Mechanical Engineering (MEEN)

MEEN 2460 Materials Science (3 credits)
Fundamental principles of materials science and engineering. Topics include atomic structure of matter, types of bonding, crystallography, role of imperfections, diffusion, phase diagrams, phase transformations, mechanical behaviors, fracture of materials, classification and property of materials. Laboratory experiments to develop understanding of processing-structure-property relationship in materials. 2 hrs. lec.; 2 hrs. lab.
Prerequisite: CHEM 1001, which may be taken concurrently. Enrolled in the Opus College of Engineering.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%202460)

MEEN 2930 Special Topics in Mechanical Engineering (1-5 credits)
Offered as an experimental course to evaluate and determine if a course should be incorporated into the regular curriculum of a program, or courses in the approval process pipeline, but not yet officially approved. Once the same course has been offered twice as a Special Topic, it cannot be offered again until it moves through the curriculum approval process and is approved with a regular curriculum course number.
Prerequisite: Enrolled in the Opus College of Engineering.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%202930)

MEEN 3210 Measurements and Controls (3 credits)
Fundamentals of measurement/instrumentation systems and control systems. Measurement topics include: sensors, signal conditioners, data acquisition, and transducers for measurement of strain, force, displacement, temperature, flow, pressure, and other engineering parameters. Control system topics include: mathematical modeling of dynamic systems, and analysis and design of systems using sensors, actuators, and controllers. Time-domain and frequency-domain methods for design of feedback control systems. Computer and laboratory exercises using MATLAB and LabVIEW. 2 hrs. lec., 2 hrs. lab.
Prerequisite: GEEN 2120 and ELEN 3001.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%203210)

MEEN 3220 Dynamics of Mechanical Systems (3 credits)
Analytical and computational analysis of the kinematics and kinetics of planar multi-body mechanical systems. Vibration analysis of single degree of freedom systems. Engineering applications including dynamic balancing, vibration absorption and vibration isolation.
Prerequisite: MATH 2451 or MATH 2455; and GEEN 2120.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%203220)

MEEN 3250 Design of Machine Elements 1 (4 credits)
Detailed design of structural elements, shafts, gears, bearings and other machine elements. Laboratory activities which cover the theoretical and experimental analysis of machine elements. 3 hrs. lec., 2 hrs. lab.
Prerequisite: GEEN 2110 and GEEN 2130.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%203250)

MEEN 3260 Numerical Methods of Mechanical Systems (3 credits)
Numerical algorithms (math analysis, optimization, function approximation) for analysis and preliminary design of engineering systems. Development and use of MATLAB functions. Finite difference and finite element analysis of thermal and elastic systems. 3 hrs. lec.
Prerequisite: MATH 2451 and GEEN 2130.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%203260)

MEEN 3310 Thermodynamics 1 (3 credits)
Elementary principles of equilibrium thermodynamics. Property relationships for pure substances, ideal gases and incompressible substances. Work and heat transfer, mass conservation and the first and second laws of thermodynamics applied to closed and open systems, operating at steady and unsteady conditions. Thermal efficiencies of thermodynamic cycles and isentropic efficiencies of single-stream devices.
Prerequisite: MATH 1451 or MATH 1455; PHYS 1030, PHYS 1003 or PHYS 1013; and PHYS 1020.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%203310)

MEEN 3320 Fluid Mechanics (3 credits)
Fundamental conservation laws of mass, momentum and energy as applied to fluid systems. Properties of fluids, hydrostatics, flow of real fluids in closed and open systems, dynamic similarity, dimensional analysis and viscid and inviscid fluid flow.
Prerequisite: MATH 2450 or MATH 1455; and GEEN 2120.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%203320)

MEEN 3330 Fundamentals of Heat Transfer (3 credits)
Overview of principal mechanisms of heat transfer: conduction, convection, and thermal radiation. Application of conduction and forced convection to heat exchangers. Discussion of theory and applications of conduction, forced and natural convection, boiling and condensation and thermal radiation.
Prerequisite: MATH 2451 or MATH 2455; MEEN 3310; and MEEN 3320 or BIEN 4400.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%203330)

MEEN 3340 Thermodynamics 2 (3 credits)
The culmination of thermodynamic, fluid and heat transfer concepts to the application of power and refrigeration cycles, psychrometrics systems, and combustion processes. Includes a laboratory section in which experiments are conducted to demonstrate, test and assess devices, processes and cycles. 2 hrs. lec.; 2 hrs. lab.
Prerequisite: MEEN 3310; MEEN 3330, which may be taken concurrently.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%203340)

MEEN 3426 Engineering Statistics (3 credits)
Introductory course in statistics, which is the field of study concerned with the collection, analysis and interpretation of uncertainty in data. Topics include summary statistics, basic probability, commonly used distributions, confidence intervals, and hypothesis testing. In addition, introductory concepts of engineering economy and cash flow diagrams will be covered in the first few weeks of the course to prepare students for the FE exam.
Prerequisite: MATH 1451 or MATH 1455.
Level of Study: Undergraduate
Marquette Core Curriculum: NSM Expanding Our Horizons
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%203426)

