CONSTRUCTION ENGINEERING TECHNOLOGY

The construction industry is the largest industry in the world. Leadership in this field requires a broad knowledge of labor, materials and equipment, capital and construction procedures. The interdisciplinary approach of the construction engineering technology program offers the student specialized coursework in all phases of construction, designed to prepare him or her for responsible positions in industry.

The primary goal of the Construction Engineering Technology (CET) program is to enhance the quality of the instructional program through effective management of the curriculum, teaching assignments and fiscal and physical resources. This goal includes providing instructional facilities, equipment and support services for faculty and students which maintain an excellent learning environment.

Program Educational Objectives

OSU Construction Engineering Technology graduates a few years after graduation will:

1. Solve problems typically found in the construction industry in construction engineering design, estimating, planning, scheduling and project management using mathematical, analytical and scientific skills of engineering technology.
2. Successfully work in teams and communicate effectively in written, oral and graphical forms.
3. Continue life-long career and professional growth by actively interacting with local industries and participating in appropriate professional societies.

Construction Engineering Technology graduates can expect to obtain these outcomes upon graduation:

1. An ability to select and apply the knowledge, techniques, skills and modern tools of the discipline to broadly-defined engineering technology activities;
2. An ability to select and apply a knowledge of mathematics, science, engineering and technology to engineering technology problems that require the application of principles and applied procedures or methodologies;
3. An ability to conduct standard tests and measurements; to conduct, analyze and interpret experiments; and to apply experimental results to improve processes;
4. An ability to design systems, components or processes for broadly-defined engineering technology problems appropriate to program educational objectives;
5. An ability to function effectively as a member or leader on a technical team;
6. An ability to identify, analyze and solve broadly-defined engineering technology problems;
7. An ability to apply written, oral and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature;
8. An understanding of the need for and an ability to engage in self-directed continuing professional development;
9. An understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity;
10. A knowledge of the impact of engineering technology solutions in a societal and global context; and
11. A commitment to quality, timeliness and continuous improvement.

Faculty with excellent credentials, including a balance of formal education, teaching ability and appropriate industry experience, are recruited nationwide and are provided opportunities for individual professional development and regular contact with the industry. Faculty members are encouraged to become involved in extension and research programs relating to the department’s areas of strength or growth and to serve the needs for continuing education within the industry, particularly in the regional construction community.

These needs and opportunities for service are assessed regularly through close cooperation with local and regional construction professionals and industry associations. An active Construction Engineering Advisory Board, representing a broad cross-section of the industry, meets regularly to offer support and guidance necessary to preserve uncompromising excellence.

The Construction Engineering Technology program is accredited by the Engineering Technology Accreditation Commission of ABET, http://www.abet.org. The educational objectives of the Construction Engineering Technology program are consistent with those required by ETAC of ABET and are listed under “Division of Engineering Technology” in the Catalog.

Undergraduate Admission

Students who satisfy the CEAT admission requirements are eligible to enroll for the first two years of the program in the lower division of the curriculum for Construction Engineering Technology. In order to balance the number of students in the CET upper division with available CET resources, advancement to the CET upper division is by application. Applications are due to the CET no later than the last working day of April each year. To be eligible for program advancement, lower-division students must have:

1. Completed 60 credit hours of coursework counting toward the CET degree;
2. Completed all of the required (shaded) courses on the Degree Requirement Sheet (these courses are also listed on the Calculation Work Sheet of the Application to Upper Division form);
3. Achieved a grade of 'C' or better in the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMT 1213</td>
<td>Introduction to Construction</td>
<td>3</td>
</tr>
<tr>
<td>CMT 2253</td>
<td>Printreading &amp; BIM</td>
<td>3</td>
</tr>
<tr>
<td>CMT 2263</td>
<td>Estimating I</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 2103</td>
<td>Financial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 1214</td>
<td>College Physics II (LN)</td>
<td>4</td>
</tr>
<tr>
<td>GENT 2323</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 2123</td>
<td>Calculus for Technology Programs I (A)</td>
<td>3</td>
</tr>
<tr>
<td>CMT 2352</td>
<td>Concrete Technology</td>
<td>2</td>
</tr>
</tbody>
</table>

A substitution for any of these courses must meet the same ‘C’ requirement.

