Technical Elective Course listing for BS in ME

Updated 8/11/2023 NA

The purpose of technical electives is to broaden and/or deepen a student's knowledge of engineering and technology. Mechanical Engineering majors are required to take a total of 12 hours of technical electives. A wide variety of courses are appropriate to satisfy this requirement. Sometimes it may also be desirable for a student to select an elective course from a discipline outside of Mechanical Engineering.

The student's choice of elective classes must always be discussed with, and approved by, their advisor prior to enrollment. Technical electives should be chosen that provide the student with the foundation necessary to achieve a competitive advantage in attaining their career goals. Not all electives will be approved. Some restrictions are:

1. Electives should only be taken during the senior year.
2. Only three elective hours (one class) may be taken outside Mechanical Engineering (from Non-Mechanical Technical Elective list below).
3. The student must have the required prerequisites and/or background for the course.
4. Any course not shown in the listing below must first be approved by the Undergraduate Coordinator and documented in the student's academic folder.
5. An elective cannot usually be an alternate form of material already covered. For example, a second high-level programming language would not be acceptable. Nor would a first or second class in thermodynamics in another department be acceptable.
6. Material that could reasonably be learned independently is ordinarily not suitable. Nor is material that is not directly related to a career in mechanical engineering, or that is vocational.
7. The student may be able to take a graduate level class as a technical elective provided he/she has completed the Mechanical Engineering classes up to their junior year with a grade point average of 3.2 or better, and permission has been obtained from both their advisor and the instructor.

Below are listed some suitable technical electives. Other classes not listed may be appropriate after consultation with your academic advisor and the undergraduate coordinator.

Mechanical Engineering *	
o EAS 4101 Fundamentals of Aerodynamics	o EML 4501 Machine Design
o EGN 3454 Numerical Methods for Mechanical Engineers	o EML 4512 Thermal-Fluid Design
o EMA 4225 Mechanical Metallurgy	o EML 4536 Design using FEM (Finite Element Method)
o EMA 4501 Electron Microscopy	o EML 4542 Materials Selection and Design
o EMA4806 / EMA 4813 Computational Material Physics	o EML 4711 Introduction to Gas Dynamics
o EML 4161 Cryogenics	o EML 4800 Introduction to Robotics
o EML 4228 Vehicle Design	o EML 4804 Mechatronics II
o EML 4312 Design and Analysis of Control Systems	o EML 4830 Introduction to Mobile Robotics
o EML 4316 Advanced Design and Analysis of Control Systems	o EML 4841 Bio-Robotics and Locomotion
o EML 4321 Manufacturing Processes Control	o EML 4524 Design and Modeling Manufacturing Processes
o EML 4421 Fundamentals of Propulsion Systems	o EML 4930 Special Topics in ME
o EML 4450 Energy Conversion Systems for Sustainability	o EML 4905 Directed Independent Study (permission required)
o EML 4452 Sustainable Power Generation	o EML 4970 Honors in the Major (First 3 credits†)
	o EML 4930 Introduction to Bayesian Statistics

† Student may elect to use three (3) of the six (6) required credits of EML 4970, Honors Work, towards fulfilling the Technical Elective requirement –
See Honors Work course request form; https://eng.famu.fsu.edu/sites/default/files/pdfs/me/Honors_Work_course_request_form.pdf