MEEN 3443 Manufacturing Engineering (3 credits)
The types of processes available to manufacture various products. The characteristics of these processes and how they interact with design requirements, tolerances, safety and the environment. Integration of basic concepts into complete processes. Determination of the process to manufacture various assigned products. 2 hrs. lec., 2 hrs. lab.
Prerequisite: MEEN 2460.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%203443)

MEEN 3460 Materials Selection in Mechanical Design (3 credits)
Design methodology and the criteria for the selection of materials from the four classes of materials (metals, plastics, ceramics and composites) are discussed. Criteria include processing requirements, mechanical properties, and environmental resistance. A rationale for selecting materials based on materials selection charts is presented. The process-structure-property relationship for ferrous and non-ferrous alloys, plastics, ceramics and composites is presented from the point of view of understanding selection criteria. Considerations of cost and availability are also taken into consideration. 3 hrs. lec.
Prerequisite: MEEN 2460.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%203460)

MEEN 4110 Mechanical Engineering Potpourri (3 credits)
Survey of practical engineering tools and processes utilizing in entry-level engineering positions. Comparison of engineering philosophical paradigms underlying the industrial state gate product design process from ideation, product, design, product manufacture and quality control to end of product life.
Prerequisite: Sr. stndg.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204110)

MEEN 4220 Intermediate Dynamics (3 credits)
Develop an understanding of the principles of 3D rigid body kinematics (motion) and kinetics (forces and accelerations). Use these principles to analyze the dynamic behavior of mechanical systems. Learn to use analytical mechanics tools including virtual work and Lagrange's method. Develop a systematic approach for solving engineering problems.
Prerequisite: MEEN 2120.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204220)

MEEN 4230 Intermediate Mechanics of Materials (3 credits)
Review of beam theory; asymmetric bending, shear center, thin-walled sections; torsion of non-circular sections, open and closed thin-walled sections; energy methods, Castigliano's second theorem, statically indeterminate structures, internal static indeterminacy; curved beams.
Prerequisite: GEEN 2130.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204230)

MEEN 4260 Introduction to Continuum Mechanics (3 credits)
Introduction to tensor notation, tensor analysis and coordinate system invariance; analysis of stress, strain and rate of strain for infinitesimal and finite deformation; application of Newtonian mechanics to deformable media; mechanical constitutive equations; field equations for solid and fluid mechanics.
Prerequisite: MATH 2451, Co-req: MATH 3100 or MEEN 3260, or equivalent.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204260)

MEEN 4265 Intermediate Finite Element Methods (3 credits)
Introduces the finite element solution method for linear, static problems. Includes calculation of element stiffness matrices, assembly of global stiffness matrices, exposure to various finite element solution methods, and numerical integration. Emphasizes structural mechanics, and also discusses heat transfer and fluid mechanics applications in finite element analysis. Computer assignments include development of finite element code (FORTRAN or C) and also use of commercial finite element software (ANSYS and/or MARC).
Prerequisite: MEEN 3260.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204265)

MEEN 4270 Physical Systems Modeling (3 credits)
Principles of modeling of physical systems, including devices and processes. Development of models of physical systems: mechanical, electrical, fluid, thermal and coupled systems. Time-dependent behavior of interconnected devices and processes. Computer-based modeling and simulation of physical systems. Identification using models and measured data. Introduction to control systems analysis and design.
Prerequisite: MATH 2451.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204270)

MEEN 4275 Mechatronics (3 credits)
Mechatronics, as an engineering discipline, is the synergistic combination of mechanical engineering, electronics, control engineering, and computer science, all integrated through the design process. This course covers mechatronic system design, modeling and analysis of dynamic systems, control sensors and actuators, analog and digital control electronics, interfacing sensors and actuators to a microcomputer/microcontroller, discrete and continuous controller design, and real-time programming for control.
Prerequisite: MEEN 3210 and MEEN 3220.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204275)

MEEN 4310 Combustion: Thermochemistry, Kinetics and Applications (3 credits)
Fundamentals of combustion, including thermodynamics, chemical equilibrium and chemical kinetics. The application of the principles are emphasized for the development of mathematical models in MATLAB that can be used to simulate combustion in fundamental reactors and internal combustion engines. Prior experience with computer programming is recommended.
Prerequisite: MEEN 3340 and MEEN 3260.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204310)

MEEN 4320 Internal Combustion Engines (3 credits)
Fundamental aspects of the design and operating characteristics of spark-ignition and diesel engines. Presents an overview of the thermodynamics, combustion, fluid flow and heat transfer that takes place within the engine cylinder. Discusses efficiency and emissions challenges that the engine must meet.
Prerequisite: MEEN 3330 and MEEN 3340.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204320)

