MECHANICAL ENGINEERING, MS

Degree: Master of Science (MS)
Field of Study: Mechanical Engineering

Program Overview

The Department of Mechanical and Aerospace Engineering offers a Master of Science degree in Mechanical Engineering.

Graduate Policies

For graduate policies and procedures, please review the School of Graduate Studies section of the General Bulletin.

Program Requirements

MS Track Options

A Mechanical Engineering MS is also available exclusively online.

Thesis-Focused Track

For a thesis-focused Mechanical Engineering MS, students must complete a minimum of 30 credit hours of graduate-level credits, including:

a. a minimum of 18 to 21 credit hours of approved graduate-level courses, and
b. 9 to 12 credit hours of MS thesis research, EMAE 651

Project-Focused Track

For a project-focused Mechanical Engineering MS, students must complete a minimum of 30 credit hours of graduate-level credits, including:

a. a minimum of 21 to 27 credit hours of approved graduate-level courses, and
b. 3 to 9 credit hours of MS project research, EMAE 695

Course-Focused Track

For a course-focused Mechanical Engineering MS, students must complete a minimum of 30 credit hours of graduate-level credits, including:

a. a minimum of 30 credit hours of approved graduate-level courses, and
b. satisfactory completion of the culminating course-focused experience, i.e. passing the course ENGR 600. To pass ENGR 600, students must earn at least a 3.00 grade in each of the three courses required for their concentration area.

Concentration Requirements

Depending on the area of interest, students should select courses from the list below with the approval of their advisor. Other technical, math and science courses within and outside of EMAE may be also acceptable with approval of their advisor.

Aeronautics

Code	Title	Credit Hours
Required Courses:		
EMAE 453	Advanced Fluid Dynamics I	3
EMAE 482	Propulsion	3
EMAE 483	Flight Mechanics	3
Recommended Courses:		
EMAE 454	Advanced Fluid Dynamics II	3
EMAE 457	Combustion	3
EMAE 471	Computational Fluid Dynamics	3

Biomechanics

Code	Title	Credit Hours
Required Courses:		
EMAE 407	Fundamentals of Biomechanics	3
EMAE 415	Introduction to Musculo-skeletal Biomechanics	3
EMAE 456	Micro-Electro-Mechanical Systems in Biology and Medicine (BioMEMS)	3
Recommended Courses:		
EBME 427	Movement Biomechanics and Rehabilitation	3
EBME 474	Biotransport Processes	3
EMAE 480	Fatigue of Materials	3

Dynamics, Control and Manufacturing

Code	Title	Credit Hours
Required Courses:		
EMAE 481	Advanced Dynamics I	3
EMAE 489	Robotics I	3
EMAE 487	Vibration Problems in Engineering	3
or EMAE 560	Sustainable Manufacturing	
Recommended Courses:		
EMAE 479	Mechanics and Control of Compliant Robotics	3
EMAE 540	Advanced Dynamics II	3
CSDS 473	Modern Robot Programming	3
CSDS 491	Artificial Intelligence: Probabilistic Graphical Models	3

Fluids and Thermal Sciences

Code	Title	Credit Hours
Required Courses:		
EMAE 453	Advanced Fluid Dynamics I	3
EMAE 455	Advanced Thermodynamics	3
EMAE 459	Advanced Heat Transfer	3
Recommended Courses:		
EMAE 454	Advanced Fluid Dynamics II	3
EMAE 457	Combustion	3
EMAE 460	Theory and Design of Fluid Power Machinery	3
EMAE 461	Chemistry of Fire Safe Polymers and Composites	3
EMAE 463	Fire Dynamics	3
EMAE 471	Computational Fluid Dynamics	3

EMAE 494	Energy Systems	3
EMAE 554	Turbulent Fluid Motion	3
EMAE 557	Convective Two-Phase Flow and Heat Transfer	3
EMAE 559	Hypersonics and Gas Dynamics	3

Solid Mechanics

Code	Title	Credit Hours
Required Courses:		
EMAE 401	Mechanics of Continuous Media	3
ECIV 435	Elasticity and Data-driven Mechanics	3
EMAE 475	Finite Element Analysis	3
Recommended Courses:		
EMSE 421	Fracture of Materials	3
EMAE 450	Advanced Mechanical Engineering Analysis	3
EMAE 480	Fatigue of Materials	3

Interdisciplinary

Take any three of the above required courses with the consent of your advisor and satisfy the other degree requirements.