


# MECHANICAL ENGINEERING (ME)

 - General Education Course

## ME 111 Mech Engineering Computations **3 Credit hours**

Introduction to effective problem-solving techniques used in various engineering applications. Computational tools including C and MATLAB will be covered.

**Pre-req:** MTH 127 with a minimum grade of D or MTH 130 with a minimum grade of D or MTH 132 (may be taken concurrently) with a minimum grade of D or MTH 229 (may be taken concurrently) with a minimum grade of D or MTH 229H (may be taken concurrently) with a minimum grade of D or ACT Math with a score of 24 or SAT Mathematics Before Mar. 16 with a score of 560 or SAT MATH SECTION SCORE with a score of 570.

**Concurrent PR:** MTH 132 or MTH 229 or MTH 229H

**Grade Mode:** Normal Grading Mode

## ME 240 Manufacturing Processes **3 Credit hours**

An introduction to manufacturing systems and strategy. A study of manufacturing processes. Measurement and quality assurance machining, welding, and casting processes. Hot and cold forming and joining processes. 1 lec and 6 lab

**Pre-req:** ENGR 215 with a minimum grade of D and (ENGR 102 with a minimum grade of D or CE 102 with a minimum grade of D).

**Grade Mode:** Normal Grading Mode

## ME 245 Circuits and Instrumentation **3 Credit hours**

This course provides basic concepts of DC and AC circuit analysis, an overview of the instrument characteristics and measurement principles, and description and evaluation of sensors commonly used with instrumentation.

**Pre-req:** MTH 230 with a minimum grade of D.

**Grade Mode:** Normal Grading Mode

## ME 305 Aircraft Systems **3 Credit hours**

This course covers flight dynamics; and modeling, stability, and control aspects of aircrafts.

**Pre-req:** ENGR 213 with a minimum grade of D.

**Grade Mode:** Normal Grading Mode

## ME 310 Thermodynamics II **3 Credit hours**

Gas, vapor, combined power cycles, co-generation, entropy, combustion, fuel cells, and equations of state.

**Pre-req:** ENGR 219 with a minimum grade of D.

**Grade Mode:** Normal Grading Mode

## ME 312 Flight Mechanics **3 Credit hours**

This course covers flight dynamics; modeling, stability, and control aspects of aircrafts.

**Pre-req:** ME 305 with a minimum grade of D.

**Grade Mode:** Normal Grading Mode

## ME 320 Fluid Power **3 Credit hours**

This course covers physical principles of fluid power cylinders, control valves, fluid power components: compressors, pumps, valves, cylinders, and motors, fluid power circuits, troubleshooting: hydraulic, symptoms, procedures, pneumatics.

**Pre-req:** ENGR 214 with a minimum grade of D and ENGR 216 with a minimum grade of D.

**Grade Mode:** Normal Grading Mode

## ME 325 Mechanical Engineering Lab-I **1 Credit hour**

Experiments in fluid, heat, and thermodynamics; Experimental analysis, planning, and design; Estimation of error and uncertainty analysis; Principles and performance of measuring systems; Laboratory experience; Technical report writing.

**Pre-req:** (ME 360 with a minimum grade of D or ENGR 318 with a minimum grade of D) and ENGR 219 with a minimum grade of D and STA 345 with a minimum grade of D and ME 350 (may be taken concurrently) with a minimum grade of D.

**Concurrent PR:** ME 350

**Attributes:** No Textbook Required

**Grade Mode:** Normal Grading Mode

## ME 330 Manufacturing Methods/Design **3 Credit hours**

This course covers economical production by understanding the capabilities of different manufacturing processes, candidate manufacturing processes for a given part, performing manufacturability evaluation at the design stage, automation, IMS.

**Pre-req:** ME 240 with a minimum grade of D.

**Grade Mode:** Normal Grading Mode

## ME 340 Machine Element Design **3 Credit hours**

Mechanical design of machine elements, static and fatigue failures, shaft systems, bearings, gears, springs, screws and fasteners.

**Pre-req:** ENGR 216 with a minimum grade of D.

**Grade Mode:** Normal Grading Mode

## ME 350 Heat Transfer **3 Credit hours**

Analysis and solutions of conduction, free and forced convection, radiation heat transfer and design of heat exchangers.

**Pre-req:** ENGR 219 with a minimum grade of D and (ME 360 with a minimum grade of D or ENGR 318 with a minimum grade of D).