MEEN 4325 Intermediate Fluid Mechanics (3 credits)
Intermediate Fluid Mechanics continues to develop fluid mechanic concepts, building on a working knowledge of the Reynolds Transport Theorem. Topics include: differential analysis, irrotational flow theory, boundary layer theory and compressible flow theory. Both laminar and turbulent flows are discussed. Some working knowledge of computer programming is necessary.
Prerequisite: MATH 2450 or MATH 2455, and MEEN 3320 or equiv.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204325)

MEEN 4350 Transport Phenomena (3 credits)
The subject of transport phenomena includes three closely related topics: fluid dynamics, mass transfer, and heat transfer. Fluid dynamics involves the transport of momentum, mass transfer is concerned with the transport of mass of various chemical species, and heat transfer deals with the transport of energy. In practice, rarely are these phenomena acting alone. Thus in this introductory course, these three topics are studied together so that a more cohesive understanding of these interrelated processes is developed.
Prerequisite: MEEN 3340.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204350)

MEEN 4360 Intermediate Thermodynamics (3 credits)
This intermediate course will cover fundamentals of thermodynamics, including classical and statistical approaches with application to equilibrium and non-equilibrium, non-reactive and reactive systems. Topics relevant to micro/nanoscale and biological systems may be covered.
Prerequisite: MEEN 3340.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204360)

MEEN 4370 Heat Exchangers Design and Analysis (3 credits)
Addresses the fundamental thermal-hydraulic equations and correlations used to design and analyze various types of heat exchangers. A systematic approach/method to the thermal-hydraulic design and analysis, or rating, of various types of heat exchanger systems through selected virtual and real problems.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204370)

MEEN 4380 Renewable Energy - Fundamentals and Applications (3 credits)
Emphasis on thermodynamics, heat transfer and fluid mechanics aspects of renewable energy systems and applications. Topics include solar, wind, hydropower, geothermal, biomass, and wave and tide. Both technical and economic analyses of renewable energy systems.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204380)

MEEN 4410 Experimental Design (3 credits)
Application of statistical concepts to design engineering experiments to improve quality, production techniques, and reliability. Use and advantages of various models; factorial, fractional factorial, orthogonal arrays and fractional designs.
Prerequisite: MATH 4720 or MEEN 3426 or cons. of instr.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204410)

MEEN 4420 Failure Analysis (3 credits)
Methodology of failure analysis. Studies of brittle fracture, ductile fracture, fatigue, stress corrosion and electro-chemical corrosion as applied to the failure of metals. Involves some laboratory work and analyses of a variety of metallurgical failures.
Prerequisite: MEEN 2460 and GEEN 2130.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204420)

MEEN 4430 Powder Metallurgy (3 credits)
The course introduces a modern technology with growing importance. It covers the basics of powder metallurgy with main emphasis on sintered steel. The primary topics covered are powder production, die compacting, sintering theory and practice, full density processing, properties under static and dynamic loading conditions.
Prerequisite: MEEN 2460.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204430)

MEEN 4440 Processing and Forming of Materials (3 credits)
Solidification and microstructural development in metal casting with an overview of selected melting processes. Overview of primary and secondary working principles involved in ferrous materials processing. Stress based and finite element analyses are applied to both sheet and bulk forming to develop a fundamental understanding of deformation processing principles and technology associated with processes such as drawing, open and closed die forging and rolling.
Prerequisite: MEEN 2460 and MEEN 3443, which can be taken concurrently.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204440)

MEEN 4450 Mechanical Behavior of Materials (3 credits)
Stress and strain relationships for elastic behavior. Theory of plasticity. Plastic deformation of single crystals and polycrystalline aggregates. Dislocation theory, fracture, internal friction, creep and stress rupture and brittle failure.
Prerequisite: MEEN 2460 and GEEN 2130; or cons. of instr.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204450)

MEEN 4470 Computer Integrated Production Systems (3 credits)
Overview of computer integrated production systems, which include computer numerical control, industrial robotics, material transport and storage systems, automated production lines, flexible manufacturing systems, quality control systems, CAD/CAM, production planning and control, just-in-time and lean manufacturing.
Prerequisite: MEEN 3443 or con. of instr.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204470)

MEEN 4485 Welding Engineering (3 credits)
Arc welding physics, fundamentals of power supplies and welding circuits, fusion and solid-state welding processes, weld testing, analysis of welded joints, demonstrations using various processes.
Prerequisite: GEEN 2130 and MEEN 3443.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204485)

MEEN 4570 Biomaterials Science and Engineering (3 credits)
Designed to introduce the uses of materials in the human body for the purposes of healing, correcting deformities and restoring lost function. The science aspect of the course encompasses topics including: characterization of material properties, biocompatibility and past and current uses of materials for novel devices that are both biocompatible and functional for the life of the implanted device. Projects allow students to focus and gain knowledge in an area of biomaterials engineering in which they are interested. Same as BIEN 4420.
Prerequisite: MEEN 2460 or consent of instructor.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204570)

