

CIVIL ENGINEERING (CIVE)

CIVE 1000 Freshman Civil Engineering Experience

[0-1 credit hours]

Computer literacy, report writing, word processing, table creation, equation, equation writing, data manipulation, data graphical plotting. Introduction to various disciplines in Civil Engineering, Structural, Geotechnical, Transportation, Environmental. Practice in engineering problem solving process.

Term Offered: Fall

CIVE 1100 Civil Engineering Measurements

[3 credit hours]

Study of graphical representations of engineering structures and systems and application by hand drawing and computer aided techniques. Instruments and methods for linear and angular measurements. Error theory and propagation. Familiarization with geographical information systems.

Corequisites: CIVE 1110

Term Offered: Spring, Fall

CIVE 1110 Computer Aided Drafting for Civil Engineers

[1 credit hour]

Study of graphical representation of engineering structures and systems and application by hand-drawing and computer aided techniques.

Corequisites: CIVE 1100

Term Offered: Spring, Fall

CIVE 1150 Engineering Mechanics: Statics

[3 credit hours]

Study of coplanar statics of particles, vector addition, resultant components, equilibrium, free body diagrams, equivalent force systems, vector products, scalar products, 2 & 3 dimensional equilibrium of rigid bodies, analysis of machines, pulleys, trusses. Centroids, moments of inertia, shear and bending moment diagrams.

Prerequisites: (MATH 1850 with a minimum grade of D- and PHYS 2130 with a minimum grade of D-) or (MATH 1920 with a minimum grade of D- and PHYS 2130 with a minimum grade of D-)

Term Offered: Spring, Summer, Fall

CIVE 1160 Engineering Mechanics: Strength Of Materials

[3 credit hours]

Material properties. Axially loaded members, including eccentric loads and thin wall pressure vessels. Axial load applications: Stress-Strain relationships, Stress & Strain transformations. Torsion: solid sections, circular sections. Torsional load applications: Combined axial and torsion stress. Beams: shear and bending moment diagrams, bending stress, deflection. Beam load applications: Combined shear, torsion and bending stress. Buckling of long columns.

Prerequisites: CIVE 1150 with a minimum grade of D-

Term Offered: Spring, Summer, Fall

CIVE 1170 Fluid Mechanics For Civil Engineers

[3 credit hours]

Fundamental concepts of fluid mechanics. Use of hydrostatics, continuity, momentum and energy equations to solve fluid problems applied to pipe flow, open channel flow and boundary layer flow. Introduction to turbo machinery.

Prerequisites: PHYS 2130 with a minimum grade of D-

Term Offered: Spring

CIVE 2000 Professional Development

[1 credit hour]

Basic concepts of career planning, co-op performance expectations, necessary skills for maximizing learning from experiences and realities of the professional community.

Prerequisites: CIVE 1000 with a minimum grade of D- or CHEE 1000 with a minimum grade of D-

Term Offered: Spring

CIVE 2110 Civil Engineering Materials With Laboratory

[3 credit hours]

Introduction to properties of aggregates, Portland cement, concrete, steel, glass and bituminous mixtures. Mix designs of cement and asphalt concrete and standard test procedures for strength, workability, serviceability and durability.

Prerequisites: CIVE 1160 with a minimum grade of D-

Term Offered: Spring, Fall

CIVE 2550 Sustainability Problem Solving

[3 credit hours]

Teams of students work as part of an enterprise to address real-world engineering design projects or problems. Develops group problem-solving skills. Stresses interpersonal, project management, and action planning skills. Frames the problem from a systems and sustainability perspective including the technical, social, economic, and environmental dimensions and solutions of the problem.

Term Offered: Spring, Summer, Fall

CIVE 2990 Individual Study In Civil Engineering

[1-3 credit hours]

An opportunity for qualified underclassmen to pursue a relevant area of Civil Engineering of particular personal interest under the supervision of a faculty member.

