Construction Engineering

Administered by the Department of Civil, Construction and Environmental Engineering

Undergraduate Study

For curriculum in construction engineering leading to the degree bachelor of science. This curriculum is accredited under the General Criteria and Construction Engineering Program Criteria by the Engineering Accreditation Commission of ABET, http://www.abet.org.

Construction engineering is a curriculum administered by the Department of Civil, Construction, and Environmental Engineering. For details of the curriculum in construction engineering leading to the degree bachelor of science. By three to five years after graduation, graduates of the construction engineering program will have:

1. Established themselves in successful careers in construction engineering, or a related field.
2. Collaborated effectively on multi-disciplinary teams to address the needs of society and the environment.
3. Pursued lifelong learning, professional development, and registration as appropriate for their employers.

Students who successfully complete the curriculum will be prepared for entry into the field or for further study at the graduate level in construction engineering or related fields of study, such as law, business and other engineering disciplines.

Construction engineers need to possess strong fundamental knowledge of engineering design and management principles, including knowledge of business procedures, economics, and human behavior. Graduates of this curriculum may expect to engage in design of temporary structures, coordination of project design, systems design, cost estimating, planning and scheduling, company and project management, materials procurement, equipment selection, and cost control. With the emergence of integrated project delivery methods such as design-build construction, the role of the construction engineer is expanding the need for trained professionals that understand both aspects of the project delivery environment. The curriculum offers opportunities to study emphases concerned with building, heavy, mechanical or electrical construction. The process of construction involves the organization, administration, and coordination of labor and resources, temporary and permanent materials, equipment, supplies and utilities, money, technology and methods. These must be integrated in the most efficient manner possible to complete construction projects on schedule, within the budget, and according to the standards of quality and performance specified by the project owner or designer. The curriculum blends engineering management and business sciences into a study of the processes of construction whereby designer’s plans and specifications are converted into physical structures and facilities.

The curriculum develops the ability of students to be team workers, creative thinkers, and effective communicators. This is achieved by providing students with opportunities to:

- interact with practicing professionals.
- gain work experience during summer jobs, internship, and cooperative education assignments that emphasize the knowledge required of construction engineers.
- develop leadership skills by participating in student organizations.
- develop, analyze, and interpret alternative solutions to open-ended problems.
- study abroad.

The construction industry is becoming increasingly global. Courses in humanities, social sciences, U.S. diversity, and international perspectives are included in the curriculum to broaden the student’s perspective of the work environment. In addition, the department has several exchange program opportunities for students to participate in study-abroad programs. Interested and qualified students have the opportunity to participate in the cooperative education program or internship program to supplement academic work with work experience.

Construction engineering students are encouraged to participate in life-long learning, continuous professional development, and to achieve professional engineer registration and/or registration as a certified professional constructor. Qualified construction engineering students within 30 credits of completing their degree may apply for concurrent enrollment in the Graduate College. See Civil Engineering Graduate Study for more information.

Graduate Study

An area of specialization in construction engineering and management is offered within the graduate program of the Department of Civil, Construction and Environmental Engineering. See Civil Engineering, Courses and Programs.

A graduate certificate is also available which requires 12 credits:

- C E 501 Preconstruction Project Engineering and Management 3
- C E 502 Construction Project Engineering and Management 3
- C E 503 Construction Finance and Business Management 3
- One of the following: 3
  - C E 505 Design of Construction Systems
  - C E 506 Case Histories in Construction Documents
  - C E 510 Information Technologies for Construction
  - C E 594A Special Topics Construction Engineering and Mgt.: Planning and Scheduling
  - C E 594C Special Topics Construction Engineering and Mgt.: Cost Estimating
  - C E 594E Special Topics Construction Engineering and Mgt.: Project Controls
  - C E 594F Special Topics Construction Engineering and Mgt.: Computer Applications for Project Controls
  - C E 594L Special Topics Construction Engineering and Mgt.: Advanced Building Construction Topics
  - C E 594M Special Topics Construction Engineering and Mgt.: Design Build Construction

Total Credits 12

Courses are offered for minor work to students taking major work in other curricula or in interdepartmental programs.