MEEN 4590 Engineering Fundamentals Review (1 credits)
Review of basic science, mathematics, engineering science, and economics. S/U grade assessment.
Prerequisite: Sr. stndg.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204590)

MEEN 4920 Principles of Design (3 credits)
Course content focuses on a structured product design and development process that includes project definition, customer needs identification, product specification, concept generation and concept selection. Also focuses on issues related to teamwork, project management and effective communication. Student team design projects culminate in the development of a technically and economically viable concept and a proposal for future development of this concept (done in the second semester of this two-course sequence). 2 hrs. lec., 1 hr. disc.
Prerequisite: Sr. stndg; Co-op students, Jr. stndg. Cross-listed with BIEN 4920, COEN 4920, EECE 4920.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204920)

MEEN 4931 Topics in Mechanical Engineering (3 credits)
Covers a unique perspective or in-depth topic in: energy conversion, mechanical analysis and design and manufacturing systems.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204931)

MEEN 4995 Independent Study in Mechanical Engineering (1-3 credits)
Undergraduate independent study project of either theoretical or experimental nature.
Prerequisite: Jr. stndg., 3.000 GPA, cons. of instr., and cons. of dept. ch. Consent required.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204995)

MEEN 4998 Senior Design Project (3 credits)
Course focuses on detailed design, prototyping, and testing design concepts. Course includes topics directly relevant to student design projects and careers in the engineering profession. Student team design projects culminate in a final report that documents the performance and details (engineering drawings and/or documentation) of their final design. 2 hrs. lec., 1 hr. disc.
Prerequisite: MEEN 4920. Cross-listed with BIEN 4998, COEN 4998, and EECE 4998.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%204998)

MEEN 5220 Intermediate Dynamics (3 credits)
Develop an understanding of the principles of 3D rigid body kinematics (motion) and kinetics (forces and accelerations). Use these principles to analyze the dynamic behavior of mechanical systems. Learn to use analytical mechanics tools including virtual work and Lagrange's method. Develop a systematic approach for solving engineering problems.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%205220)

MEEN 5230 Intermediate Mechanics of Materials (3 credits)
Review of beam theory; asymmetric bending, shear center, thin-walled sections; torsion of non-circular sections, open and closed thin-walled sections; energy methods, Castigliano's second theorem, statically indeterminate structures, internal static indeterminacy; curved beams.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%205230)

MEEN 5260 Introduction to Continuum Mechanics (3 credits)
Introduction to tensor notation, tensor analysis and coordinate system invariance; analysis of stress, strain and rate of strain for infinitesimal and finite deformation; application of Newtonian mechanics to deformable media; mechanical constitutive equations; field equations for solid and fluid mechanics.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%205260)

MEEN 5265 Intermediate Finite Element Method (3 credits)
Introduces the finite element solution method for linear, static problems. Includes calculation of element stiffness matrices, assembly of global stiffness matrices, exposure to various finite element solution methods, and numerical integration. Emphasizes structural mechanics, and also discusses heat transfer and fluid mechanics applications in finite element analysis. Computer assignments include development of finite element code (FORTRAN or C) and also use of commercial finite element software (ANSYS and/or MARC).
Prerequisite: MEEN 3260 or equiv.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%205265)

MEEN 5270 Physical Systems Modeling (3 credits)
Principles of modeling of physical systems, including devices and processes. Development of models of physical systems: mechanical, electrical, fluid, thermal and coupled systems. Time-dependent behavior of interconnected devices and processes. Computer-based modeling and simulation of physical systems. Identification using models and measured data. Introduction to control systems analysis and design.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%205270)

MEEN 5275 Mechatronics (3 credits)
Mechatronics, as an engineering discipline, is the synergistic combination of mechanical engineering, electronics, control engineering, and computer science, all integrated through the design process. This course covers mechatronic system design, modeling and analysis of dynamic systems, control sensors and actuators, analog and digital control electronics, interfacing sensors and actuators to a microcomputer/microcontroller, discrete and continuous controller design, and real-time programming for control.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%205275)

MEEN 5310 Combustion: Thermochemistry, Kinetics and Applications (3 credits)
Fundamentals of combustion and chemical kinetics, with applications to engines and combustion devices. Study of fluid flow, thermodynamics, combustion, heat transfer and friction phenomena, and fuel properties relevant to engine power, efficiency and emissions. Examination of spark-ignition, diesel, stratified charge, HCCI, mixed-cycle and gas turbine engines.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%205310)

MEEN 5320 Internal Combustion Engines (3 credits)
Fundamental aspects of the design and operating characteristics of spark-ignition and diesel engines. Presents an overview of the thermodynamics, combustion, fluid flow and heat transfer that takes place within the engine cylinder. Discusses efficiency and emissions challenges that the engine must meet.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%205320)