**Grade Mode:** Normal Grading Mode

## ME 360 Fluid Dynamics **4 Credit hours**

Fluid statics, fluid kinematics, Bernoulli equation, momentum analysis, dimensional analysis, internal flows, fluid machinery, power and efficiency, external flows, compressible flows, differential analysis and Navier-Stokes equation, computational fluid dynamics.

**Pre-req:** ENGR 214 with a minimum grade of D and MTH 231 (may be taken concurrently) with a minimum grade of D.

**Concurrent PR:** MTH 231

**Grade Mode:** Normal Grading Mode

## ME 410 Kinematics & Design of Machine **3 Credit hours**

The determination of the motion and forces of machines and mechanisms including rotating machinery, cams and gears. Analyze position, velocity, accelerations, static loads, and dynamic loads.

**Pre-req:** ENGR 214 with a minimum grade of D and ENGR 216 with a minimum grade of D.

**Grade Mode:** Normal Grading Mode

## ME 420 Control Systems **3 Credit hours**

This course provides basic concepts of control; open and closed-loop control systems; and PLC Programming.

**Pre-req:** ME 245 with a minimum grade of D and MTH 335 with a minimum grade of D.

**Grade Mode:** Normal Grading Mode

## ME 422 Flight Stability and Control **3 Credit hours**

This course covers flight dynamics; and modeling, stability, and control aspects of aircrafts.