Term Offered: Summer, Fall

CIVE 3120 Civil Engineering Systems Analysis

[3 credit hours]

Systems Approach, optimization by differential calculus techniques, linear programming, transportation and assignment problems, management of construction projects, critical path method, PERT and decision analysis.

Prerequisites: MATH 2850 (may be taken concurrently) with a minimum grade of D-

Term Offered: Spring, Fall

CIVE 3210 Soil Mechanics

[0-3 credit hours]

A study of soil as an engineering material. Geologic origins, physical properties, movement of water through soil, soil stresses, consolidation, shear strength. Engineering properties testing of soils in laboratory.

Prerequisites: (CIVE 1160 with a minimum grade of D- and CIVE 1170 with a minimum grade of D-)

Term Offered: Spring, Fall

CIVE 3220 Foundation Engineering

[3 credit hours]

Application of soil mechanics principles to design for problems encountered in excavations, embankments, foundations, retaining structures, abutments, slope stability. Evaluation of the ability of soil to function in various capacities.

Prerequisites: CIVE 3210 with a minimum grade of D-

Term Offered: Summer

CIVE 3310 Structural Analysis

[3 credit hours]

Analysis of statically determinate structures; analysis of simple and compound trusses, beams and frames; introduction to indeterminate structures; slope deflection and moment distribution. Introduction to computer applications.

Prerequisites: (CIVE 1160 with a minimum grade of D- and MATH 1890 with a minimum grade of D- or MATH 2890 with a minimum grade of D-)

Term Offered: Spring, Fall

CIVE 3410 Steel Design I

[3 credit hours]

An introduction to the principles underlying design of axial tension members, axial compression members, beams, columns and base plates. Also includes welded and bolted connections.

Prerequisites: CIVE 3310 with a minimum grade of D- and CIVE 2110 with a minimum grade of D-

Term Offered: Summer

CIVE 3420 Reinforced Concrete Design I

[3 credit hours]

Introduction to principles and underlying design of basic structural beams, columns, one-way slabs in reinforced concrete. Shear reinforcement.

Prerequisites: CIVE 3310 with a minimum grade of D-

Term Offered: Spring, Fall

CIVE 3510 Transportation Engineering I

[3 credit hours]

To provide an overview of transportation systems and operating characteristics of various highway modes. Concept of land use/transportation interaction. Considerations of vehicle and human characteristics in design of highway elements. Introduction to highway capacity and traffic control devices. Transportation planning process leading to local area traffic management with introduction to transportation system management and intelligent transportation systems.

Prerequisites: (CIVE 1100 with a minimum grade of D- and MIME 2300 with a minimum grade of D-)

Term Offered: Fall

CIVE 3520 Transportation Engineering II

[3 credit hours]

Survey of various modes of transport with emphasis on service provided by each and facilities required. Introduction to physical and practical aspects of design of transport facilities including drainage, pavements, railroads, ports and harbors, pipelines and transportation terminals.

Prerequisites: (CIVE 3510 with a minimum grade of D- and CIVE 3210 with a minimum grade of D- and CIVE 2110 with a minimum grade of D-)

Term Offered: Summer

CIVE 3610 Water Supply And Treatment

[0-3 credit hours]

This course includes lecture, laboratory exercises and a team-based design project. The topics covered will include water quality, water supply, design of the physical and chemical treatment processes, water distribution systems and contemporary issues related to drinking water.

Prerequisites: CIVE 1170 with a minimum grade of D-

Term Offered: Fall

CIVE 3620 Air Pollution Engineering I

[3 credit hours]

Introduction to sources of air pollution, basic meteorological processes, air quality modeling, technology for air pollution control, odor control and noise pollution. Introduction to health effects of air pollutants, risk assessment and global atmospheric change. The students are required to use the USEPA programs for stack design and computations for ground level concentrations.