MEEN 5325 Intermediate Fluid Mechanics (3 credits)
Intermediate Fluid Mechanics continues to develop fluid mechanic concepts, building on a working knowledge of the Reynolds Transport Theorem. Topics include: differential analysis, irrotational flow theory, boundary layer theory and compressible flow theory. Both laminar and turbulent flows are discussed. Some working knowledge of computer programming is necessary.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%205325)

MEEN 5350 Transport Phenomena (3 credits)
Includes three closely related topics: fluid dynamics, mass transfer, and heat transfer. Fluid dynamics involves the transport of momentum, mass transfer is concerned with the transport of mass of various chemical species, and heat transfer deals with the transport of energy. In practice, rarely are these phenomena acting alone. Develops a more cohesive understanding of these interrelated processes.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%205350)

MEEN 5360 Intermediate Thermodynamics (3 credits)
Covers fundamentals of thermodynamics, including classical and statistical approaches with application to equilibrium and non-equilibrium, non-reactive and reactive systems. May cover topics relevant to micro/nanoscale and biological systems.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%205360)

MEEN 5370 Heat Exchangers Design and Analysis (3 credits)
Addresses the fundamental thermal-hydraulic equations and correlations used to design and analyze various types of heat exchangers. A systematic approach/method to the thermal-hydraulic design and analysis, or rating, of various types of heat exchanger systems through selected virtual and real problems.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%205370)

MEEN 5380 Renewable Energy - Fundamentals and Applications (3 credits)
Emphasis on thermodynamics, heat transfer and fluid mechanics aspects of renewable energy systems and applications. Topics include solar, wind, hydropower, geothermal, biomass, and wave and tide. Both technical and economic analyses of renewable energy systems.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%205380)

MEEN 5410 Experimental Design (3 credits)
Application of statistical concepts to design engineering experiments to improve quality, production techniques, and reliability. Use and advantages of various models; factorial, fractional factorial, orthogonal arrays and fractional designs.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%205410)

MEEN 5420 Failure Analysis (3 credits)
Methodology of failure analysis. Studies of brittle fracture, ductile fracture, fatigue, stress corrosion and electro-chemical corrosion as applied to the failure of metals. Involves some laboratory work and analyses of a variety of metallurgical failures.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%205420)

MEEN 5430 Powder Metallurgy (3 credits)
Introduces a modern technology with growing importance. Covers the basics of powder metallurgy with main emphasis on sintered steel. The primary topics covered are powder production, die compacting, sintering theory and practice, full density processing, properties under static and dynamic loading conditions.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%205430)

MEEN 5440 Processing and Forming of Materials (3 credits)
Solidification and microstructural development in metal casting with an overview of selected melting processes. Overview of primary and secondary working principles involved in ferrous materials processing. Stress based and finite element analyses are applied to both sheet and bulk forming to develop a fundamental understanding of deformation processing principles and technology associated with processes such as drawing, open and closed die forging and rolling.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%205440)

MEEN 5450 Mechanical Behavior of Materials (3 credits)
Stress and strain relationships for elastic behavior. Theory of plasticity. Plastic deformation of single crystals and polycrystalline aggregates. Dislocation theory, fracture, internal friction, creep and stress rupture and brittle failure.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%205450)

MEEN 5470 Computer Integrated Production Systems (3 credits)
Overview of computer integrated production systems, which include computer numerical control, industrial robotics, material transport and storage systems, automated production lines, flexible manufacturing systems, quality control systems, CAD/CAM, production planning and control, just-in-time and lean manufacturing.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%205470)

MEEN 5485 Welding Engineering (3 credits)
Arc welding physics, fundamentals of power supplies and welding circuits, fusion and solid-state welding processes, weld testing, analysis of welded joints, demonstrations using various processes.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%205485)

MEEN 5570 Biomaterials Science and Engineering (3 credits)
Designed to introduce the uses of materials in the human body for the purposes of healing, correcting deformities and restoring lost function. The science aspect of the course encompasses topics including: characterization of material properties, biocompatibility and past and current uses of materials for novel devices that are both biocompatible and functional for the life of the implanted device. Projects allow students to focus and gain knowledge in an area of biomaterials engineering in which they are interested. Same as BIEN 4420.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%205570)

MEEN 5931 Topics in Mechanical Engineering (3 credits)
Topics may include energy conversion, mechanical analysis and design, and manufacturing systems.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%205931)

MEEN 6101 Advanced Engineering Analysis 1 (3 credits)
Various types of (first and high-order) homogeneous ordinary differential equations using proper methods and techniques: integral method, Green's function, Laplace transform technique, Frobenius series solution method. Boundary value problems (BVPs) with using orthogonality property and Fourier series. Introduction to partial differential equations- the method of separation of variable. Emphasizes applications to real engineering problems.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206101)

MEEN 6102 Advanced Engineering Analysis 2 (3 credits)
Vectors, matrices/tensors and linear algebra. Vector calculus with various integral theorems. Functions of complex variable and integration theorem in complex plane. Special topics in complex variable functions: integration in complex plane, complex series and residue theorem and conformal mappings. Emphasizes applications to real engineering problems.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206102)