**Pre-req:** MTH 335 with a minimum grade of D and ME 312 with a minimum grade of D.

**Grade Mode:** Normal Grading Mode

- ME 425 Mechanical Engineering Lab-II** **1 Credit hour**  
Engineering measurements and experimentations. Hands-on labs and data analyses in several major topics of the Mechanics of Materials theory and Theory of Machines.  
**Pre-req:** ME 340 with a minimum grade of D.  
**Grade Mode:** Normal Grading Mode
- ME 430 Design of Thermal Systems** **3 Credit hours**  
Design and analysis of thermal systems including components selection and integrations.  
**Pre-req:** ME 350 with a minimum grade of D.  
**Grade Mode:** Normal Grading Mode
- ME 435 Design of Mechanical System** **3 Credit hours**  
Problem solving methodology in the design, analysis, and synthesis of mechanical systems. Engineering design process involving modeling, computer simulation, concepts of optimization, robustness, reliability, sustainability.  
**Pre-req:** ME 410 (may be taken concurrently) with a minimum grade of D.  
**Concurrent PR:** ME 410  
**Attributes:** No Textbook Required  
**Grade Mode:** Normal Grading Mode
- ME 440 Design & Analysis Energy Sys** **3 Credit hours**  
Design characteristics and operational performance of energy systems.  
**Pre-req:** ME 310 with a minimum grade of D.  
**Attributes:** No Textbook Required  
**Grade Mode:** Normal Grading Mode
- ME 445 Hydraulic & Pneumatic Control** **3 Credit hours**  
This course covers standard symbols, pumps, control valves, assemblies, actuators, filter regulator lubricator (FRL), maintenance procedures, switching, control devices, fluid power circuits including design, application, and troubleshooting.  
**Pre-req:** ME 245 with a minimum grade of D.  
**Grade Mode:** Normal Grading Mode
- ME 447 Engineering Analysis** **4 Credit hours**  
Experimental laboratory mainly from within the thermo-fluids area, concerned with fluid statics, flow, heat transfer, internal combustion engines, data acquisition, analysis, including use of computers. Principles of good experimental design.  
**Pre-req:** MTH 335 with a minimum grade of D.  
**Grade Mode:** Normal Grading Mode
- ME 450 CNC and Rapid Prototyping** **3 Credit hours**  
This course covers CNC CAD/CAM, CNC tools, coordinate systems, CNC programming Language, CNC operation, CNC tool paths, CNC turning, G/M code reference, CNC milling work-holding, rapid prototyping, 3D printing.  
**Pre-req:** ME 240 with a minimum grade of D.  
**Grade Mode:** Normal Grading Mode
- ME 451 Jet Propulsion** **3 Credit hours**  
The theories and principles of jet propulsion. Thermodynamic cycles. The mechanics and thermodynamics of combustion. Turbine engine performance characteristics. Component and cycle analysis of jet engines and turbomachinery.  
**Pre-req:** ME 310 with a minimum grade of D.  
**Grade Mode:** Normal Grading Mode
- ME 452 Capstone Design I** **1 Credit hour**  
Prepares mechanical engineering students for ME 453 Capstone Design II, professional responsibility, development of effective communication skills, and learning strategies. Students begin to work on a capstone design project.  
**Pre-req:** ME 350 with a minimum grade of D and ME 410 with a minimum grade of D.  
**Grade Mode:** Normal Grading Mode
- ME 453  Capstone Design II** **3 Credit hours**  
Students utilize the engineering design process to complete a comprehensive project that addresses a real-world problem with realistic constraints in a collaborative environment.  
**Pre-req:** ME 452 with a minimum grade of D.  
**Attributes:** Capstone Course  
**Grade Mode:** Normal Grading Mode
- ME 455 Metallurgy** **3 Credit hours**  
Covers material properties and behavior of pure metals and common metal alloys. Discuss various aspects of extractive, mechanical, physical metallurgy, theory and practice of identification, selection, processing, conditioning, and testing.  
**Pre-req:** ENGR 215 with a minimum grade of D.  
**Grade Mode:** Normal Grading Mode
- ME 456 Materials for Aerospace** **3 Credit hours**  
Covers the main structural materials used in aircraft in terms of their production, properties, performance, and applications.  
**Pre-req:** ENGR 215 with a minimum grade of D.  
**Grade Mode:** Normal Grading Mode
- ME 460 Vibrations** **3 Credit hours**  
Modeling of vibratory motion of single and multiple degree of freedom systems; free and forced response; modal summation method for response predictions; simulation of the vibration by using Matlab.  
**Pre-req:** ENGR 214 with a minimum grade of D and MTH 335 with a minimum grade of D.  
**Grade Mode:** Normal Grading Mode
- ME 465 Mechatronics** **3 Credit hours**  
Dynamic analysis of mechatronic systems, sensors, transducers, and electric circuits and control.  
**Pre-req:** ME 420 with a minimum grade of D.  
**Grade Mode:** Normal Grading Mode
- ME 471 Finite Elements Method** **3 Credit hours**  
This course covers flight dynamics; and modeling, stability, and control aspects of aircrafts.  
**Pre-req:** ENGR 216 with a minimum grade of D and ENGR 335 with a minimum grade of D.  
**Grade Mode:** Normal Grading Mode
- ME 473 Computational Fluid Dynamics** **3 Credit hours**  
Conservation laws of fluid motion and heat transfer; Fundamental knowledge to use numerical techniques to solve fluid-thermal problems.  
**Pre-req:** ENGR 335 with a minimum grade of D and (ME 360 with a minimum grade of D or ENGR 318 with a minimum grade of D).  
**Grade Mode:** Normal Grading Mode

**ME 475 Introduction to Robotics 3 Credit hours**

Introduction to effective problem-solving techniques used in various engineering applications. Computational tools including C and MATLAB will be covered.

**Pre-req:** ME 410 with a minimum grade of D and ME 420 with a minimum grade of D.

**Grade Mode:** Normal Grading Mode

**ME 480 Special Topics 1-4 Credit hours**

Subject matter to be selected from topics of current interest.

**Grade Mode:** Normal Grading Mode

**ME 481 Special Topics 1-4 Credit hours**

Subject matter to be selected from topics of current interest.

**Grade Mode:** Normal Grading Mode

**ME 482 Special Topics 1-4 Credit hours**

Subject matter to be selected from topics of current interest.

**Grade Mode:** Normal Grading Mode

**ME 483 Special Topics 1-4 Credit hours**

Subject matter to be selected from topics of current interest.

**Grade Mode:** Normal Grading Mode

**ME 485 Independent Study 1-4 Credit hours**

Individual study of advanced mechanical engineering areas.

**Grade Mode:** Normal Grading Mode

**ME 486 Independent Study 1-4 Credit hours**

Individual study of advanced mechanical engineering areas.

**Grade Mode:** Normal Grading Mode

**ME 487 Independent Study 1-4 Credit hours**

Individual study of advanced mechanical engineering areas.

**Grade Mode:** Normal Grading Mode

**ME 488 Independent Study 1-4 Credit hours**

Individual study of advanced mechanical engineering areas.

**Grade Mode:** Normal Grading Mode