

CIVIL ENGINEERING, MENG

Introduction

Graduate Education Policies and Procedures apply to this program.

There are many reasons to consider a Master's of Engineering degree in Civil Engineering:

- Gain advanced training in your chosen civil engineering specialty.
- Become an expert in your chosen thesis (or report) research.
- Position yourself in a competitive employment market.
- Earn more than those with only a bachelor's degree.

The Master of Engineering (MEng) in Civil Engineering at CU Denver is intended for students who have a non-engineering undergraduate degree. The program is structured to give basic knowledge in engineering in an interdisciplinary manner, allowing students to enhance their engineering education with courses from complimentary areas of study.

Our graduate programs offer ample opportunities for hands-on research. The civil engineering graduate program is designed for both full-time and part-time students who want to advance their academic and professional skills in civil engineering and related areas. Many students are full-time, while many also work full-time jobs and complete evening classes. Depending on a student's pace, the MEng program typically takes 2-4 years to complete. Most graduate courses are offered in the afternoons or evenings.

Specialty Areas

- Construction Engineering and Management
- Geomatics and Geographic Information Systems (GIS)
- Hydrologic, Environmental, and Sustainability Engineering
- Transportation Engineering

Program Prerequisites

Prerequisite classes are in addition to the 30 semester hours needed to complete a master's degree, as they are necessary background information that is usually included in an engineering bachelor's program. Students must receive a grade of C minus (C-) or better for the prerequisite class to apply to the program.

Students may complete prerequisite classes either before or after being admitted to a degree program. However, applicants with 5 or more incomplete prerequisites will not be admitted. Students may complete no more than nine credit hours of graduate work before completing these prerequisites. Note, all courses taken while enrolled in graduate studies at CU Denver count toward your grade point average (GPA).

If prerequisites are taken while admitted to the master's program, students must maintain a 3.0 overall GPA, per Graduate Education policies and procedures.

Transfer Credit

Master's students may transfer up to 9 semester hours from another institution toward their master's degree, if approved by their advisor

Program Requirements

1. Students must complete a minimum of 30 credit hours at the graduate level
2. Students must complete 3 credit hours of master's report including a written comprehensive exam and an oral defense to a committee of at least two graduate faculty. The student's topic must be approved by the faculty advisor.
3. 15 credit hours of course work must be completed with civil or construction engineering classes; this includes the master's report hours.
4. 15 credit hours may be completed outside of the civil engineering department in related disciplines that supplement the student's area of study. This requirement gives the Master of Engineering degree the ability to be interdisciplinary and tailored to the student's exact area of interest.
5. Students must earn a minimum grade of B (3.0) in all major courses taken at CU Denver and must achieve a minimum cumulative major GPA of 3.0. All graded attempts in required and elective courses are calculated in the major GPA. Students cannot complete any course requirements as pass/fail, or satisfactory/unsatisfactory.
6. Every graduate student must also satisfy the degree requirements of Graduate Education on the Denver campus, specified in the Information for Graduate Students section of this catalog.
7. The MEng must be completed within seven years of the date the student begins the degree program.

Construction Engineering and Management

The Master's program in construction engineering and management provides the necessary decision-making skills to support complex construction projects and subsequent management throughout their useful life. Construction engineering and management concerns the design, planning and management of the construction, maintenance and disposal of structures, infrastructure, transportation systems, site work, and commercial, industrial, residential and environmental projects (for example: highways, bridges, airports, buildings, dams, reservoirs, light and high-speed rail systems, hospitals, laboratories, residential communities, utilities and environmental restoration projects).

Code	Title	Hours
<i>Required core courses:</i>		9
CEMT 5231	Construction Materials and Methods	
CEMT 5232	Construction Planning and Control	
CEMT 5233	Construction Cost Estimating	
<i>Construction Electives</i>		12
CEMT 5234	Sustainable Construction	
CEMT 5235	Advanced Construction Engineering	
CEMT 5236	Project Management Systems	
CEMT 5237	Advanced Project Management	
CEMT 5238	Integrated Construction Leadership	
CEMT 5239	Introduction to Temporary Structures and Construction Engineering	
CEMT 5240	Building Information Modeling (BIM)	
CEMT 5242	Construction Safety	
CEMT 5246	Construction, Business and Innovation	
<i>General Electives</i>		9

Course selection should be based on planned career path, masters report focus, eligibility and availability of the courses. The following courses are some of the possibilities, but you should discuss course choices with your advisor.

Any 5000+ CVEN or CEMT course	
ARCH 5450	Sustainable Design Practices
ARCH 6313	LEED Certification, Greenbuilding Seminar
BANA 6720	Simulation Modeling
BIOL 5460	Environmental Toxicology
BUSN 6520	Leading Individuals and Teams
ENGR 5301	Systems Engineering: Principles and Practice
ENTP 6020	Business Model Development & Planning
ENVS 5010	Landscape Biogeochemistry
GEOG 5220	Environmental Impact Assessment
INTB 6020	Cross-Cultural Management
LDAR 5532	Landform Manipulation
MGMT 6808	Leadership Development
PUAD 5644	Environmental and Hazards Law
URPL 5050	Urban Development
URPL 6500	Environmental Planning/Management
Other topics as approved by faculty advisor	
Total Hours	30

General Civil Engineering

The General Civil Engineering focus is structured to allow students to customize their engineering graduate education with courses from complimentary areas of study.