MEEN 6103 Approximate Methods in Engineering Analysis (3 credits)
Treatment of approximate methods for solving various problems in engineering. Matrix methods, variational methods (e.g., Ritz, Galerkin, etc.), finite difference methods, finite element method.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206103)

MEEN 6220 Advanced Dynamics (3 credits)
Kinematics of particles and rigid bodies. Basic principles of vector mechanics. Variational principles. Basic principles of analytical mechanics.
Prerequisite: MEEN 4220/5220 or equiv.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206220)

MEEN 6225 Advanced Vibrations (3 credits)
Theory of vibration with applications. Natural modes of vibration for lumped parameter systems. Response of lumped systems with damping. Response of distributed parameter system including bars, beams, etc.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206225)

MEEN 6230 Advanced Mechanics of Materials (3 credits)
Thick wall cylinders, rotating disks, initial stresses; stress concentration factors, cracks, discontinuity stresses; autofrettage, residual stresses; beams on elastic foundation, introduction to plates and shells, pressure vessel analysis.
Prerequisite: MEEN 5230; or MEEN 5250.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206230)

MEEN 6240 Composite Materials (3 credits)
Introduction to fiber/matrix materials systems with emphasis on continuous fiber-reinforced composites. Principles of anisotropic elasticity, classical lamination theory, and viscoelasticity. Analysis of mechanical, thermal, hygroscopic and combination loading of laminated composites. Review of manufacture/fabrication methods for advanced composites, consolidation techniques, and basic issues in the design of advanced composites.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206240)

MEEN 6250 Industrial Robotics (3 credits)
Fundamentals of industrial robotic systems. Covers serial and parallel manipulators, forward and inverse kinematics, differential kinematics, multi-rigid-body dynamics, trajectory planning, linear control theory, actuators and sensors, mechanism design and vision systems.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206250)

MEEN 6260 Multiscale Material Modeling (3 credits)
Numerical and analytical techniques for modeling the micromechanics and micro-structural evolution of complex heterogeneous materials (including granular, composite, and atomic/molecular materials); techniques for transferring information between local (micro-scale) and global (macro-scale) representations of multi-scale materials.
Prerequisite: MEEN 3260 or equiv., and MEEN 4260 or MEEN 5260 or equiv.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206260)

MEEN 6310 Advanced Fluid Mechanics (3 credits)
Further development of fluid flow theory starting with classic potential flow solutions. Numerical and analytical techniques for both inviscid and viscid fluid flows, including boundary layer theory and stability. Transition routes and chaos with an introduction to turbulence.
Prerequisite: MEEN 5325 or MEEN 5350 or equiv.; computer programming experience recommended.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206310)

MEEN 6320 Turbulence (3 credits)
Advanced physical and mathematical description of fluid flow systems, including the fundamentals of turbulence motion. The development of the Reynolds stress equations, processes that govern dissipation and statistical description of scales. Includes the modeling techniques associated with turbulent velocity profiles as well as the development of zero, one and two equation closure models.
Prerequisite: MEEN 5350 or equiv.; computer programming experience recommended.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206320)

MEEN 6330 Statistical Thermodynamics (3 credits)
Fundamentals and Applications of Statistical Thermodynamics. Properties in the dilute limit and beyond. Quantum mechanics, spectroscopy, and spectroscopic measurement techniques. Kinetic theory and chemical kinetics.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206330)

MEEN 6340 Thermal Radiation Heat Transfer (3 credits)
Blackbody radiation characteristics. Non-black surface properties: emissivity, absorptivity and reflectivity and values for real materials. Blackbody radiation exchange and viewfactor algebra. Graybody exchange. Effects of non-diffuse, non-gray surface properties. Absorption-emission-scattering during transmission through media: transfer equation and approximate solutions. Emphasis on terrestrial solar and building thermal envelope through examples.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206340)

MEEN 6345 Multicomponent Mass Transfer (3 credits)
Fundamentals of Multicomponent Mass Transfer, including Maxwell-Stefan diffusion, Generalized Fick's Law, ideal and non-ideal mixtures, interphase mass transfer and film theory and multicomponent mass transfer in porous media.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206345)

MEEN 6350 Convective Heat and Mass Transfer (3 credits)
Principles and mechanisms of convective transports of energy and of chemical species associated with laminar and turbulent flows, including condensation and boiling. Calculation of heat and mass transport coefficients. Mathematical modeling, with applications to engineering devices involving several of these processes, with and without phenomenological coupling.
Prerequisite: MEEN 6310.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206350)

MEEN 6360 Computational Fluid Mechanics (3 credits)
Review of the fundamental thermofluids science, mathematical and computational principles underlying modern CFD software. Utilization of software for representative applications. Individual student project devoted to a new application.
Prerequisite: MEEN 6101 and MEEN 6320; or cons. of instr.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206360)

