

CIVIL ENGINEERING (CE)

 - General Education Course

CE 102 Introduction to CAD **2 Credit hours**

An introduction of scales, plan reading, engineering graphics and computer aided design (CAD). Introduction to the operation of modern 2D and 3D CAD software used in civil engineering applications.

Pre-req: MTH 127 (may be taken concurrently) with a minimum grade of D or MTH 130 (may be taken concurrently) with a minimum grade of D or MTH 132 (may be taken concurrently) with a minimum grade of D or MTH 229H (may be taken concurrently) with a minimum grade of D or ACT Math with a score of 24 or SAT Mathematics Before Mar. 16 with a score of 560 or SAT MATH SECTION SCORE with a score of 570.

Concurrent PR: MTH 127 or MTH 130 or MTH 132 or MTH 229 or MTH 229H

Attributes: No Textbook Required

Grade Mode: Normal Grading Mode

CE 241 Introduction to Geomatics **3 Credit hours**

Introduction to methods and tools used to measure, analyze, and present surveying data: horizontal distances, elevation, angles, areas, and volumes. Including both field and CAD lab exercises.

Pre-req: (CE 102 with a minimum grade of D or ENGR 102 with a minimum grade of D) and ENGR 111 with a minimum grade of D.

Grade Mode: Normal Grading Mode

CE 312 Structural Analysis **3 Credit hours**

Stability and determinacy of civil engineering structures. Forces and deflections in statically determinate trusses, beams, and frames. Influence lines for planar structures. Elementary indeterminate structural analysis. Computer applications.

Pre-req: ENGR 216 (may be taken concurrently) with a minimum grade of D.

Concurrent PR: ENGR 216

Grade Mode: Normal Grading Mode

CE 319 Civil Engr Fluid Mechanics Lab **1 Credit hour**

Laboratory experiments to support study of civil engineering fluid mechanics, including fluid properties, buoyancy, hydrostatic forces, flow visualization, jet impact, pipe flow, and open channel flow.

Pre-req: ENGR 318 (may be taken concurrently) with a minimum grade of D.

Concurrent PR: ENGR 318

Grade Mode: Normal Grading Mode

CE 321 Civil Engineer Materials **4 Credit hours**

The study of civil engineering materials; metals and alloys, mineral aggregates, cements, concrete and concrete products, bituminous materials, lumber and timber. Laboratory testing of materials.

Pre-req: ENGR 216 with a minimum grade of D.

Grade Mode: Normal Grading Mode

CE 322 Geotechnical Engineering **4 Credit hours**

This course will provide students with an introduction to soil mechanics, including soil characterization, compaction, consolidation, and shear strength. Students will also understand soil behaviors through hands-on experience

Pre-req: ENGR 216 with a minimum grade of D.

Grade Mode: Normal Grading Mode

CE 331 Hydraulic Engineering **3 Credit hours**

Hydraulic flow in pipe networks, water hammer, surge tanks, pumps and turbines. Basic open channel flow. Storm and sanitary sewer design. Dams and reservoirs.

Pre-req: ENGR 318 with a minimum grade of D.

Grade Mode: Normal Grading Mode

CE 341 Advanced Geomatics **3 Credit hours**

Introduction to advanced geo-spatial data collection instrumentation, processes and capabilities. Geo-spatial data display, integration and analyses software tools are presented and utilized in a lecture/lab format.

Pre-req: CE 241 with a minimum grade of D.

Grade Mode: Normal Grading Mode

CE 342 Transportation Engineering **3 Credit hours**

Introduction to transportation systems: highway, rail, water, and air transportation organization and administration; vehicle and human characteristics; rectilinear and curvilinear vehicle motion; location, design and planning of transportation systems.

Pre-req: CE 241 with a minimum grade of D.

Grade Mode: Normal Grading Mode

CE 351 Environmental Engineering **3 Credit hours**

Environmental issues, problems, and evaluation methodology; fundamental concepts in pollution modeling and control, and engineering management approaches; material transport, balance, and separations; kinetics and reactor design. .

Pre-req: CHM 212 with a minimum grade of D.

Grade Mode: Normal Grading Mode

CE 413 Reinforced Concrete **3 Credit hours**

Behavior and design of reinforced concrete elements according to ACI 318. Design of beams, one-way slabs, columns, and beam-columns based on strength and serviceability requirements.

