

INTERDISCIPLINARY ENGINEERING PROGRAMS

CEMS offers two undergraduate Interdisciplinary Engineering Programs: a Bachelor of Science in Engineering and a Bachelor of Science in Engineering Management. These programs are not ABET-accredited, nor are they designed to be. They are flexible, cross-disciplinary degrees that allow students to study engineering alongside the liberal arts, sciences and/or business administration. Additional Interdisciplinary Engineering offerings include an Undergraduate Certificate in Computer-Aided Engineering Technology, a Certificate in Semiconductor Engineering and Physics, and a Certificate in Autonomy and Robotics, as well as a Minor in Sustainable Energy Engineering.

The Interdisciplinary Engineering Programs are collaboratively overseen by the Department of Civil & Environmental Engineering, the Department of Electrical and Biomedical Engineering, the Department of Mechanical Engineering, and the Department of Physics. More information is available within the individual program sections of this catalogue.

REGULATIONS

Students pursuing any of the undergraduate Interdisciplinary Engineering Programs (BS Engineering or BS Engineering Management) are subject to the Academic Standards in CEMS outlined in this catalogue.

Students may apply no more than three credits graded D, D+ or D- in any engineering (BME, CEE, CMPE, EMGT, ENGR or ME) course toward the degree.

In order to earn the Bachelor of Science in Engineering or the Bachelor of Science in Engineering Management, students must achieve a minimum 2.00 GPA in all Engineering (BME, CEE, CMPE, EMGT, ENGR, EE, ME), Mathematics, Statistics, Physics, Chemistry and Computer Science coursework.

MAJORS

INTERDISCIPLINARY ENGINEERING PROGRAM MAJORS

Engineering B.S.E.

Engineering Management B.S.E.M.

MINORS AND CERTIFICATES

INTERDISCIPLINARY ENGINEERING PROGRAMS MINORS AND CERTIFICATES

Autonomy and Robotics - Undergraduate Certificate

Computer-Aided Engineering Technology - Undergraduate Certificate

Geospatial Technologies Minor

Semiconductor Engineering and Physics - Undergraduate Certificate

Sustainable Energy Engineering Minor

Engineering Management Courses

EMGT 1990. Special Topics. 1-18 Credits.

See Schedule of Course for specific titles.

EMGT 1991. Internship. 1-3 Credits.

On-site supervised work experience combined with a structured academic learning plan directed by a faculty member or a faculty-staff team in which a faculty member is the instructor of record, for which academic credit is awarded. Offered at department discretion.

EMGT 1993. Independent Study. 1-18 Credits.

A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

EMGT 2041. Engineering Economics. 3 Credits.

Fundamental concepts and applied techniques in the economic aspects of engineering alternatives. Economic dimensions for sustainable practice, including basic financial decision making, methods to evaluate business and engineering assets, analysis of project cash flows, life cycle analysis, and replacement decisions. Prerequisites: MATH 1248; minimum Junior standing. Catamount Core: SU.

EMGT 2990. Special Topics. 1-18 Credits.

Specialized or experimental course offered as resources permit.

EMGT 2991. Internship. 1-18 Credits.

On-site supervised work experience combined with a structured academic learning plan directed by a faculty member or a faculty-staff team in which a faculty member is the instructor of record, for which academic credit is awarded. Offered at department discretion.

EMGT 2993. Independent Study. 1-18 Credits.

A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion. Prerequisite: Senior standing in Engineering Management.

EMGT 2994. Teaching Assistantship. 1-3 Credits.

Undergraduate student service as a teaching assistant, usually in an introductory-level course in the discipline, for which credit is awarded. Offered at department discretion.

EMGT 2995. Undergraduate Research. 1-18 Credits.

Undergraduate student work on individual or small team research projects under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

EMGT 3051. Engineering Project Management. 3 Credits.

Principles of project management on designing, building/manufacturing engineering facilities, processes, products and structures; metrics for managing quality, schedule, and financial performance of projects; services and product procurement; project financial management; legal and insurance aspects. Prerequisites: Minimum Junior standing.

EMGT 3071. Optimizn for Industr Decisions. 3 Credits.

Students build optimization models for a wide range of business and engineering decisions. Provides a sound conceptual understanding of mathematical optimization and techniques used for solving real-world problems, especially in engineering design, manufacturing operations and supply chain management. Prerequisites: MATH 2248; MATH 2522 or MATH 2544.

EMGT 3091. Industrial Sys Modeling & Sim. 3 Credits.

Covers the fundamental concepts and techniques of modeling systems in manufacturing and business processes, including assembly lines, inventory systems, and organizational process flows. Covers fundamentals of queueing theory, system analysis, model construction, and interpretation and analysis of model reports. Prerequisites: MATH 1248 or MATH 1242; STAT 1410, STAT 2430 OR STAT 2510.