MEEN 6365 Computational Methods in Heat Transfer and Fluid Flow (3 credits)
Basics of scientific computing. Classification of differential equations. Finite difference and finite volume methods. Direct and iterative solvers. Verification and validation. Implicit and explicit methods. Stability and convergence. Solution of heat diffusion equation, advection-diffusion equation and fluid flow. Basics of CFD.
Prerequisite: Intermediate knowledge of heat transfer and fluid flow. Knowledge of computer programming.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206365)

MEEN 6366 Computational Methods for Solids and Structures (3 credits)
A theoretical development of the finite element method for analysis of solids and structures with geometric and materials nonlinearities. Topics include the formulation of both Updated and Total Lagrangian 3D finite elements, solutions to quasi-static and time-dependent solid mechanics problems, non-linear materials modeling, solution methods, and stability issues often encountered in complex finite element analysis. Reviews linear elastic finite element theory and non-linear continuum mechanics. Emphasizes programming of the finite element method.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206366)

MEEN 6370 Combustion Chemistry and Mechanisms (3 credits)
Advanced theoretical, experimental and numerical techniques for studying the chemistry and kinetic mechanisms of combustion. The technical content for includes theories of gas phase chemical kinetics, a discussion of experimental and theoretical techniques for evaluating kinetic rate coefficients, and strategies for the development and reduction of kinetic mechanisms intended for modeling combustion reactions. Topics relevant to statistical thermodynamics and the physical dynamics of technical flames may be covered.
Prerequisite: MEEN 4310 or MEEN 5310 or equiv.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206370)

MEEN 6375 Turbulent Combustion (3 credits)
Fundamentals of turbulence, turbulence modeling and RANS. Fundamentals of combustion and chemical kinetics. Turbulent premixed and non-premixed combustion. Closure models for turbulent combustion such a Flamelet models, EDC models and PDF models. Applications of turbulent combustion modeling.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206375)

MEEN 6470 Statistical Methods in Engineering (3 credits)
Development of statistical models in engineering and statistical analysis of data. Statistical concepts. Inference methods. Application of statistical models to component reliability and probability design. Probability plotting; Monte Carlo simulation.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206470)

MEEN 6473 Computer Integrated Manufacturing (3 credits)
Primary objectives include the validation of the underlying philosophy behind computer integrated manufacturing and the definition of characteristics of various components which constitute a C.I.M. environment. Describes the benefits of C.I.M. and how to upgrade conventional plants to a C.I.M. operation.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206473)

MEEN 6475 Advanced Ergonomics/Human Factors Engineering (3 credits)
Fundamentals of ergonomics/human factors engineering (HFE) with emphasis on the application of basic principles to advances in engineering applications, research, and development. Topics include: engineering anthropometry, cumulative trauma disorders, low back disorders, electromyography, biomechanical modeling, and ergonomic guidelines. Requires research papers in the above areas or in a related ergonomics/HFE field.
Prerequisite: Cons. of instr.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206475)

MEEN 6480 Metal Forming (3 credits)
Elements of von Mises plasticity theory-stress and deformation states, constitutive equations, and flow rules; plane and axisymmetric behavior. Solution techniques - exact, slipline theory, upper and lower bounds, finite bending, deep drawing.
Prerequisite: MEEN 5440 or equiv.; or cons. of instr.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206480)

MEEN 6931 Topics in Mechanical Engineering (3 credits)
Topics may include thermofluid science, mechanical analysis and design, and manufacturing systems.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206931)

MEEN 6960 Seminar in Mechanical Engineering (0 credits)
Scholarly presentations on current topics in mechanical engineering and related areas by visiting and resident investigators. Required of all full-time graduate students. S/U grade assessment.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206960)

MEEN 6995 Independent Study in Mechanical Engineering (1-3 credits)
Faculty-supervised, independent study/research of a specific area or topic in Mechanical Engineering.
Prerequisite: Cons. of instr. and cons. of dept. ch. Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206995)

MEEN 6999 Master's Thesis (1-6 credits)
S/U grade assessment.
Prerequisite: Cons. of dept. ch. Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%206999)

MEEN 8986 Cooperative Education in Mechanical Engineering (1-3 credits)
Offers an additional educational experience for graduate students in mechanical engineering, intended to increase student professional development and growth as an independent engineer and/or researcher. Provides the opportunity to work on-site with engineers from industry.
Prerequisite: Cons. of dept. ch. Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%208986)

MEEN 8995 Independent Study in Mechanical Engineering (1-3 credits)
Faculty-supervised, independent study/research of a specific area or topic in Mechanical Engineering.
Prerequisite: Cons. of instr. and cons. of dept. ch. Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%208995)

MEEN 8999 Doctoral Dissertation (1-12 credits)
S/U grade assessment.
Prerequisite: Cons. of dept. ch. Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%208999)

MEEN 9970 Graduate Standing Continuation: Less than Half-Time (0 credits)
Fee. S/U grade assessment. Designated as less than half-time status only, cannot be used in conjunction with other courses, and does not qualify students for financial aid or loan deferment.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%209970)