Curriculum in Construction Engineering

Administered by the Department of Civil, Construction, and Environmental Engineering.

Leading to the degree bachelor of science.

Total credits required: Building Option - 125.0, Heavy Option - 125.0, Electrical - 124.0, Mechanical - 125.0 cr.

The Construction Engineering Department requires a grade of a C or better for any transfer credit course that is applied to the degree program. Note: Department does not allow Pass/Not Pass credits to be used to meet graduation requirements for either required or elective courses.

See also Basic Program and Special Programs.

International Perspectives: 3 cr. 1

U.S. Diversity: 3 cr. 1

Communication Proficiency/Library requirements:

- ENGL 150 Critical Thinking and Communication (C or better in this course) 3
- ENGL 250 Written, Oral, Visual, and Electronic Composition (C or better in this course) 3
- LIB 160 Information Literacy 1
- Business Communication Elective: one course of the following with a minimum grade of C.
  - ENGL 302 Business Communication
  - ENGL 309 Report and Proposal Writing
  - ENGL 314 Technical Communication

Social Sciences and Humanities: 12 cr.

One of the following 3
- PSYCH 101 Introduction to Psychology
- PSYCH 230 Developmental Psychology
- PSYCH 250 Psychology of the Workplace
- PSYCH 280 Social Psychology
- SOC 134 Introduction to Sociology
- ECON 101 Principles of Microeconomics
- or ECON 102 Principles of Macroeconomics

International Perspectives 2

3
Basic Program: 27 cr. 3  
Minimum GPA of 2.00 required for this set of courses to graduate, including any transfer courses. See Requirement for Entry into Professional Program in College of Engineering Overview section.  
CHEM 167 General Chemistry for Engineering Students 4  
or CHEM 177 General Chemistry I 3  
ENGL 150 Critical Thinking and Communication 3  
ENGL 250 Written, Oral, Visual, and Electronic Composition 3  
ENGR 101 Engineering Orientation R  
C E 160 Engineering Problems with Computational Laboratory 3  
Lib 160 Information Literacy 1  
MATH 165 Calculus I 4  
MATH 166 Calculus II 4  
PHYS 222 Introduction to Classical Physics II 5  
Total Credits 27  
Math and Physical Science: 11 cr. (B, H); 12 cr. (E, M).  
STAT 105 Introduction to Statistics for Engineers 3  
MATH 266 Elementary Differential Equations (B, H) 3  
MATH 267 Elementary Differential Equations and Laplace Transforms (E, M) 4  
PHYS 222 Introduction to Classical Physics II 5  
Construction Engineering Core: 27 cr. (B, H); 28 cr. (E, M). Minimum 2.00 GPA for this set of courses to graduate including any transfer courses.  
E M 274 Statics of Engineering 3  
E M 324 Mechanics of Materials 3  
CON E 422 Construction Cost Estimating and Cost Engineering 3  
CON E 441 Construction Planning, Scheduling, and Control 3  
E M 378 Mechanics of Fluids 3  
C E 332 Structural Analysis I 3  
See options for remaining option core courses 9-10  
Total Credits 27-28  
Additional Required Courses: 32 cr. (B, E, H), 33 cr. (M)  
CON E 121 Cornerstone Learning Community: Orientation to Academic Life 1  
CON E 122 Cornerstone Learning Community: Orientation to Professional Life 1  
C E 170 Graphics for Civil Engineering 2  
C E 111 Fundamentals of Surveying I 3  
CON E 222 Contractor Organization and Management of Construction 3  
I E 305 Engineering Economic Analysis 3  
CON E 241 Construction Materials and Methods 3  
CON E 251 Mechanical/Electrical Materials and Methods 1  
Law Elective 3  
CON E 487 Construction Engineering Design I 3  
CON E 488 Construction Engineering Design II 3  
Business Communication Elective (minimum grade of C) 3  
ENGL 302 Business Communication 3  
ENGL 309 Report and Proposal Writing 3  
ENGL 314 Technical Communication 3  
Complete one course from Math or Stat Elective, 3 cr. (B, E, H); 4 cr. (M) 2 3-4  
Total Credits 32-33  
Select remaining courses from one of the following options:  
Building Option: Remaining Core courses (9 cr.)  
C E 360 Geotechnical Engineering 3  
CON E 322 Construction Equipment and Heavy Construction Methods 3  
Total Credits 9  
Civil Engineering Options 19 cr.  
Mechanical Option: Remaining Core courses (10 cr.)  
C E 333 Structural Steel Design I 3  
C E 334 Reinforced Concrete Design I 3  
C E 385 Design of Portland Cement Concrete 1  
CON E 352 Mechanical Systems in Buildings 3  
CON E 353 Electrical Systems in Buildings 3  
E M 327 Mechanics of Materials Laboratory 1  
Engineering Topics Elective 2 2  
Total Credits 16  
Heavy Option: Remaining Core courses (9 cr.)  
C E 360 Geotechnical Engineering 3  
CON E 322 Construction Equipment and Heavy Construction Methods 3  
CON E 340 Concrete and Steel Construction 3  
Total Credits 9  
Electrical Engineering Option 10 cr.  
Electrical Engineering Core 9 cr.  
E E 230 Electronic Circuits and Systems 4  
E E 303 Energy Systems and Power Electronics 3  
E E 456 Power System Analysis I 3  
Total Credits 10  
Remaining option courses - 13 cr.  
CON E 352 Mechanical Systems in Buildings 3  
CON E 353 Electrical Systems in Buildings 3  
E E 201 Electric Circuits 4  
E E 457 Power System Analysis II 3  
Total Credits 13  
Mechanical Engineering Option 10 cr.  
Mechanical Engineering Core 8 cr.  
M E 231 Engineering Thermodynamics I 3  
M E 436 Heat Transfer 4  
Total Credits 13
M E 441  
Fundamentals of Heating, Ventilating, and Air Conditioning  
3