Students will work with their advisor to develop appropriate graduate course choices across multiple disciplines within civil engineering. Example of disciplines include transportation, sustainability, geomatics, and construction. This does not lead directly to engineering licensure and is not appropriate for a structural engineering focus.

A reflection essay must be written by the student before being approved for graduation

Code	Title	Hours
Courses approved by faculty advisor		30
Total Hours		30

Geomatics and Geographic Information Systems (GIS)

The Geomatics Engineering and Geographic Information Systems (GIS) graduate program at the University of Colorado Denver provides broad-based expertise and cutting-edge skills that span the growing geospatial field and helps alleviate the shortage of well-educated geospatial professionals. The program is intended for engineers and other geospatial, environmental and urban infrastructure professionals seeking skills in using and managing rapidly developing geospatial data technologies.

All GIS graduate courses are entirely online, as they have been for more than 20 years. However, master's degree students have the option of taking some courses on the CU Denver campus from other programs such as geography or computer science.

Our Geomatics and GIS curriculum covers a wide range of geospatial principles. Students learn from industry professionals in areas of surveying, geodesy, mapping science and cartography, photogrammetry, remote sensing, high-definition surveying, and relational GIS databases.

Our program prepares graduates for careers in industry and/or science. Students who complete the program have a comprehensive understanding in these disciplines, empowering them to advance their careers in geospatial engineering and analysis or to continue their research.

Code	Title	Hours
<i>Research credits (requires advisor approval):</i>		<i>3</i>
CVEN 5960	Master's Report	
<i>Required course:</i>		<i>3</i>
CVEN 5381	Introduction to Geographic Information Systems	
<i>Civil Engineering GIS electives:</i>		<i>24</i>
CVEN 5382	Geospatial Data Development	
CVEN 5384	GIS Project Management	
CVEN 5385	GIS Relational Database Systems	
CVEN 5387	Advanced Remote Sensing	
CVEN 5390	Interactive Web Mapping GIS	
CVEN 5391	Introduction to Geomatics	
CVEN 5392	Unmanned Aerial Systems	
CVEN 5395	GPS/GNSS	
CVEN 5396	HDS/LiDAR Tools & Data Analyses	
Other topics as approved by faculty advisor		
Total Hours		30

Hydrologic, Environmental, and Sustainability Engineering

The graduate track in hydrologic, environmental, and sustainability engineering (HESE) in the Department of Civil Engineering at the University of Colorado Denver brings together the hydrologic cycle, environmental processes, and sustainability—the powerful notion that everything we engineer should support economic prosperity, environmental health, and social justice.

Graduate coursework in the HESE track requires breadth and depth. Students are required to take at least one graduate course in each of the three areas plus at least two additional courses in one of those three areas. The program also includes graduate-level electives, allowing students to customize their program to match their professional needs and intellectual curiosity.

Code	Title	Hours
<i>Research credits (requires advisor approval).</i>		<i>3</i>
CVEN 5960	Master's Report	
Breadth courses		9
Depth courses		9
Elective courses		9
<i>Hydrology and Hydraulics</i>		
CVEN 5333	Surface Water Hydrology	
CVEN 5334	Groundwater Hydrology	
CVEN 5335	Vadose Zone Hydrology	
CVEN 5426	Pipe Network and Sewer Design	

CVEN 5427	Storm Water System Design
<i>Environmental Engineering</i>	
CVEN 5401	Introduction to Environmental Engineering
CVEN 5402	Contaminant Fate and Transport
CVEN 5404	Water and Wastewater Treatment
<i>Sustainability Science</i>	
CVEN 5405	Environmental Life Cycle Assessment
CVEN 5407	Complex Systems Methods
CVEN 5460	Introduction to Sustainable Urban Infrastructure
CVEN 5464	Sustainability and Climate Change
<i>Other topics as approved by faculty advisor</i>	
Total Hours	30

Transportation Engineering

The Master of Engineering program in transportation places an emphasis for courses and research on transportation engineering, planning, operations and management. Our studies address local, state, national and international issues with funding from federal, state, local and private sources. We develop and investigate new methods and technologies to analyze the performance and safety of alternative transportation operations and designs.

Code	Title	Hours
<i>Research credits (requires advisor approval).</i>		3
CVEN 5960	Master's Report	
<i>Transportation Engineering Electives. Choose 9 courses</i>		27
CVEN 5602	Advanced Highway Design	
CVEN 5611	Transportation Engineering Statistics	
CVEN 5612	Traffic Impact Assessment	
CVEN 5621	Highway Capacity Analysis	
CVEN 5622	Traffic Operations and Control	
CVEN 5631	Transport Modeling and Big Data	
CVEN 5633	Sustainable Transportation Systems	
CVEN 5650	Urban Street Design	
CVEN 5662	Transportation System Safety	
<i>Other topics as approved by faculty advisor</i>		
Total Hours		30