MEEN 9974 Graduate Fellowship: Full-Time (0 credits)
Fee. S/U grade assessment. Designated as full-time status. If a student is already registered in other courses full time, this continuation course is not needed.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%209974)

MEEN 9975 Graduate Assistant Teaching: Full-Time (0 credits)
Fee. S/U grade assessment. Designated as full-time status. If a student is already registered in other courses full time, this continuation course is not needed.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%209975)

MEEN 9976 Graduate Assistant Research: Full-Time (0 credits)
Fee. S/U grade assessment. Designated as full-time status. If a student is already registered in other courses full time, this continuation course is not needed.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%209976)

MEEN 9984 Master's Comprehensive Examination Preparation: Less than Half-Time (0 credits)
Fee. S/U grade assessment. Allows a student to be considered the equivalent of less than half-time status. Requires that the student is working less than 12 hours per week toward their master's comprehensive exam.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%209984)

MEEN 9985 Master's Comprehensive Examination Preparation: Half-Time (0 credits)
Fee. S/U grade assessment. Allows a student to be considered the equivalent of half-time status. Requires that the student is working more than 12 to less than 20 hours per week toward their master's comprehensive exam. May be taken in conjunction with credit-bearing or other non-credit courses to result in the status indicated, as deemed appropriate by the department.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%209985)

MEEN 9986 Master's Comprehensive Examination Preparation: Full-Time (0 credits)
Fee. S/U grade assessment. Allows a student to be considered the equivalent of full-time status. Requires that the student is working 20 hours or more per week toward their master's comprehensive exam. May be taken in conjunction with credit-bearing or other non-credit courses to result in the status indicated, as deemed appropriate by the department.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%209986)

MEEN 9987 Doctoral Qualifying Examination Preparation: Less than Half-Time (0 credits)
Fee. S/U grade assessment. Allows a student to be considered the equivalent of less than half-time status. Requires that the student is working less than 12 hours per week toward their doctoral qualifying exam.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%209987)

MEEN 9988 Doctoral Qualifying Examination Preparation: Half-Time (0 credits)
Fee. S/U grade assessment. Allows a student to be considered the equivalent of half-time status. Requires that the student is working more than 12 to less than 20 hours per week toward their doctoral qualifying exam. May be taken in conjunction with credit-bearing or other non-credit courses to result in the status indicated, as deemed appropriate by the department.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%209988)

MEEN 9989 Doctoral Qualifying Examination Preparation: Full-Time (0 credits)
Fee. S/U grade assessment. Allows a student to be considered the equivalent of full-time status. Requires that the student is working 20 hours or more per week toward their doctoral qualifying exam. May be taken in conjunction with credit-bearing or other non-credit courses to result in the status indicated, as deemed appropriate by the department.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%209989)

MEEN 9994 Master's Thesis Continuation: Less than Half-Time (0 credits)
Fee. S/U grade assessment. Allows a student to be considered the equivalent of less than half-time status. Requires that the student is working less than 12 hours per week on their master's thesis. All six thesis credits required for the degree should be completed before registering for non-credit Master's Thesis Continuation.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%209994)

MEEN 9995 Master's Thesis Continuation: Half-Time (0 credits)
Fee. S/U grade assessment. Allows a student to be considered the equivalent of half-time status. Requires that the student is working more than 12 to less than 20 hours per week on their master's thesis. All six thesis credits required for the degree should be completed before registering for non-credit Master's Thesis Continuation.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%209995)

MEEN 9996 Master's Thesis Continuation: Full-Time (0 credits)
Fee. S/U grade assessment. Allows a student to be considered the equivalent of full-time status. Requires that the student is working 20 hours or more per week on their master's thesis. All six thesis credits required for the degree should be completed before registering for non-credit Master's Thesis Continuation.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%209996)

MEEN 9997 Doctoral Dissertation Continuation: Less than Half-Time (0 credits)
Fee. S/U grade assessment. Allows a student to be considered the equivalent of less than half-time status. Requires that the student is working less than 12 hours per week on their doctoral dissertation. All 12 dissertation credits required for the degree should be completed before registering for non-credit Doctoral Dissertation Continuation.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%209997)

MEEN 9998 Doctoral Dissertation Continuation: Half-Time (0 credits)
Fee. S/U grade assessment. Allows a student to be considered the equivalent of half-time status. Requires that the student is working more than 12 to less than 20 hours per week on their doctoral dissertation. All 12 dissertation credits required for the degree should be completed before registering for non-credit Doctoral Dissertation Continuation.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%209998)

MEEN 9999 Doctoral Dissertation Continuation: Full-Time (0 credits)
Fee. S/U grade assessment. Allows a student to be considered the equivalent of full-time status. Requires that the student is working 20 hours or more per week on their doctoral dissertation. All 12 dissertation credits required for the degree should be completed before registering for non-credit Doctoral Dissertation Continuation.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=MEEN%209999)