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 and a Master of Science in Engineering Management. The MS is available as either a standalone degree or as part of the Accelerated Masters Program (AMP).

The Interdisciplinary Engineering Programs are collaboratively overseen by the Department of Civil & Environmental Engineering, the Department of Electrical & Biomedical Engineering and the Department of Mechanical Engineering. 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.

ADDITIONAL REGULATIONS

Students may apply no more than three credits graded D, D+ or D- in any engineering (BME, CE, EE, 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, CE, EMGT, ENGR, EE, ME), Mathematics, Statistics, Physics, Chemistry and Computer Science coursework.

MAJORS

INTERDISCIPLINARY ENGINEERING PROGRAM MAJORS

- Engineering B.S.E. (http://catalogue.uvm.edu/undergraduate/engineeringandmathematicalsciences/engineering/engineeringbs/)
- Engineering Management B.S.E.M. (http://catalogue.uvm.edu/undergraduate/engineeringandmathematicalsciences/engineering/engineeringmanagementbs/)

MINORS AND CERTIFICATES

INTERDISCIPLINARY ENGINEERING PROGRAMS MINORS AND CERTIFICATES

- Computer-Aided Engineering Technology (http://catalogue.uvm.edu/undergraduate/engineeringandmathematicalsciences/interdisciplinaryengineeringprograms/computeraidedengineeringtechnologycertificate/) - Undergraduate Certificate
- Geospatial Technologies Minor (http://catalogue.uvm.edu/undergraduate/engineeringandmathematicalsciences/interdisciplinaryengineeringprograms/geospatialtechnologiesminor/)

GRADUATE

Engineering Management AMP
Engineering Management M.S.

See the online Graduate Catalogue (http://catalogue.uvm.edu/graduate/) for more information.

Engineering Management Courses

EMGT 090. 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 092. 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 095. Special Topics. 1-18 Credits.
See Schedule of Course for specific titles.

EMGT 170. 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 22; Junior standing.

EMGT 185. 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 190. 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 195. Special Topics. 1-18 Credits.
Specialized or experimental course offered as resources permit.

EMGT 197. 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 198. 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 201. 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 Senior standing in Engineering.

EMGT 285. 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 290. 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 295. Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

EMGT 297. 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 298. 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 001. 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 002. 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 010. D1:Dvrsity 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.

ENGR 050. First Year Engineering Seminar. 0 or 1 Credits.
This first year experience seminar course exposes students to curricular options and career paths in engineering. Also introduces basic principles of engineering design through project-based laboratories. Students interact with faculty, professionals and peers in their fields.

ENGR 090. 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 092. 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 095. Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

ENGR 101. Engineering Communications. 3 Credits.
Traditional technical and scientific writing forms, including outlines, summaries, abstracts, technical descriptions, research reports/papers and proposals; written and oral technical communication with technical and nontechnical audience; electronic professional portfolio. Prerequisites: ENGS 001; Engineering major.

ENGR 112. 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 002 or Instructor permission.

ENGR 114. 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 002 or Instructor permission.
ENGR 116. 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: ENGR 002 or Instructor permission. Cross-listed with: EE 116.

ENGR 190. 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 192. 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 195. Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

ENGR 197. 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 198. 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 201. Ethics in CEMS Rsrch/Practice. 1 Credit.
Professional responsibilities of computer scientists, engineers, mathematicians, and statisticians in research and practice. Professional rights and responsibilities, research integrity, fair credit in research and publication. Prerequisite: Minimum Senior standing.

ENGR 290. 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 292. 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 295. Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

ENGR 296. Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

ENGR 297. 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 298. 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.