

# CONSTRUCTION ENGINEERING (CONE)

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## CONE 96 Professional Practice

**Prerequisites:** Senior standing.

**Notes:** Required of CONE majors prior to graduation. The work experience must be pre-approved by the faculty adviser in the CONE department.

**Description:** Work experience in a construction related work area.

**Credit Hours:** 0

**Max credits per semester:**

**Max credits per degree:**

**Grading Option:** Pass No Pass

## CONE 103 Introduction to Construction Engineering

**Description:** Introduction to the organization and terminology of construction engineering. Overview of technical and management skills required to succeed in the construction engineering profession.

**Credit Hours:** 1

**Max credits per semester:** 1

**Max credits per degree:** 1

**Grading Option:** Graded

**Prerequisite for:** CONE 211

## CONE 206 Engineering Economics

**Crosslisted with:** BSEN 206

**Prerequisites:** Sophomore standing

**Description:** Introduction to methods of economic comparisons of engineering alternatives: time value of money, depreciation, taxes, concepts of accounting, activity-based costing, ethical principles, civics and stewardship, and their importance to society.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Graded with Option

**Prerequisite for:** CNST 476, CONE 476; CONE 319; MECH 446; MECH 446H

**ACE:** ACE 8 Civic/Ethics/Stewardship

## CONE 211 Construction Business Methods

**Prerequisites:** CONE 103 or CNST 131 or AREN 101

**Description:** Business concepts and practices used by construction contractors. The construction industry, management principles, forms of business ownership, company organization, construction contracts, estimating and bidding, business ethics, bonds and insurance, financial statements, cost accounting, equipment management, planning and scheduling, labor relations and personnel management.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Graded

**Prerequisite for:** CONE 414

## CONE 221 Geometric Control Systems

**Prerequisites:** MATH 104 or MATH 106

**Description:** Surveying fundamentals and theory related to construction, including building layout, measurement procedures, vertical control, and surveying instrument operation. Measurement of distance, direction, elevation, and location using mechanical and electronic systems.

Explain the concepts of surveying and project layout as they apply to construction. Demonstrate the use of various surveying instruments,

equipment, technologies, and control on construction project examples.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Graded

**Course and Laboratory Fee:** \$15

## CONE 319 Construction Methods and Equipment

**Prerequisites:** CONE 206

**Description:** Characteristics, capabilities, and selection of equipment and methods used in the building construction industry. Estimating job production, equipment production rates, machine operating costs, earth-moving equipment, hoisting equipment, operations analysis, and use of various other construction and methods and equipment.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Graded with Option

**Prerequisite for:** CONE 414

## CONE 378 Construction Estimating I

**Crosslisted with:** CNST 378

**Prerequisites:** CNST 112

**Description:** Preparation of detailed cost estimates based on contract documents. Identify and analyze cost components of building and site scopes of work to perform detailed quantity take-offs. Apply labor, material, and equipment pricing from RS Means. Use production rates and quantity takeoffs to prepare a preliminary construction schedule. Complete quantity takeoffs from 2D plans and from 3D BIM software models.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Graded

**Prerequisite for:** CNST 379; CNST 440; CNST 476, CONE 476

## CONE 414 Accident Prevention in Construction

**Prerequisites:** Senior standing; CONE 211 and 319.

**Description:** Safety practices in the construction industry and the national safety and health standards of the Occupational Safety and Health Administration (OSHA). The theory of accidents; personal attitudes; statistics and environment; accident occurrence; prevention and inspection in connection with the construction of buildings, highways, and associated heavy facilities. Nationally accepted safety codes and their relationship to accepted practices in the industry.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Graded

**CONE 416 Wood and / or Contemporary Materials Design**

**Crosslisted with:** CONE 816

**Prerequisites:** CIVE 341

**Description:** Design of structural timber, beams, columns, and connections. Introduction to applicable design philosophies and codes. Overview of materials design. Masonry, aluminum, and contemporary materials such as plastics and fiber reinforced systems and composite material groups. Design considerations, cost and constructability analysis.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Graded

**CONE 417 Formwork Systems**

**Crosslisted with:** CONE 817

**Prerequisites:** CONE 416; parallel CIVE 441

**Description:** Design of structural timber, beams, columns, and connections. Introduction to applicable design philosophies and codes. Overview of materials design. masonry, aluminum, and contemporary materials such as plastics and fiber reinforced systems and composite material groups. Design considerations, cost and constructability analysis.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Graded with Option

