Prerequisites: momentum, moment of inertia, Newton's laws, work and energy and impulse and kinetics of particles and rigid bodies, including relative motion, mass, and center of gravity. A fundamental treatment of coplanar and three-dimensional kinematics.

MET 220 Strength of Materials (3 Credit Hours)
Mechanical behavior of materials subjected to various external loads. Stress-strain relationships are utilized to design members subjected to shear, axial, bending, and torsional loads. Deformations are predicted and Mohr's circle is introduced.
Prerequisites: MET 210 or CET 200

MET 225 Strength of Materials Laboratory (1 Credit Hour)
A laboratory course dealing with the standard methods of inspecting and testing materials used in engineering applications with emphasis on laboratory reports, including presentation and interpretation of experimental data.
Pre- or corequisite: MET 220

MET 230 Engineering Graphics and Computer Solid Modeling (3 Credit Hours)
Graphical communication for engineers studies the concept of 3D parametric modeling and its application in industry. In this course students will learn the fundamentals of sketching, basics of surface design, assembly modeling, and dynamic modeling of mechanisms using industry standard parametric modeling software. Emphasis on developing the skills needed for engineering design.

MET 295 Topics (1-3 Credit Hours)
Study of selected topics.

MET 300 Thermodynamics (3 Credit Hours)
The basic laws of thermodynamics, properties of fluids, heat, and work and their applications in processes and cycles and an introduction to conduction heat transfer.
Prerequisites: CHEM 121N, MATH 211, and PHYS 111N or PHYS 231N

MET 305 Fundamentals of Mechanics (3 Credit Hours)
Selected topics in statics and strength of materials are applied to mechanical engineering technology. Coverage includes force systems, equilibrium, friction, and stress-strain relationships and their application to the mechanical behavior of materials.
Prerequisites: PHYS 111N and MATH 211

MET 310 Dynamics (3 Credit Hours)
A fundamental treatment of coplanar and three-dimensional kinematics and kinetics of particles and rigid bodies, including relative motion, mass moment of inertia, Newton's laws, work and energy and impulse and momentum.
Prerequisites: MATH 211, and MET 210 or CET 200

MET 320 Design of Machine Elements (3 Credit Hours)
Practical analyses of fundamental machine elements such as shafts, springs, and screws. Fundamental principles required for the correct design of the separate elements which compose the machine with attention given to problems of synthesis and the interrelationships of the design of elements within the sub-assembly. Topics include stress analysis of screws, belts, clutches, brakes, chains and thin and thick cylinders, and lubrication and bearings.
Prerequisites: MATH 211, and a grade of C or better in MET 220 or CET 220

MET 330 Fluid Mechanics (3 Credit Hours)
The study of fluid statics and dynamics, including momentum, energy, Bernoulli's equation, laminar and turbulent fluid flow and friction in pipes, fluid machinery, and open-channel flow.
Prerequisites: MET 310

MET 335 Fluid Mechanics Laboratory (1 Credit Hour)
A laboratory course dealing with the verification of fluid equations and principles and the characteristics of fluid machinery with emphasis on presentation and interpretation of experimental data.
Prerequisites: Junior standing
Pre- or corequisite: MET 330 or CET 330

MET 350 Thermal Applications (3 Credit Hours)
A study of the applications of thermodynamics. Topics include the basic steam and gas turbine power cycles, internal combustion engines, introduction to refrigeration systems, gas mixtures, and psychrometrics applied to air conditioning processes.
Prerequisites: MET 300 with a grade of C or better

MET 367 Cooperative Education (1-3 Credit Hours)
May be repeated for credit. Available for pass/fail grading only. Student participation for credit based on the academic relevance of the work experience, criteria, and evaluative procedures as formally determined by the department and the Career Development Services program prior to the semester in which the work experience is to take place. (offered fall, spring, summer)
Prerequisites: approval by the department and Career Development Services in accordance with the policy for granting credit for Cooperative Education programs

MET 368 Internship (1-3 Credit Hours)
Available for pass/fail grading only. Academic requirements will be established by the department and will vary with the amount of credit desired. Allows students to gain short duration career-related experience.
Prerequisites: approval by department and Career Development Services

MET 369 Practicum (1-3 Credit Hours)
Available for pass/fail grading only.
Prerequisites: approval by department and Career Development Services

MET 370 Automation and Controls (3 Credit Hours)
A study of the design and analysis of feedback control system. Includes the fundamentals of programmable controllers as well as practical applications of interfacing mechanical, electrical, pneumatic and hydraulic feedback control circuits. Computer simulation software is used to model system responses.
Prerequisites: MATH 211 and either EET 350 or EET 360
Corequisites: MET 386

