Metrology and Manufacturing *or* capstone

Brief Description of Special Topics Courses (1)

Course No.	Course Title	Brief Course Description
MEGR5090-001	Topics in Mech Engineering: Design for Safety in Machines	
MEGR5091-001	Topics in Aerospace Engr.: Astromechanics	The course will build on knowledge of undergraduate engineering dynamics to introduce students to the fundamental principles of astromechanics, focusing on the motion of natural and artificial bodies in space under gravitational influence. Topics include Newton's law of gravitation, the two-body problem, Kepler's laws, and the classification and characterization of orbits through orbital elements. Students will explore techniques for orbit determination, analyze energy and time-of-flight relationships, and study orbital maneuvers such as Hohmann transfers and gravity assists. The course also introduces the patched conic approximation for interplanetary trajectories and concludes with an overview of spacecraft mission design, emphasizing practical applications in modern space exploration and satellite operations.

Brief Description of Special Topics Courses (2)

Course No.	Course Title	Brief Course Description
MEGR5092-001	Topics in Motorsports Engineer: Advanced Road Vehicle Dynamics	Advanced topics related to road vehicle dynamics. Topics will include tire mechanics and behavior modeling, transient handling dynamics, and vehicle modeling and simulation. This course will build on the foundations established in road vehicle dynamics to develop a more comprehensive understanding of vehicle behavior. The course will include instruction on the use of Dymola simulation software, and this software will be used to illustrate and explore the concepts covered over the semester.
MEGR5092-090	Topics in Motorsports Engineer: Hybrid and Alternative Fuels Automotive Powerplants	Coverage of multiple power sources for vehicle propulsion. Topics will include traditional IC Engines with alternative fuels (e.g. hydrogen), hybrid drivetrains that incorporate an IC Engine with electric motors, plug-in hybrids, battery electric vehicles, and fuel cell vehicles. The challenges and opportunities for each system will be discussed including packaging, controls, thermal management, refueling, and total system efficiencies.
MEGR5094-001	Topics in Energy Engineering: Integrated Energy Systems	

Brief Description of Special Topics Courses (3)

Course No.	Course Title	Brief Course Description
MEGR5098-001	Topics in Precision Engineer: Geometric Specification and Verification	This course reconciles the engineering design process with manufacturing quality control. These two conceptual domains of geometric specification (a feature of the design process) and verification (a feature of quality control), often presented separately, are brought together in a comprehensive and integrated manner in this class. Students will learn to (i) develop and interpret rigorous engineering drawings, (ii) convey and recognize design intent via geometric specification, and (iii) anticipate and apply inspection and metrology techniques that verify manufactured components to meet specification. These goals will be met through coverage topics such as geometric dimensioning and tolerancing (GD&T), dimensional inspection techniques, and coordinate metrology. Recent developments and advancements in these areas will also be presented, including digital product definition/model-based definition, digital twins, 'Industry 4.0,' novel metrology techniques, and computational metrology.
MEGR5098-002	Topics in Precision Engineer: Virtual Machining for Part Quality	The goal of this course is to impart a detailed view of machining systems and processes. In one semester the course will cover mechanics and dynamics of machining processes such as turning and milling, analysis of machine tool dynamics through impact hammer tests and modal analysis, performing stability analysis for turning and milling processes, cutting force simulation, tool wear and surface integrity analysis. This course will be delivered in the virtual machining used for prediction and improvement of part quality context. The course will also include the relation of machining processes with computer aided manufacturing (CAM), and Computer Numerical Control (CNC). A good understanding of algebra, elementary calculus, mechanics and dynamics are required.

Brief Description of Special Topics Courses (4)

Course Number	Course Title	Brief Course Description
MEGR7090-001	Topics in Mechanical Engineer: Machine Learning in Manufacturing and Materials	The main topic of this course is machine learning in manufacturing and materials. Machine learning is a subset of the broader topic of Artificial Intelligence (AI), and a discussion of manufacturing processes and materials intimately involves design. Therefore, this course serves as an introduction to the applications of AI in tackling mechanical engineering problems, especially in design, manufacturing, and materials. The topics cover different behaviors that make an agent intelligent, often a computer program that performs tasks like humans, e.g., representing knowledge, solving problems with reasoning, learning from observation or direct instruction, perceiving the world, and communicating through language.
MEGR7090-002	Topics in Mechanical Engineer: Advanced Numerical Methods for Compressible Flows	

Brief Description of Special Topics Courses (4)

Course Number	Course Title	Brief Course Description
MEGR7090-003	Topics in Mechanical Engineer: Multi-axis Machining	This course covers the advanced CAD/CAM applications, which are used in metal cutting processes. The theoretical and practical aspects for modelling, simulation and CNC Programming techniques will be discussed. The topics covered during the lectures will be applied through homework, lab sessions and a course project. Techniques for analytical surfaces representation and modeling, surface generation techniques in CAD environment, theoretical aspects of toolpath computation for 3 and 5 axis milling, machining strategies offered by commercial CAM packages, theoretical and practical aspects of post processing issues for 3 and 5 axis milling will be covered. Process modeling for simulation and verification of 3 and 5 axis milling processes will be covered. Machining systems such as CNC machines and robotic manufacturing systems will be focused.
MEGR7090-004	Topics in Mechanical Engineer: Additive Manufacturing of Polymer-Based Composite Materials	Additive Manufacturing (AM) of polymer-based composites is an emerging field that integrates digital fabrication with advanced functional materials. Unlike conventional AM processes, the inclusion of reinforcing phases (e.g., ceramics, fibers, magnetic or dielectric particles) introduces unique challenges in processing, design, and performance optimization. With the rapid development of novel feedstocks, photosensitive resins, direct ink writing inks, and hybrid AM platforms, polymer composite AM is enabling new applications in biomedical devices, energy storage, aerospace, defense, and multifunctional smart structures.

Brief Description of Special Topics Courses (5)

Course Number	Course Title	Brief Course Description
MEGR7090-005	Topics in Mechanical Engineer: Computational Plasticity	