CIVIL ENGINEERING (CIVE)

CIVE:101 Introduction to Civil Engineering Fundamentals (3 Credits)
Corequisite: MATH 149 or higher math or appropriate AP test score.
Introduction to Civil Engineering. Basic concepts of civil engineering practice including communication skills, problem solving skills, professional ethics/goals, and teamwork. Introduction to professional level software including spreadsheets, database, and mathematical computation. (Formerly 4300:101)

CIVE:102 Tools for Civil Engineering (3 Credits)
Prerequisite: CIVE 101. Building on concepts of engineering practices learned in Tools I further developing communication skills, problem solving skills, professional ethics/goals, statistics and model-building, and teamwork. Advanced use of professional level software including CAD, MATLAB and Excel. (Formerly 4300:102)

CIVE:201 Statics (3 Credits)
Corequisites: MATH 222 and PHYS 291. Forces, resultants, couples; equilibrium of force systems; distributed forces; centers of gravity; analysis of simple structures; moments of inertia; kinematics. (Formerly 4300:201)

CIVE:202 Introduction to Mechanics of Solids (3 Credits)
Prerequisite: CIVE 201. Axial force, bending moment diagrams, axial stress and deformation; stress-strain diagrams; torsion; flexural stress; flexural shearing stress; compound stresses; indeterminate beams; columns. (Formerly 4300:202)

CIVE:306 Theory of Structures (3 Credits)
Prerequisite: CIVE 202. Stability and determinacy; statically determinate trusses and frames; approximate frame analysis influence lines; moving loads; virtual work analysis; moment area theorem; theorem of three moments; moment distribution for continuous beams and frames. (Formerly 4300:306)

CIVE:313 Soil Mechanics (3 Credits)
Prerequisites: CIVE 202 and admission to an engineering major within the College of Engineering and Polymer Science or permission. Physical properties of soils. Soil water and groundwater flow. Stresses, displacements, volume changes, consolidation within a soil mass. Soil strength. Compaction. (Formerly 4300:313)

CIVE:314 Foundation Design (3 Credits)
Prerequisites: CIVE 313 and full admission to an engineering major in the College of Engineering and Polymer Science. Subsurface exploration, shallow foundations, earth retaining structures, deep foundations (Formerly 4300:314)

CIVE:321 Introduction to Environmental Engineering (3 Credits)
Prerequisites: CHEM 153 and MATH 222. Basic principles of ecosystems, microbiology, chemical reactions, and material flow that environmental engineers use to protect our water, air and soil. (Formerly 4300:321)

CIVE:323 Water Supply & Pollution Control (3 Credits)
Prerequisite: CIVE 321 and admission to an engineering major within the College of Engineering and Polymer Science. Pre/Corequisite: MATH 335. Water and wastewater characteristics, criteria, quantities and distribution. Water and wastewater treatment process flowsheets, design and operation. Wastewater and residue disposal. (Formerly 4300:323)

CIVE:341 Hydraulic Engineering (3 Credits)
Prerequisites: MECE 310 and admission to an engineering major within the College of Engineering and Polymer Science. This course will focus on presentation and application of fundamental hydraulic principles in both the classroom and laboratory. Examination of flow in pipelines and pipe networks, pumps and pumping stations, hydrology, flow in open channels, groundwater hydraulics, and design of hydraulic structures will be studied. Emphasis will be placed on proper application of principles, data interpretation and analysis, problem solving, and report writing. (Formerly 4300:341)

CIVE:361 Transportation Engineering (3 Credits)
Prerequisites: Junior standing and admission to an engineering major within the College of Engineering and Polymer Science. Introductory survey of transportation topics including transportation planning requirements and techniques, introduction to design of highways, airports and railroads and introduction to traffic engineering. (Formerly 4300:361)

CIVE:380 Engineering Materials Laboratory (3 Credits)
Prerequisites: CIVE 202 and admission to an engineering major within the College of Engineering and Polymer Science. Fundamentals and applications of materials science, mechanics of solids and study of laboratory instrumentation and standard techniques in testing of engineering materials. (Formerly 4300:380)