EMGT 3990. Special Topics. 1-18 Credits.

See Schedule of Course for specific titles.

EMGT 3991. Internship. 1-18 Credits.

On-site supervised work experience combined with a structured academic learning plan directed by a faculty member or a faculty-staff team in which a faculty member is the instructor of record, for which academic credit is awarded. Offered at department discretion.

EMGT 3993. Independent Study. 1-18 Credits.

A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

EMGT 3994. Teaching Assistantship. 1-3 Credits.

Undergraduate student service as a teaching assistant, usually in an introductory-level course in the discipline, for which credit is awarded. Offered at department discretion.

EMGT 3995. Undergraduate Research. 1-18 Credits.

Undergraduate student work on individual or small team research projects under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

Engineering Courses**ENGR 1010. First-Year Design Experience. 0-3 Credits.**

Introduction to the engineering profession and the engineering design process. Hands-on experiences that emphasize interdisciplinary teamwork, seeking and defining problems, and developing, fabricating and/or testing solutions. Data analysis and technical communications.

ENGR 1020. Graphical Communication. 0 or 2 Credits.

Project-based course. Principles of computer-aided drafting/design; production of engineering drawings including: orthographic, auxiliary, section, pictorials and dimensioning, graphics and charts; applications in specific engineering disciplines.

ENGR 1100. Dvrsty Issues:Math/Sci/Egr. 3 Credits.

Diversity in CEMS: under-representation, environmental justice, gender/race participation, ethical considerations, urban planning, equal opportunity, Title IX. Landscape of race/gender in STEM. Catamount Core: D1.

ENGR 1990. Special Topics. 1-18 Credits.

See Schedule of Courses for specific titles.

ENGR 1991. Internship. 1-3 Credits.

On-site supervised work experience combined with a structured academic learning plan directed by a faculty member or a faculty-staff team in which a faculty member is the instructor of record, for which academic credit is awarded. Offered at department discretion.

ENGR 1993. Independent Study. 1-18 Credits.

A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

ENGR 2120. Building Information Modeling. 1-3 Credits.

Building Information Modeling (BIM) is a digital representation integrating the design tools used by building disciplines under a single parametric computer model. Buildings, facilities and infrastructure are modeled with special attention to mechanical, plumbing, electrical and structural systems. Prerequisite: ENGR 1020 or Instructor permission.

ENGR 2140. Advanced 3D Drafting. 3 Credits.

Creation of geometric solid representations of physical objects using three dimensional CAD. Introduces parametric design; analysis tools; assembly simulation; dimension methods & standards; tolerances & geometric tolerancing. Further addresses the design for manufacturing of machined parts; sheet metal; mold design. Prerequisite: ENGR 1020 or Instructor permission.

ENGR 2150. Infrastructure & Terrain Model. 1 Credit.

Three dimensional modeling of civil infrastructure using appropriate software to automate a wide range of land surveying and civil engineering tasks such as the land surveying input, parcels, surfaces, alignments, corridors, grading, pipe networks, and earthwork. Prerequisite: ENGR 1020.

ENGR 2160. Virtual Instrument Engineering. 1-3 Credits.

Introduces logical and electrical circuit modeling using computer-based virtualization tools in a graphical format. Includes circuit simulation; scripting, interfacing; signal processing; control of instruments and data acquisition. Prerequisite: CS 1210, or Instructor permission. Cross-listed with: EE 2820.

ENGR 2990. Special Topics. 1-18 Credits.

See Schedule of Courses for specific titles.

ENGR 2991. Internship. 1-18 Credits.

On-site supervised work experience combined with a structured academic learning plan directed by a faculty member or a faculty-staff team in which a faculty member is the instructor of record, for which academic credit is awarded. Offered at department discretion.

ENGR 2993. Independent Study. 1-18 Credits.

A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

ENGR 2994. Teaching Assistantship. 1-3 Credits.

Undergraduate student service as a teaching assistant, usually in an introductory-level course in the discipline, for which credit is awarded. Offered at department discretion.

ENGR 2995. Undergraduate Research. 1-18 Credits.

Undergraduate student work on individual or small team research projects under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

ENGR 3990. Special Topics. 1-18 Credits.

See Schedule of Courses for specific titles.

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ENGR 3994. Teaching Assistantship. 1-3 Credits.

Undergraduate student service as a teaching assistant, usually in an introductory-level course in the discipline, for which credit is awarded. Offered at department discretion.

ENGR 3995. Undergraduate Research. 1-18 Credits.

Undergraduate student work on individual or small team research projects under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

ENGR 4990. Special Topics. 1-18 Credits.

See Schedule of Courses for specific titles.