4. Achieved a minimum Selection GPA (SGPA) of 3.05.
Annually, students who meet these criteria for program advancement and have made a timely application for admission to the upper division will be admitted to the upper division of the CET curriculum. The Selection Grade Point Average (SGPA) is a weighted GPA based upon specified lower-division courses which have proven to be good indicators of student success in the program. For consideration of admission to the upper division of the Construction Engineering Technology program, the following courses and multipliers will be used in calculating SPGA's:

- CMT 2352/2351 Concrete Technology & Concrete Technology Lab (3x multiplier), CMT 2263 Estimating I (3x multiplier), GENT 2323 Statics (x3 multiplier), CMT 2253 Printreading & BIM (2x multiplier), CMT 1213 Introduction to Construction (2x multiplier), MATH 2123 Calculus for Technology Programs I (A) (x2 multiplier), PHYS 1114 College Physics I (LN) (x2 multiplier), SPCH 2713 Introduction to Speech Communication (S) (x2 multiplier), PHYS 1115 Composition I (x2 multiplier), MATH 1114 College Physics II (LN) (x1 multiplier), MATH 2133 Calculus for Technology Programs II (A) (x1 multiplier), EET 1003 Introduction to Microcomputer Programming (x1 multiplier) and ACCT 2103 Financial Accounting (x1 multiplier). Additional detailed information concerning admission to the upper division may be obtained directly from the CET program.

Transfer students are required to furnish transcripts and course descriptions for previous classroom courses, as well as examples of previous academic work. Evaluation and enrollment by the CET program is on a course-by-course basis for all transfer students.

The modern constructor must have a great deal of technical knowledge to keep abreast of rapidly changing equipment, materials and methods of construction. Specialized courses in estimating, surveying, structures, construction planning and scheduling, construction law and insurance, field and office management and construction procedures provide students with the background necessary for today's construction industry. These specialized courses, in addition to a blend of the basic sciences, business and general studies, produce a well-balanced curriculum for students in construction engineering technology. Special attention is given to computer applications in construction estimating, and the development of graphic, written and oral communication skills is emphasized throughout the curriculum.

Students with an interest in building structures may select courses in the "building" option of the construction engineering technology curriculum, which provides them with knowledge of working drawings, mechanical and electrical equipment of buildings, and other coursework for a career in building construction.

Students with an interest in civil engineering structures may select courses in the "heavy" option of the construction engineering technology curriculum, which provides them with knowledge of highways, soils, foundations and other coursework for a career in the heavy and industrial construction industry.

The program attempts to identify and recruit highly qualified students who will benefit from the instructional platform, and faculty members promote retention and ultimate graduation of construction engineering technology students through effective instruction and advisement. A schedule of outcome assessment among graduates and their employers assures that the program continues to provide the academic training required for success.

Graduates of construction engineering technology have shown the curriculum to be successful in their development as productive members of the construction industry, holding responsible positions as project managers, estimators, material and equipment salespersons, and construction managers at all levels.

**Courses**

**CMT 1213 Introduction to Construction**

- **Description:** Overview of the entire construction industry with emphasis on construction materials, methods and systems. Both building and heavy highway construction drawings and their interpretation. Same course as CMT 1214.
- **Credit hours:** 3
- **Contact hours:** Lecture: 3
- **Levels:** Undergraduate
- **Schedule types:** Lecture

**Department/School:** Engineering Technology

**CMT 2203 Construction Drawings (for non-majors)**

- **Description:** Principles of graphic communication are applied to reading and drawing construction plans, with emphasis to fire protection systems. Does not meet CMT degree requirements. (Online course for non-CMT majors).
- **Credit hours:** 3
- **Contact hours:** Lecture: 3
- **Levels:** Undergraduate
- **Schedule types:** Lecture

**Department/School:** Engineering Technology

**CMT 2253 Printreading & BIM**

- **Prerequisites:** Grade of "C" or better in MATH 1513 or ALEKS score greater or equal to 60 or permission of instructor.
- **Description:** Principles of 2D and 3D graphic communication are applied to reading and drawing construction plans. Techniques for measuring items of construction work from plans and specifications are also covered.
- **Credit hours:** 3
- **Contact hours:** Lecture: 3
- **Levels:** Undergraduate
- **Schedule types:** Lecture

**Department/School:** Engineering Technology

**CMT 2263 Estimating I**

- **Prerequisites:** Grade of "C" or better in CMT 1213 and CMT 2253 and MATH 1613 or MATH 1715 or ALEKS score greater or equal to 65 or permission of instructor.
- **Description:** Quantity take-off with emphasis on excavation, formwork and concrete, masonry, rough carpentry and miscellaneous specialty items.
- **Credit hours:** 3
- **Contact hours:** Lecture: 3
- **Levels:** Undergraduate
- **Schedule types:** Lecture

**Department/School:** Engineering Technology

**CMT 2351 Concrete Technology Lab**

- **Prerequisites:** Grade of "C" or better in CMT 1214, CMT 2253, and CMT 2342 or concurrent enrollment in CMT 2342 or permission of department.
- **Description:** Practical applications of material selection, proportioning, batching, mixing, conveying, placing, finishing, curing, and testing concrete. Previously offered as CMT 2343.
- **Credit hours:** 1
- **Contact hours:** Lab: 2
- **Levels:** Undergraduate
- **Schedule types:** Lab