MET 386 Automation and Controls Laboratory (1 Credit Hour)
Laboratory and computer simulation of control systems including programmable controllers as well as practical applications of interfacing mechanical, electrical and pneumatic control systems.
Prerequisites: MATH 211 and either EET 350 or EET 360
Corequisites: MET 370

MET 387 Power and Energy Laboratory (2 Credit Hours)
Experiments dealing with applied thermodynamics, mechanical power and energy systems with emphasis on laboratory report writing, including presentation and interpretation of experimental data.
Prerequisites: MET 350, and MET 335 or MET 335W
MET 395 Topics (1-3 Credit Hours)
Study of selected topics.
Prerequisites: permission of the instructor

MET 396 Topics (1-3 Credit Hours)
Study of selected topics.
Prerequisites: permission of the instructor

MET 400 Computer Numerical Control in Production (3 Credit Hours)
Principles of computer numerical control consistent with most recently developed standards, industry practices, and CAD/CAM systems including such topics as types of CNC machines, CNC milling, CNC turning and CNC electro-discharge machinery. A significant portion of the course includes programming in multiple axes.
Prerequisites: ENGT 305

MET 405 Introduction To Welding Technologies (3 Credit Hours)
An introduction to conventional and non-conventional welding processes. This course is intended to provide the student with a basic understanding of the various welding processes, welding terminology, joints, symbols, welding defects, equipment. Topics covered include welding processes, heat and fluid flow, structure of metals, solidification phenomena, phase transformations, residual stresses, and nondestructive examination techniques. Real life examples will be used to illustrate the fundamental concepts of the course. The student will also be introduced to career opportunities in the welding field. Lab time will be used to enforce lecture topics when needed.
Prerequisites: MET 200 and ENGT 305

MET 406 Additive Manufacturing (3 Credit Hours)
This course provides an overview of various additive manufacturing (AM) processes. Topics include fundamentals of polymer, composite, and metal AM processes, process parameters, AM software, AM cost, and AM’s industrial potential such as prototyping, tooling, production customization, spare parts, art, design, architecture and construction.
Prerequisites: ENGT 305

MET 410 Advanced Manufacturing Processes (3 Credit Hours)
A course in nontraditional manufacturing processes including ultrasonic machining, abrasive jet machining, waterjet cutting, electromechanical machining, electrical discharge machining, plasma arc machining and chemical milling. Semester project is required. (qualifies as a CAP experience)
Prerequisites: ENGT 305

MET 415 Introduction to Robotics (3 Credit Hours)
An introductory course in robotics dealing with the history and development of robots, mechanical components and control systems, actuators, robot programming and utilization. Included are laboratory experiments in robot motion and programming.
Prerequisites: ENGT 305

MET 420 Design for Manufacturing (3 Credit Hours)
Principles of design for manufacturing, materials and process selection for design, design for assembly, design for production and case studies. Also includes impact of product design, design for maintenance, recyclability, disassembly, quality and robustness. Semester project requires redesign of an existing product for manufacturing.
Prerequisites: ENGT 305

MET 426 Introduction to Mechatronics (3 Credit Hours)
A study of the mechatronics concepts and their application on actual problems encountered in engineering practice. Includes the basics of electromechanical systems, electrical circuits, solid-state devices, digital circuits and motors, all of which are fundamental to understanding mechatronic systems.
Prerequisites: ENGT 305

MET 427 Mechatronic System Design (3 Credit Hours)
A study of the integrated modeling and optimal design of a physical system, which includes sensors, actuators, electronic components, and its embedded digital control system. Includes simultaneous optimal design practice with respect to the realization of the design specifications related to different engineering domains.
Prerequisites: ENGT 305

MET 430 Mechanical Subsystem Design (3 Credit Hours)
Fundamental principles required for the correct design of the separate elements which compose the machine with attention given to problems of synthesis and the interrelationships of the design of elements within the sub-assembly. Topics include stress analysis of screws, belts, clutches, brakes, chains and thin and thick cylinders, and lubrication and bearings.
Prerequisites: MET 320

MET 431 Modeling and Simulation of Mechatronic Systems (3 Credit Hours)
The course provides foundations, principles, methods, and tools for modeling and simulation of electro-mechanical components and systems using appropriate modeling techniques. The course is focused on the multi-body dynamics systems, fluid, hydraulic, and electrical systems.
Prerequisites: ENGT 305

