MET - Mechanical Engineering Technology

MET 200 Materials and Manufacturing Processes (3 Credit Hours)
Application and characteristics, both physical and chemical, of the materials most commonly used in industry as well as procedures and processes used in converting raw materials into a finished product.

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: ENGT 220

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 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: A grade of C or better in MATH 211, and MET 210 or CET 200 or ENGT 200

MET 320 Design of Machine Elements (3 Credit Hours)
The course provides a comprehensive overview of mechanical design principles and stress analysis in design of mechanical drive systems (such as belts, chains, and gears), shaft design, bearings, and fasteners, as well as the integration of electric motors and motion control elements like clutches and brakes. The course emphasizes practical design applications in design of machine elements.
Prerequisites: A grade of C or better in MATH 211 and ENGT 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: MATH 211, and MET 210 or CET 200 or ENGT 200

MET 331 Fluid Mechanics Laboratory (1 Credit Hour)
Experimental study of applied fluid mechanics, its fundamental concepts including fluid statics, Bernoulli's equation, pipe friction, flow measuring devices, and fluid machinery. Includes report writing, presentation and interpretation of experimental data.
Prerequisites: MATH 211
Pre- or corequisite: MET 330

MET 340 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 numerical tools.
Prerequisites: A grade of C or better in MATH 211, and MET 300

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 351 Thermal Applications Laboratory (1 Credit Hour)
Experimental study of applied thermodynamics and energy conversion efficiencies; power cycles, refrigeration cycles, compressible flow, and heat transfer. Includes teamwork and collaborative laboratory report writing, along with presentation and interpretation of experimental data.
Prerequisites: MET 331
Pre- or corequisite: MET 350

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 prior to the semester in which the work experience is to take place. (offered fall, spring, summer)
Prerequisites: Permission of the departmental chair in accordance with departmental Cooperative Education policies; Student participation in a professional work experience; Approval for enrollment and allowable credits are determined by the department; Additional support may be provided by the Monarch Internship and Co-Op Office in at least one semester prior to enrollment

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 is required; additional support may be provided by the Monarch Internship and Co-Op Office in the semester prior to enrollment

MET 369 Practicum (1-3 Credit Hours)
Available for pass/fail grading only.
Prerequisites: Approval by department is required; Additional support may be provided by the Monarch Internship and Co-Op Office in the semester prior to enrollment

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 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: MATH 211

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 435 Advanced Fluid Mechanics and Turbomachinery (3 Credit Hours)
Foundations, principles, methods, and tools for solving a variety of industrial fluid problems, computing pipe friction losses in complex systems, understanding fluid-machinery operation, pump selection process, understanding turbine and dam mechanics, and designing gas/air flow in ducts.
Prerequisites: MET 330

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, psychometric 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 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: MATH 211

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: MET 471

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 provides an in-depth look at shipboard systems and introduces topics such as basic shipboard specifications, design requirements, systems, and operations. Concepts related to digital threads and digital twin in shipbuilding are covered.
Prerequisites: MET 330 and MET 350

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, logistics: planning for maintenance and repair, using and ordering spare parts, technical manuals, system specifications, and operations. Modern tools such as AI are included.
Prerequisites: MATH 211

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