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## Mechanical and Energy Engineering

### *Mechanical and Energy Engineering, MEEN*

**5100. Advanced Energy Conversion.** 3 hours. Axiomatic presentation of the law of thermodynamics including corollaries and applications related to energy conversion, the exergy method and entropy dissipation method for the evaluation of thermodynamic systems and cycles, thermodynamic equilibrium and stability, irreversible thermodynamics, chemical equilibria and applications in combustion.

**5110. Alternative Energy Sources.** 3 hours. Introduction to the physics, systems and methods of energy conversion from non-conventional energy sources, such as solar, geothermal, ocean-thermal, biomass, tidal, hydroelectric, wind and wave energy. Advantages and disadvantages of alternative energy sources and engineering challenges for the harnessing of such forms of energy; energy storage; fuel cells.

**5112. Nuclear Energy.** 3 hours. Atomic physics and the structure of the atom; radioactivity; interactions of neutrons with matter; nuclear cross-sections; nuclear fuels and fuel elements; elements of nuclear reactors; components and operation of nuclear power plants. Notable accidents of nuclear reactors. Breeder reactors.

**5120. Advanced Fluid Dynamics.** 3 hours. Fundamentals of vector and tensor notation and formulation of governing equations; model of inviscid and viscous flow, vorticity and circulation; exact solutions; turbulence; boundary layer theory; free surface flow; compressible flow. Prerequisite(s): MATH 2730, MEEN 3120.

**5140. Advanced Mathematical Methods for Engineers.** 3 hours. Provides an introduction to advanced mathematical methods used in engineering science, such as vector calculus, integral transforms, partial differential equations and numerical methods.

**5200. Principles of HVAC.** 3 hours. Thermodynamics and psychometrics applied to the HVAC system calculations, energy estimating methods, ducts and piping systems, heat pump and heat recovery systems, air-processing, refrigeration and heating equipment.

**5210. Solar Energy.** 3 hours. Fundamentals of radiation processes, blackbody and gray-body; and gray-body radiation; solar radiation flat-plate and parabolic collectors; concentration optics and practical solar concentration devices; central receivers, solar ponds, power cycles of solar plants; thermal storage subsystems and system design.

**5220. Computational Fluid Dynamics and Heat Transfer.** 3 hours. Finite difference, finite volume, and finite element computational methods; techniques for building geometry and meshing; commercial software; modeling and numerically solving real-world fluid flow and heat transfer problems. Prerequisite(s): MEEN 3120, MEEN 3210.

**5250. Dispersed Multiphase Flow and Heat Transfer.** 3 hours. Characteristics of particles, bubbles and drops; conservation equations, creeping flow solution, flow and heat transfer at higher Reynolds numbers; the treatment of non-spherical particles, bubbles, and drops; effects of rotation and shear; two-way effects of turbulence; effects of higher concentration, molecular and statistical description.

**5900-5910. Special Problems in Mechanical and Energy Engineering.** 1–6 hours. Special problems in mechanical and energy engineering for graduate students only. Prerequisite(s): Approval the student's supervisor and/or consent of department. May be repeated for credit.

**5950. Masters Thesis.** 3 or 6 hours. A minimum of 6 hours of thesis work is required. No credit is assigned until the thesis is filed and approved by the dean of the graduate school. Continuous enrollment is required once thesis work has begun. Prerequisite(s): approval of the student's supervisor and/or consent of department.

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## Mechanical Engineering Technology

see Engineering Technology

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## Merchandising and Hospitality Management

### *Merchandising and Hospitality Management, SMHM*

**5000. Merchandising and Hospitality Management Study Tour.** 1–3 hours. Experiential learning in industry centers for fashion, home furnishings, and/or hospitality provides a context for career development as well as an overview of the industry at work. Students collect and synthesize primary and secondary data into comprehensive analyses for career opportunities, trends, brands and other appropriate elements for the fashion, home furnishings, and hospitality industries. Prerequisite(s): consent of school. Pre-trip and post-trip classes are required. No more than three hours of field study may be used to fulfill degree requirements. (Meets with SMHM 4000.)

**5080. Merchandising Ventures.** 3 hours. Study of entrepreneurship skills and strategies resulting in application to a business plan that establishes a new venture with fashion and/or home furnishings products. Additionally, students independently identify and investigate innovative entrepreneurial ventures that culminate in a comprehensive research product. Prerequisite(s): SMHM 2090 or SMHM 2400 or SMHM 2490; SMHM 3510 or ACCT 2010; or consent of instructor. (Meets with SMHM 4080.)

**5090. Virtual Merchandising.** 3 hours. (2;2) Merchandising application through experiential learning that ultimately results in the development of a product- or service-based web site with an emphasis on target market appeal, appropriate merchandising applications, and a suitable web site infrastructure based on objective research including data collection from a relevant population sample. Students apply theory and critical thinking skills to a virtual merchandising format. Prerequisite(s): SMHM 2090 or SMHM 2400 or SMHM 2490 or consent of instructor. (Meets with SMHM 4090.)

**5200. Survey of Beverages in the Hospitality Industry.** 3 hours. Examination of wines, beers, and distilled spirits with a focus on vinicultural techniques, beer and distilled spirit production and classification, styles of wine and other beverages, and theory of wine and food pairing. Prerequisite(s): students must be 21 years of age or older.

**5240. Global Fashion Retailing.** 3 hours. A strategic perspective of fashion-oriented products in a dynamic marketplace. Included are case analyses of merchandising principles practiced by representative companies. Interpretations of global trends and issues affecting multi-channel distribution.