Pre-req: CE 312 with a minimum grade of D and ENGR 216 with a minimum grade of D.

Grade Mode: Normal Grading Mode

CE 414 Structural Steel Design **3 Credit hours**

Behavior and design of structural steel elements according to AISC 360. Design of tension members, bolted and welded connections, columns, beams, and beam-columns based on strength and serviceability requirements.

Pre-req: CE 312 with a minimum grade of D and ENGR 216 with a minimum grade of D.

Attributes: No Textbook Required

Grade Mode: Normal Grading Mode

CE 415 Advanced Reinforced Concrete **3 Credit hours**

Background of ACI 318, emphasizing Precast elements. Earth-retaining structures. Sustainable solutions including fiber reinforced composites. strut-and-tie analogies. seismic design. Modern reinforced concrete design procedures and comparison of standard design codes.

Pre-req: CE 413 with a minimum grade of D.

Grade Mode: Normal Grading Mode

CE 425 Foundation Engineering **3 Credit hours**

This course will focus on designing shallow and deep foundations, including spread and mat foundations, driven piles, and drilled shafts. Topics include bearing capacity of soils, settlement, and pile behaviors.

Pre-req: CE 322 with a minimum grade of D.

Grade Mode: Normal Grading Mode

CE 426 Retaining Structures and Slope**3 Credit hours**

This course will provide students with an understanding of retaining structure applications and slope stability analysis in Geotechnical Engineering practice.

Pre-req: CE 322 with a minimum grade of D.

Grade Mode: Normal Grading Mode

CE 433 Hydrologic Engineering**3 Credit hours**

Introduction to the water cycle, including precipitation, evaporation, infiltration, and runoff. Methods of modeling surface runoff, routing, and floodplain analysis. Computerized design of culverts, storm sewers, and watershed modeling.

Pre-req: ENGR 318 with a minimum grade of D.

Grade Mode: Normal Grading Mode

CE 434 Water/Wastewater Trtmt Dsgn**3 Credit hours**

Physical, chemical, and biological principles in water and wastewater treatment. Design of treatment systems, including flocculation, sedimentation, disinfection, activated sludge, fixed-growth, and solids treatment. Includes bench-scale demonstrations of treatment steps.

Pre-req: CE 351 with a minimum grade of D.

Grade Mode: Normal Grading Mode

CE 438 Pavement Design and Management**3 Credit hours**

This course is designed to teach the undergraduate engineering student about the application of transportation engineering, material behavior and engineering management principles to design and manage highway pavements.

Pre-req: ENGR 216 with a minimum grade of D and CE 342 with a minimum grade of D.

Grade Mode: Normal Grading Mode

CE 443 Transportation Systems Design**3 Credit hours**

Application of transportation engineering principles to evaluate existing transportation systems and design necessary improvements. Transportation systems include roadway segments, intersections, sidewalks, and interchanges. Course includes a design project.

Pre-req: CE 342 with a minimum grade of D.

Grade Mode: Normal Grading Mode

CE 452 Senior Seminar of Civil Engr**1 Credit hour**

This seminar course will prepare students for engineering practice upon graduation. Topics include professional responsibility, engineering ethics, employment opportunities, and review for the Fundamentals of Engineering Exam.

Pre-req: CE 312 with a minimum grade of D or CE 331 with a minimum grade of D.

Grade Mode: Normal Grading Mode

CE 453  Capstone Senior Design**3 Credit hours**

Students utilize the engineering design process to complete a comprehensive civil engineering project that addresses a real-world problem with realistic constraints in a collaborative environment. (PR: ENGR 451 and on CE Design Elective).

Pre-req: ENGR 451 with a minimum grade of D and (CE 413 with a minimum grade of D or CE 414 with a minimum grade of D or CE 425 with a minimum grade of D or CE 426 with a minimum grade of D or CE 434 with a minimum grade of D or CE 438 with a minimum grade of D or CE 443 with a minimum grade of D).

Attributes: Capstone Course

Grade Mode: Normal Grading Mode

CE 480 Special Topics in CE**1-4 Credit hours**

Current topics in civil engineering to be selected depending on the interests of the students and faculty.

Grade Mode: Normal Grading Mode