Non-Mechanical Technical Electives must be 3000 level or above * student must complete all required prerequisites	Civil Engineering * o CES 3100 Structural Analysis o CES 4101 Advanced Structural Analysis o ENV 4001 Environmental Engineering o ENV 4341 Solid and Hazardous Waste Engineering o TTE 4201 Traffic Engineering o TTE 4250 Traffic Operations
Physics * o PHY 3101 Intermediate Modern Physics o PHY 3424 Optics	
Mathematics * o MAA 4402 Complex Variables o FAMU - MAD 3401 Numerical Analysis o FSU - MAD 3703 Numerical Analysis I o FAMU - MAP 3341 Partial Differential Equations o FSU - MAP 4341 Elementary Partial Differential Equations I o MAS 3105 Applied Linear Algebra I (3-4 cr) o FSU - STA 3032 Applied Statistics for Engineers and Scientists (3 cr)	**Electrical Engineering *** o EEL 3216 Fundamentals of Power Systems o EEL 3472 Electromagnetic Fields I o EEL 3705 Digital Logic Design o EEL 4220 Electromechanical Dynamics o EEL 4746 Microprocessor-Based System Design
	Industrial Engineering * o EGN 3443 Statistical Topics in Engineering o EIN 4333 Design of Integrated Production Systems and Facilities Layout o EIN 4621 Manufacturing Systems Engineering o EIN 4611 Industrial Automation and Robotics o EIN 4150/ 4444 Technology Entrepreneurship & Commercialization

If you choose to follow one of the area tracks, completion of three courses in that area will gain you a Certificate of Specialization in that area.

Track areas:

Dynamic Systems	
Fall:	**Spring:**
- EML 4288 Vehicle Design - EML 4312 Design and Analysis of Control Systems - EML 4804 Mechatronics II - EML 4830 Introduction to Mobile Robotics w/Lab, EML 4830L - MAS 3105 Applied Linear Algebra (3-4 cr)	- EML 4042 Modeling & Simulation for Mechanical Systems - EML 4316 Advanced Design and Analysis of Control Systems - EML 4501 Machine Design - EML 4800 Introduction to Robotics - EML 4841 Bio/Robotic Locomotion - EML 4930 Advanced Dynamics - EML 4930 Applied Optimal Control - EML 4930 Human Biomechanics - EML 4930 Mechatronics & Art - EML 4930 Model Based Computational Methods in Robotics

Mechanics and Materials	
Fall:	**Spring:**
- EMA 4501 Electron Microscopy - EML 4536 Design using FEM (Finite Element Method) - EML 4542 Materials Selection in Design - EML 4930 Materials II - EML 4930 Intro to Additive Manufacturing - EML 4930 Failure Analysis - EML 4930 Tribology	- EMA 4225 Mechanical Metallurgy - EML 4930 Applied Superconductivity - EML 4930 Continuum Mechanics - EML 4930 Solid Mechanics and Electro Magnetics of Continuous Media - EML 4930 Energy Materials & Devices - EML 4930 Microstructure of Materials - EML 4930 Thermodynamics for Materials Science

Thermal Fluids	
Fall:	**Spring:**
- EML 4450 Energy Conversion Systems for Sustainability - EML 4512 Thermal-Fluid Design - EML 4930 Analysis in Mechanical Engineering Part I - EML 4930 Experimental Methods and Advanced Flow Diagnostics - EML 5152 Heat Transfer	- EML 4161 Cryogenics - EML 4421 Fundamentals of Propulsion Systems - EML 4452 Sustainable Power Generation - EML 4711 Introduction to Gas Dynamics - EML 4930 Computational Fluid Dynamics - EML 4930 Fluid Structure Interaction - EML 4930 Intro to Hypersonic Flows - EML 4930 Turbulence - EML 4930 Analysis in Mechanical Engineering Part II

Aeronautics Track	
Fall:	**Spring:**
- EAS 4101 Fundamentals of Aerodynamics - EML 4512 Thermal-Fluid Design - EML 4221 Introduction to Physical Acoustics	- EML 4421 Fundamentals of Propulsion Systems - EML 4711 Introduction to Gas Dynamics

Magnet Science and Technology	
Fall:	**Spring:**
- EML 4536 Design using FEM (Finite Element Method) - EML 4930 Solid Mechanics and Electromagnetics of Continuous Media	- EML 4161 Cryogenics - EML 4930 Magnet Technology - EML 4930 Applied Superconductivity