**Department/School:** Engineering Technology
CMT 2352 Concrete Technology
**Prerequisites:** Grade of "C" or better in CMT 1214 and CMT 2253 or permission of department.
**Credit hours:** 2
**Contact hours:** Lecture: 2
**Levels:** Undergraduate
**Schedule types:** Lecture
**Department/School:** Engineering Technology

CMT 3273 Scheduling Construction Projects
**Prerequisites:** Acceptance to the CMT Upper-Division or permission of department; grade of "C" or better in CMT 2263.
**Description:** Scheduling basics, including bar charts and critical-path methods; manual and computer techniques using current software; emphasis on using schedules for construction project management.
**Credit hours:** 3
**Contact hours:** Lecture: 3
**Levels:** Undergraduate
**Schedule types:** Lecture
**Department/School:** Engineering Technology

CMT 3322 Construction Practicum I
**Prerequisites:** Grade of "C" or better in CMT 1213 and CMT 2253, or permission of department.
**Description:** Supervised field experience in construction; 400 hours minimum documented time required. Same course as 3331.
**Credit hours:** 2
**Contact hours:** Lecture: 2
**Levels:** Undergraduate
**Schedule types:** Lecture
**Department/School:** Engineering Technology

CMT 3323 Strength of Materials for Construction Managers
**Prerequisites:** Acceptance to the CMT Upper Division or permission of department; grade of "C" or better in MATH 2123 and GENT 2323.
**Description:** Stress and strain and their relationship to loads in buildings. Axial and bending loads on beams and columns. Applications in building and construction emphasized.
**Credit hours:** 3
**Contact hours:** Lecture: 3
**Levels:** Undergraduate
**Schedule types:** Lecture
**Department/School:** Engineering Technology

CMT 3332 Construction Practicum II
**Prerequisites:** Grade of "C" or better in CMT 2263, CMT 3322 and CIVE 3614 or permission of department.
**Description:** Supervised temporary, full-time employment in construction, emphasizing field and office engineering and a variety of project management functions; 400 hours minimum documented time required. Previously offered as CMT 3333.
**Credit hours:** 2
**Contact hours:** Lecture: 2
**Levels:** Undergraduate
**Schedule types:** Lecture
**Department/School:** Engineering Technology

CMT 3364 Structures I
**Prerequisites:** Grade of "C" or better in CMT 2343 and CMT 3323 or GENT 3323 or ENSC 2143 and MATH 2133, PHYS 1214, CMT 3322 and acceptance to the upper division.
**Description:** Methods of structural analysis applicable to construction; design of timber structures and forms for concrete structures. Previously offered as CMT 3363.
**Credit hours:** 4
**Contact hours:** Lecture: 3 Lab: 2
**Levels:** Undergraduate
**Schedule types:** Lab, Lecture, Combined lecture and lab
**Department/School:** Engineering Technology

CMT 3363 Structures II
**Prerequisites:** Grade of "C" or better in PHYS 1214 and acceptance to the CMT Upper Division.
**Description:** Plumbing, heating, air-conditioning, electrical and lighting systems as applied to residences and commercial buildings.
**Credit hours:** 3
**Contact hours:** Lecture: 2 Lab: 3
**Levels:** Undergraduate
**Schedule types:** Lab, Lecture, Combined lecture and lab
**Department/School:** Engineering Technology

CMT 3464 Environmental Building Systems
**Prerequisites:** Grade of "C" or better in PHYS 1214 and acceptance to the Upper Division.
**Description:** Analysis and design of elements in steel and reinforced concrete structures; review of shop drawings for both types of construction. Course previously offered as CMT 3553.
**Credit hours:** 4
**Contact hours:** Lecture: 3 Lab: 2
**Levels:** Undergraduate
**Schedule types:** Lab, Lecture, Combined lecture and lab
**Department/School:** Engineering Technology

CMT 3433 Principles of Site Development
**Prerequisites:** Grade of "C" or better in CMT 2343, CIVE 3614 and CMT 3323 or GENT 3323 or ENSC 2143 and acceptance to Upper Division.
**Description:** Site layout, vertical and horizontal control, surveying instrument adjustments, site investigations, excavations, site drainage and geotechnical considerations. Course previously offered as CMT 2333.
**Credit hours:** 3
**Contact hours:** Lecture: 2 Lab: 3
**Levels:** Undergraduate
**Schedule types:** Lab, Lecture, Combined lecture and lab
**Department/School:** Engineering Technology

