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-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
Credits: 3
This course introduces design of machine elements and deals with theories of deformation, failure, and fatigue. A study of shaft design, fasteners, welds, gears, ballled roller bearings, belts, chains, clutches, and brakes.

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-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
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.