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tr>
<td>CON E 352</td>
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<td>CON E 353</td>
<td>Electrical Systems in Buildings</td>
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<td>E E 442</td>
<td>Introduction to Circuits and Instruments</td>
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<td>E E 448</td>
<td>Introduction to AC Circuits and Motors</td>
<td>2</td>
</tr>
<tr>
<td>M E 442</td>
<td>Heating and Air Conditioning Design</td>
<td>3</td>
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Total Credits 13

Co-op/Internships - Optional

1. These university requirements will add to the minimum credits of the program unless the university-approved courses are also approved by the department to meet other course requirements within the degree program. U.S. diversity and international perspectives courses may not be taken Pass/Not Pass.

2. Choose from department approved list (http://www.ccee.iastate.edu/academics/advising/construction-engineering-student-forms).

3. See Basic Program for Professional Engineering Curricula for accepted substitutions for curriculum designated courses in the Basic Program.

See also: A 4-year plan of study grid showing course template by semester for a building emphasis in Construction Engineering. (http://catalog.iastate.edu/planofstudy/engineering/construction_engineering_bs_building_emphasis)

See also: A 4-year plan of study grid showing course template by semester for an electrical emphasis in Construction Engineering. (http://catalog.iastate.edu/planofstudy/engineering/construction_engineering_bs_electrical_emphasis)

See also: A 4-year plan of study grid showing course template by semester for a heavy/highway emphasis in Construction Engineering. (http://catalog.iastate.edu/planofstudy/engineering/construction_engineering_bs_heavyhighway_emphasis)

See also: A 4-year plan of study grid showing course template by semester for a mechanical emphasis in Construction Engineering. (http://catalog.iastate.edu/planofstudy/engineering/construction_engineering_bs_mechanical_emphasis)