CMT 3554 Structures II
**Prerequisites:** Grade of "C" or better in CMT 3364 and acceptance to the CMT Upper Division.
**Description:** Analysis and design of elements in steel and reinforced concrete structures; review of shop drawings for both types of construction. Course previously offered as CMT 3553.
**Credit hours:** 4
**Contact hours:** Lecture: 3 Lab: 2
**Levels:** Undergraduate
**Schedule types:** Lab, Lecture, Combined lecture and lab
**Department/School:** Engineering Technology

CMT 3563 CAD and BIM for Construction Managers
**Prerequisites:** Grade of "C" or better in CMT 1213 and CMT 2253.
**Description:** Interpretation and production of construction drawings using computer aided drafting. Theory and use of Building Information Modeling software builds upon computer aided drafting skills.
**Credit hours:** 3
**Contact hours:** Lecture: 2 Lab: 2
**Levels:** Undergraduate
**Schedule types:** Lab, Lecture, Combined lecture and lab
**Department/School:** Engineering Technology
CMT 4050 Advanced Construction Management Problems
Description: Special problems in construction management. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Other: 1
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Engineering Technology

CMT 4263 Estimating II
Prerequisites: Grade of "C" or better in EET 1003, CMT 2263 and GENT 2323 or ENSC 2113; acceptance to the CMT Upper Division or permission of department.
Description: Extensive use of actual contract documents for quantity take-off, pricing and assembling the bid for several projects. Use of computers in estimating.
Credit hours: 3
Contact hours: Lecture: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Engineering Technology

CMT 4273 Technology in Construction
Prerequisites: Grade of "C" or better in CMT 4263 and acceptance to the CMT Upper Division.
Description: Applications of various technologies including software for construction.
Credit hours: 3
Contact hours: Lab: 6
Levels: Undergraduate
Schedule types: Lab
Department/School: Engineering Technology

CMT 4283 Business Practices for Construction
Prerequisites: Acceptance to the CMT Upper Division; grade of "C" or better in ACCT 2103, CMT 3273 and CMT 4563; or permission of department.
Description: Principles of management applied to construction contracting; organizing office and field staff; bonding, liens, financial management practices; introduction to the construction manager concept; schedule of values; construction billings.
Credit hours: 3
Contact hours: Lecture: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Engineering Technology

CMT 4293 Construction Manager Concepts
Prerequisites: Grade of "C" or better in CMT 3332, CMT 4283, CMT 4273, CMT 3364, and ENGL 3323 and acceptance to the CMT Upper Division or permission of department.
Description: Capstone course utilizing skills and knowledge of estimating, scheduling, bidding, construction management, CAD, TQM, partnering and safety; includes topics in leadership, motivation and the use of current project management software.
Credit hours: 3
Contact hours: Lecture: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Engineering Technology

CMT 4333 Equipment Management for Constructors
Prerequisites: Grade of "C" or higher in CMT 2263, CMT 2343 and ACCT 2103 and acceptance to the CMT Upper Division or permission of department.
Description: Selection and use of equipment, estimating equipment costs, estimating equipment production rates for all types of equipment used in building construction and heavy/highway construction.
Credit hours: 3
Contact hours: Lecture: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Engineering Technology

CMT 4443 Construction Safety and Loss Control
Prerequisites: Must be accepted to the CMT Upper Division or obtain department permission.
Description: A detailed study of OSHA Part 1926 - Construction Safety and Health Compliance and related safety topics including topics related to the OSHA 30-hour training program; concepts and methods of loss control.
Credit hours: 3
Contact hours: Lecture: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Engineering Technology

CMT 4533 Heavy Civil Construction and Estimating
Prerequisites: Grade of "C" or better in CMT 4263, CMT 2343, CMT 2263 and acceptance to the CMT Upper Division or permission of department.
Description: Theory and application of contractor estimating and bidding procedures used in heavy and highway construction projects.
Credit hours: 3
Contact hours: Lecture: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Engineering Technology

CMT 4563 Construction Law and Insurance
Prerequisites: A grade of "C" or better in CMT 3322 and SPCH 2713 and acceptance to the CMT Upper Division or permission of the department.
Description: Legal and insurance problems as they pertain to the construction industry.
Credit hours: 3
Contact hours: Lecture: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Engineering Technology

Undergraduate Programs
- Construction Engineering Technology: Building, BSET (http://catalog.okstate.edu/engineering-architecture-technology/construction-engineering-technology/building-bset)
- Construction Engineering Technology: Heavy, BSET (http://catalog.okstate.edu/engineering-architecture-technology/construction-engineering-technology/heavy-bset)

Faculty
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Professor: Mark H. Pruitt, MS, MArch, RA
Assistant Professors: Lantz Holtzhower, PhD; Jonghoon Kim, PhD; Rachel Mosier, PhD, PE