CIVE:401 Steel Design (3 Credits)
Prerequisites: CIVE 306 and admission to an engineering major within the College of Engineering and Polymer Science. Tension, compression members; open web joists; beams; bearing plates; beam-columns; bolted, welded connections. (Formerly 4300:401)

CIVE:403 Reinforced Concrete Design (3 Credits)
Prerequisites: CIVE 306 and admission to an engineering major within the College of Engineering and Polymer Science. Ultimate strength analysis and design; compression steel; diagonal tension; stirrups; development length; one-way slab; T-beams; two-way slabs; columns; isolated and combined footings. (Formerly 4300:403)

CIVE:404 Advanced Structural Design (3 Credits)
Prerequisites: CIVE 401 and CIVE 403. Composite design; plate girders; plastic design; cantilever retaining walls; torsion in R/C members; deflection of R/C members; continuous girder bridge design. (Formerly 4300:404)

CIVE:407 Advanced Structural Analysis (3 Credits)

CIVE:414 Design of Earth Structures (3 Credits)
Prerequisite: CIVE 314 or permission. Design of earth structures: dams, highway fills, cofferdams, etc. Embankment construction techniques, quality control, embankment analysis, instrumentation, foundation soil stabilization, seepage analysis and control. Design problem. Graduate students will perform more advanced analysis and design. (Formerly 4300:414)

CIVE:418 Soil & Rock Exploration (3 Credits)
Prerequisite: CIVE 314 or permission. Site exploration criteria and planning. Conventional boring, sampling and in situ testing methods. Theory and application of geophysics and geophysical methods including seismic, electrical resistivity, gravity, magnetic and radioactive measurements. Air photo interpretation. (Formerly 4300:418)
CIVE:471 Construction Administration (3 Credits)
Prerequisites: Junior standing and full admission to an engineering major in the College of Engineering and Polymer Science. Construction management functions, scheduling techniques for construction projects, scheduling PERT networks and linear operations, estimating building projects, construction contracts and legal structure, construction finance, engineering economics, equipment productivity, machine power, equipment selection and utilization, equipment cost, construction safety, construction trends, LEED construction. (Formerly 4300:471)

CIVE:472 Construction Engineering (3 Credits)
Prerequisite: Senior standing or permission. Construction equipment selection and management. Techniques of various engineering construction operations including blasting, tunneling, concrete framework and dewatering. (Formerly 4300:472)

CIVE:473 Construction Materials (2 Credits)
Prerequisites: CIVE 380 and CHEE 305. Composition, structure and mechanical behavior of structural materials such as concrete, wood, masonry, plastics and composite materials. Discussion of applications and principles of evaluating material properties. (Formerly 4300:473)

CIVE:474 Underground Construction (2 Credits)
Prerequisite: CIVE 314. Description of practices and techniques of underground construction. Selection of proper method for individual job. Design of underground openings, support systems and linings. (Formerly 4300:474)

CIVE:480 Reliability-Based Design (4 Credits)
Prerequisite: STAT 261 and senior standing. Probability concepts in civil engineering. Risk analysis and reliability based design. (Formerly 4300:480)

CIVE:482 Special Projects: Civil Engineering (1-3 Credits)
Prerequisites: Senior standing and permission. Directed individual or group research or study in student’s field of interest. Topic subject to approval by adviser. (Formerly 4300:482)

CIVE:489 Fundamental of Engineering Exam Review (0 Credits)
Prerequisite: Senior standing. This course is intended to prepare civil engineering students for the Fundamentals of Engineering Exam, which is to be taken prior to graduation. (Formerly 4300:489)

CIVE:490 Senior Design in Civil Engineering (3 Credits)
Prerequisites: CIVE 323, CIVE 341, CIVE 361, CIVE 403, senior standing and admission to an engineering major within the College of Engineering and Polymer Science. Pre/Corequisites: CIVE 314 and CIVE 401. A civil engineering design project that emphasizes interdisciplinary teamwork to solve a substantial, currently relevant problem. (Formerly 4300:490)

Gen Ed: - Capstone

CIVE:497 Honors Project (1-3 Credits)
(May be repeated for a total of six credits) Prerequisite: Senior standing in Honors Program. Individual creative project or design relevant to civil engineering, supervised by faculty member of the department. (Formerly 4300:497)