MET 440 Heat Transfer (3 Credit Hours)
A study of conduction, convection and radiation heat transfer and heat exchangers. Emphasis is on applications and problem solving using current techniques, and modern correlations.
Prerequisites: MET 300

MET 445 Computer Integrated Manufacturing (3 Credit Hours)
Principles of computer integrated manufacturing, system integration, architecture and database development. Topics include part design specifications, process engineering, fixed automation and process planning.
Prerequisites: ENGT 305

MET 450 Energy Systems (3 Credit Hours)
A study of the application of thermodynamics to power plants, engines, compressors, turbines, and associated systems. A detailed study is made of fossil fuel power plants with an introductory study of nuclear power and other energy conversion systems.
Prerequisites: MET 350

MET 455 Lean Engineering (3 Credit Hours)
This course looks at the history of lean and six sigma philosophies, their principles and implementation methodologies for creating a world class enterprise. Topics in Lean include five s, value stream mapping, cellular manufacturing, pull system, performance metrics, Lean supplier network, Lean product development and Lean implementation models. Semester research report is a course requirement. Class activities may involve physical simulation of production environment.
Prerequisites: ENGT 305

MET 460 Refrigeration and Air Conditioning (3 Credit Hours)
The design and application of refrigeration and air conditioning systems. Studies are made of compressors, condensers, evaporators, psychrometric processes, load calculations and air distribution systems. High performance vapor compression systems, absorption systems and other cycles are analyzed.
Prerequisites: MET 330 and MET 350

MET 465 Geometric Dimensioning and Tolerancing (3 Credit Hours)
Methods and rules of dimensioning and tolerancing, calculation of fits, and geometrical tolerances using ANSI-Y14.5M, tolerances of form, orientation, and profile, including flatness, straightness, circularity, cylindricity, angularity, etc. Student work consists of designing and detailing various product drawings.
Prerequisites: ENGT 305

MET 471 Nuclear Systems I (3 Credit Hours)
Reactor physics principles as applied to the design and operation of various types of commercial nuclear power reactors. Topics include sources of radiation and interaction with matter, neutron interactions, diffusion theory, and reactor kinetics.
Prerequisites: ENGT 305
MET 472 Nuclear Systems II (3 Credit Hours)
Complete study of the nuclear fuel cycle, from mining through fabrication, fuel management in an operating commercial power reactor, spent fuel management, and fuel reprocessing, with emphasis on chemical engineering considerations.
Prerequisites: ENGT 305

MET 475 Marine Engineering I (3 Credit Hours)
This course includes: fundamental principles of naval architecture including nomenclature, geometry, stability, hydrostatics, structures, and motions; ship design processes; and a basic introduction to shipboard systems such as HVAC, refrigeration, power generation, propulsion, hydraulics, electronics, cargo handling systems, seawater systems, freshwater systems, and fuel, lube and other oil systems.
Prerequisites: MET 330 and MET 350

MET 476 Marine Engineering II (3 Credit Hours)
This course builds upon MET 475 and provides a more in-depth look on how the marine shipbuilding industry is using various software including SIEMENS PLM, 3D CAD modeling and new technologies like laser scanners and augmented reality to reshape the future of shipbuilding, maintenance, and repair processes. Focus will be based on model-based learning and creating a ‘digital thread’ of information. Students will practice what they learn on shipbuilding concepts using commercial software that is widely used across automotive, aerospace, and marine industries.
Prerequisites: MET 475

MET 480 High Performance Piston Engines (3 Credit Hours)
A study of the fundamental principles and performance characteristics of spark ignition and diesel internal combustion engines. Overview of engine types and their operation, engine design and operating parameters; ideal and semi-empirical models of engine cycles; combustion, fluid flow and thermal considerations in engine design and performance. Laboratory evaluation of engine performance using flow and dynamometer systems. (cross-listed with MAE 477/MAE 577)
Prerequisites: MET 350 or MAE 312

MET 485 Maintenance Engineering (3 Credit Hours)
This course looks at maintenance systems: predictive, preventative and corrective; large scale maintenance systems, principles of reliability engineering, maritime logistics; planning for maintenance and repair, using and ordering spare parts, technical manuals, system specifications, and shipyard operations.
Prerequisites: ENGT 305

MET 495 Topics in Mechanical Engineering Technology (1-3 Credit Hours)
Study of selected topics.
Prerequisites: permission of the instructor

MET 496 Topics in Mechanical Engineering Technology (1-3 Credit Hours)
Study of selected topics.
Prerequisites: permission of the instructor