**CONE 450 Sustainable Construction**

**Crosslisted with:** CONE 850

**Prerequisites:** Senior standing.

**Description:** Sustainable construction and its application to the green building industry. LEED certification process, sustainable building site management, efficient waste water applications, optimizing energy performance, indoor environmental issues, performance measurement and/or verification, recycled content and certified renewable materials.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Graded

**CONE 459 BIM I: Introduction to Building Information Modeling (BIM)**

**Crosslisted with:** CONE 859

**Prerequisites:** CNST 112 Construction, or Graduate standing in AREN, CIVE, CNST, or CONE.

**Description:** This course instructs CAD users on the effective use of Building Information Model (BIM) for Integration of design, document and Construction Estimate. Topics include: model-based 3D design, file formats, interoperability, and MEP modeling.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Graded with Option

**CONE 466 Heavy and/or Civil Estimating**

**Crosslisted with:** CONE 866

**Prerequisites:** CONE 319, CONE 378, and CONE 485.

**Description:** Estimating techniques and strategies for heavy and/or civil construction. Unit pricing, head and civil constructions takeoffs and estimating, equipment analysis, overhead cost and allocations, estimating software and government contracts.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Graded

**CONE 476 Project Budgets and Controls**

**Crosslisted with:** CNST 476

**Prerequisites:** CNST 378, and BSEN 206 or FINA 300

**Description:** The basic systems related to revenues and expenses associated with record keeping of construction contracts. Managerial accounting related to planning and control of construction projects.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Graded

**Prerequisite for:** CONE 489

**CONE 481 Highway and Bridge Construction**

**Crosslisted with:** CONE 881

**Prerequisites:** Senior standing; CNST 241.

**Description:** The methods and equipment required in the construction of roads and bridges. Methods and equipment necessary for roads and bridges. Substructure and superstructures, precast and cast-in-place segments, and standard and specialized equipment.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Graded

**CONE 482 Heavy and/or Civil Construction**

**Crosslisted with:** CNST 482, CNST 882, CONE 882

**Prerequisites:** CNST 379

**Notes:** Not open to non-degree graduate students

**Description:** History, theory, methods, and management principles of planning and executing heavy and/or civil projects. Emerging and new equipment capabilities. Economical use of equipment and management of costs associated with production.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Graded

**CONE 483 Support of Excavation**

**Crosslisted with:** CONE 883

**Prerequisites:** Senior standing.

**Description:** The design and placement of excavation supports according to OSHA requirements and industry standards. A variety of routine to moderately complex support systems. Open excavations, sheet piling and cofferdams, soil mechanics, lateral loads, hydrology, and pumping methods.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Graded

**CONE 485 Construction Planning, Scheduling, and Controls****Crosslisted with:** CNST 485, CNST 885, CONE 885**Prerequisites:** CNST 378**Notes:** Not open to non-degree graduate students**Description:** Planning and scheduling a project using the critical path methods (CPM) with computer applications. Project pre-planning, logic networks, precedence diagrams, time estimates, critical path, float time, crash programs, scheduling, short interval schedules, pull planning, and monitoring project activities.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded**Prerequisite for:** CNST 489; CONE 489**CONE 489 Construction Engineering Capstone Course****Prerequisites:** CONE 485 and CONE 476**Notes:** To be taken in the term preceding graduation. Embodies the cumulative CONE experience in a project format and uses teams to simulate actual construction enterprises operating in cooperative and competitive situations which replicate the construction industry.**Description:** An integrated, comprehensive project.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded**ACE:** ACE 10 Integrated Product**CONE 495 Internship****Crosslisted with:** CNST 495**Prerequisites:** Permission of instructor, Letter of application, Letter of agreement from industry mentor**Notes:** Not open to non-degree graduate students**Description:** Participation in a full-time summer internship associated with a construction-related entity. Includes weekly assignments and a final presentation designed to foster interactions between the intern and the business side of the entity. General topics include personnel and time management, structuring business plans, scheduling work, finance and budgets, marketing plans, contracts, risk analysis, and communication and leadership.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded**Offered:** SUMMER**Experiential Learning:** Fieldwork**CONE 498 Special Projects****Prerequisites:** Permission.**Description:** Individual research on a selected technical, structural, materials or management problem in construction.**Credit Hours:** 1-6**Min credits per semester:** 1**Max credits per semester:** 6**Max credits per degree:** 6**Grading Option:** Graded