

Construction Engineering Courses

CONE 501 - Productivity in Construction

Hours: 3

This course addresses improved methods of construction; various techniques of work sampling and productivity measurement; and current innovations in the construction industry for increasing efficiency. Prerequisites: Departmental approval.

CONE 510 - Bridge Engineering

Hours: 3

Overview of design of highway bridges, and an introduction to maintenance of highway bridges; history of bridge engineering, types of bridges and materials of construction, design rules, loads, inspection, rating and preventive maintenance, esthetics. Prerequisites: Departmental approval.

CONE 512 - Dynamic Loads and Structural Behavior

Hours: 3

Dynamic modeling of single, multidegree of freedom and continuous systems; dynamic load factors; damping; mode superpositions; numerical integration; dynamic behavior of structures and structural elements under action of dynamic loads resulting from wind, earthquake, blast, impact, moving loads and machinery. Prerequisites: Departmental approval.

CONE 514 - Behavior and Design of Composite Structures

Hours: 3

Design of composite structural systems comprising structural steel and reinforced concrete; composite slabs on steel beams; composite slabs on formed metal deck; columns; moment frame systems; shear wall systems; braced frame systems; dual systems; introduction to retrofitting applications. Prerequisites: Departmental approval.

CONE 515 - Behavior and Design of Prestressed Concrete Structures

Hours: 3

The course introduces students to the behavior and design of prestressed concrete structures and provides them the background needed to design various prestressed concrete members. Course topics include an overview of prestressing technology, loss of prestress, axially loaded prestressed members, flexural and shear behavior/design of prestressed members, and deflections. At the end of the course, students are expected to have the ability to describe the expected behavior of and perform basic design procedures for typical prestressed concrete members. Prerequisites: Departmental approval.

CONE 516 - Machine Intelligence and Applications in Civil Engineering

Hours: 3

Designing machine vision and machine learning based algorithms for applications in engineering, construction, and manufacturing; additional emphasis on image processing, feature representation, and machine learning. Prerequisites: Departmental approval.

CONE 518 - Thesis

Hours: 3-6

This course provides graduate students with the structured guidance and academic support necessary to successfully complete a master's thesis. Students will engage in independent research under faculty supervision, developing their research questions, methodology, literature review, and analysis. Prerequisites: Graduate Standing, Departmental approval.

CONE 520 - Finite Element Theory and Applications in Structural Engineering

Hours: 3

Role of the finite element method (FEM) in structural engineering; use of commercial finite element software; application of FEM method for various structural engineering problems; selection of appropriate FEM models; types of elements and mesh sizes; use and interpretation of FEM results. Prerequisites: Departmental approval.

CONE 522 - Advanced Construction Technology

Hours: 3

This graduate-level course explores cutting-edge technologies and innovative practices in the construction industry to improve efficiency, sustainability, and project performance. Topics include advanced building materials, automation and robotics in construction, Building Information Modeling (BIM), prefabrication and modular construction, smart infrastructure, and sustainable construction techniques. The course also examines the integration of digital tools such as artificial intelligence, drones, and the Internet of Things (IoT) in construction management and monitoring. Through case studies, simulations, and hands-on projects, students will gain the knowledge and skills to implement advanced technologies in modern construction projects, addressing challenges related to cost, time, quality, and environmental impact. Prerequisites: Departmental approval.

CONE 524 - Sustainability in Construction

Hours: 3

This graduate-level course examines sustainable practices, materials, and technologies in the construction industry to minimize environmental impact and enhance long-term resilience. Topics include green building design, energy-efficient construction, life-cycle assessment, sustainable materials, waste reduction strategies, and environmental certifications such as LEED and BREEAM. Students will explore emerging trends in circular economy principles, net-zero buildings, and climate-responsive design. The course integrates theoretical concepts with practical applications through case studies, policy analysis, and hands-on sustainability assessments. By the end of the course, students will be equipped with the knowledge and tools to implement sustainable solutions in construction projects, promoting environmental stewardship and economic viability. Prerequisites: Departmental approval.

CONE 526 - Building Information Modelling

Hours: 3

This course focuses on the role of Building Information Modeling (BIM) in Engineering. Students will learn the fundamental processes of BIM based on 3D computer drafting, including site analysis and data extraction, basic model building, dimensioning, planning, and elevations, parametric modeling, documentation, and 3D rendering. Prerequisites: Departmental approval.