ME. MECHANICAL ENGINEERING

ME-401. APPLIED ENGINEERING ANALYSIS
Credits: 3

This course is intended for physical science and engineering students. Topics include inner product spaces, operator algebra, eigenvalue problems, Fourier series, Sturm-Liouville theory, and partial differential equations. Cross list [[MTH-461]]

ME-402. ENGINEERING COMPUTATIONAL ANALYSIS
Credits: 3

This course introduces applications of Matrix algebra (Review only), solution of linear simultaneous equations , solving linear system of equations by iteration methods , roots of algebraic and transcendental equations , interpolation, methods of finding polynomial roots , Eigen values & eigenvectors, numerical integration, numerical differentiation, numerical solution of initial value problems, boundary value problems.

ME-411. PRODUCT DEVELOPMENT
Credits: 3

This course introduces organizational issues and decision-making for capital investments in new technologies. The commercialization process is traced from research and development and marketing activities through the implementation phase involving the manufacturing function. Term project is a commercialization plan for a new manufacturing technology.

ME-414. INVERSE PROBLEMS IN MECHANICS
Credits: 3

Inverse problems are very common in engineering where the outputs are known but the inputs are unkown. This course will show how to properly setup a well-posed inverse problem, how to solve matrix inverse, and conduct hands on experiments by creating strain gage based force transducers.

ME-417. ROBOTICS
Credits: 3

This course is an introduction of robot mechanisms, intelligent controls, and industrial robot programming. Course topics include kinematics and motion planning, mechanism design for manipulators and mobile robots, dynamics and control design, actuators and sensors, human-machine interface, and embedded software. Laboratories and projects provide experience with DC and servo motors, real-time feedback control, embedded software, and industrial robot programming.

Click here for course fee.

Pre-Requisites

EGR-222 and ME-234

Co-Requisites

MTH-212 concurrent or before

ME-418. QUALITY CONTROL ENGINEERING
Credits: 3

This course addresses quality control in the manufacturing environment, statistical methods used in quality assurance, statistical process control.

ME-425. ENERGY SYSTEMS
Credits: 3

This course introduces fundamental principles of energy transmission and energy conversion. Comprehension of the physical systems in which the conversion of energy is accomplished. Primary factors necessary in the design and performance analysis of energy systems three credits.

ME-427. TRANSPORT PHENOMENA
Credits: 3

This course introduces theory and applications of heat, mass, and momentum transport. The fluid dynamics topics such as conservation laws, laminar and turbulent flow, Navier Stokes equations of motion and other related topics will be covered. Topics include free and forced convection, boiling and condensation, and the analogy between heat and mass transport. Practical problems of engineering applications in different areas will be discussed.

ME-432. VIBRATION OF DYNAMIC SYSTEMS
Credits: 3
Fees: $100

This course is an introductory course in mechanical vibration dealing with free and forced vibration of single and multi-degree of freedom for linear systems.

ME-436. SOLID MECHANICS
Credits: 3

This course is an introduction to continuum mechanics, variational methods, including vectors and tensors, state of stress and compatibility equation, plain stress and strain. Energy Principles and virtual work will be discussed.

ME-438. MACHINE DESIGN II
Credits: 3

An advanced course in machine design topics that expands upon the concepts of Machine Design I. This course goes into more detail of the basic machine fundamentals introduced previously such as levers, belts, pulleys, gears, cams and power screws. Emphasis is also placed on 3D printing and the future of additive manufacturing.

Pre-Requisites

ME-333

ME-439. CLASSICAL MECHANICS
Credits: 3

This course is an introduction to classical mechanics. Topics covered include: Newtonian mechanics, oscillations, Lagrangian and Hamilton's principle, Dynamics of a systems of particles and rigid bodies.

ME-442. MATERIAL SCIENCE
Credits: 3

This course introduces advance materials for engineers, emphasizing the fundamentals of manufacturing/structure/property/function relation and applications. Topics include materials selection for machine design components in micro and nano-scales, biomaterials, nano-composites, and optimized materials for nano-sensors & actuator systems.

ME-443. ADDITIVE MANUFACTURING
Credits: 3

An introduction to additive manufacturing, also known as 3-D printing, which is a process of building 3-D objects from a digital file. Emphasis will be placed on both existing and emerging additive manufacturing processes in the context of design, modeling, materials, processing, and applications. This course provides hands-on experience and implements active learning strategies.
Click here for course fees.

ME-451. MECHATRONICS
Credits: 3

This course is a multidiscipline technical area defined as the synergistic integration of mechanical engineering with electronic and intelligent computer control in the design and manufacture of industrial products and processes. This course covers topics such as actuators and drive systems, sensors, programmable controllers, microcontroller programming and interfacing, and automation systems integration.

ME-452. NANO-TECHNOLOGY
Credits: 3

This course explores the fundamentals of Nanotechnology and its applications for colloidal suspension, Electrophoretic deposition and nano sensing by understanding materials properties, micro-machining, sensor and actuator principles. Two hours lecture and three hours lab per week.

ME-454. CONTROL SYSTEMS
Credits: 3

Laplace transforms and matrices. Mathematical modeling of physical systems. Block diagram and signal flow graph representation. Time-domain performance specifications. Stability analysis; Routh-Hurwitz criterion. Steady state error analysis. Root-locus and frequency response techniques. Design and compensation of feedback systems. Introductory State space analysis.

ME-480. ADVANCED CADD
Credits: 3

An advanced course in Computer-Aided Drafting and Design (CADD) using SolidWorks. This course will introduce topics such as advanced modeling, advanced assemblies, Finite Element Analysis (FEA), and sheet metal.

Pre-Requisites

ME-180, ME-335

ME-498. ADVANCED TOPICS IN MECHANICAL ENGINEERING
Credits: 1-3

This course includes selected topics in the field of mechanical engineering. These may include one or more of the following: control systems, automation, robotics, manufacturing systems, solid mechanics, energy systems, fluid flow, acoustics, computer systems, bio-mechanics.

ME-501. GRADUATE EDUCATION CONTINUUM
Credits: 1-9

Recorded with grade for one credit-hour. Occurs as a continuum bases till successful completion of thesis or project.

ME-599. THESIS/PROJECT
Credits: 3-6

Students have the option of selecting up to six credits- hours of thesis or three credit hour of project under guidance of a thesis/project advisor. The thesis will have a committee of three members; at least two members (including the adviser) must be Wilkes faculty members. The thesis/project should be presented in an open forum.