Prerequisites: CIVE 1170 with a minimum grade of D-

Term Offered: Spring

CIVE 3630 Wastewater Engineering

[3 credit hours]

This course is focused on wastewater engineering processes. The class format may include lectures, laboratory and field exercises, problem sessions, and team-based design work. The topics covered will include wastewater characterization, collection, treatment process design, discharge, as well as stormwater management and modeling.

Prerequisites: CIVE 1170 with a minimum grade of D-

Term Offered: Spring, Fall

CIVE 3720 Boundary Surveying

[3 credit hours]

Analysis of evidence and procedures for boundary location, Researching local survey records, and Platting and Subdivision Design. Basic legal principles for boundary surveying. Evaluation, use, and admissibility of boundary evidence in courts of law. Discussion of surveyor's liability and role in courts of law.

Prerequisites: CIVE 1100 with a minimum grade of D- and CIVE 1110 with a minimum grade of D-

Term Offered: Spring

CIVE 3730 Geodetic and Control Surveying

[0-3 credit hours]

Introduction to Geodesy and Control Surveying including State Plane Coordinates, Azimuths from Celestial Observations, Development of Control Networks for Surveys, Introduction of Global Positioning Systems and Aerial Mapping, high accuracy measurements which account for the curvature of the Earth, and definitions of geodetic data for survey control. Prerequisites: (CIVE 1100 or CET 1210) AND (CIVE 1110 or CET 2030)

Prerequisites: (CIVE 1100 with a minimum grade of D- or CET 1210 with a minimum grade of D-) and (CIVE 1110 with a minimum grade of D- or CET 2030 with a minimum grade of D-)

Term Offered: Summer

CIVE 3760 Route and Construction Surveying

[0-3 credit hours]

Route Surveying and Geometric Design including Horizontal, Vertical and Spiral Curves, Topographic Surveying and Mapping, Earthwork Volumes, and Construction Layout and Staking. Prerequisites: (CIVE 1100 or CET 1210) AND (CIVE 1110 or CET 2030)

Prerequisites: (CIVE 1100 with a minimum grade of D- or CET 1210 with a minimum grade of D-) and (CIVE 1110 with a minimum grade of D- or CET 2030 with a minimum grade of D-)

Term Offered: Summer

CIVE 3770 Cadastral Surveys and Ohio Land Systems

[3 credit hours]

Study of the Official Surveys of the United States. Establishment and Retracement of Public Land Survey System Surveys and Colonial Land Surveys. History of Land Systems in the United States and Original Ohio Land Subdivisions. Prerequisites: (CIVE 1100 or CET 1210) AND (CIVE 1110 or CET 2030).

Prerequisites: (CIVE 1100 with a minimum grade of D- or CET 1210 with a minimum grade of D-) and (CIVE 1110 with a minimum grade of D- or CET 2030 with a minimum grade of D-)

Term Offered: Spring

CIVE 3940 Co-Op Experience

[1 credit hour]

Approved co-op work experience. Course may be repeated.

Prerequisites: CIVE 2000 with a minimum grade of D-

Term Offered: Spring, Summer, Fall

CIVE 3950 Co-op Experience

[1 credit hour]

Approved co-op work experience beyond third required co-op experience. Course may be repeated.

Prerequisites: CIVE 3940 with a minimum grade of D-

Term Offered: Spring, Summer, Fall

CIVE 4210 Advanced Soil Mechanics

[3 credit hours]

A study of soil behavior including stress distributions, deformation, consolidation and shear strength. The course focuses upon the development and use of well accepted solutions and practical applications.

Prerequisites: CIVE 3210 with a minimum grade of D-

CIVE 4240 Design With Geosynthetics

[3 credit hours]

Use of geosynthetic materials in engineering design for reinforcement, barrier, separation and/or drainage functions. Design applications for geotechnical, transportation and environmental uses.

Prerequisites: (CIVE 3210 with a minimum grade of D- and CIVE 3220 with a minimum grade of D-)

CIVE 4300 Advanced Mechanics Of Materials

[3 credit hours]

Theory of elasticity, plane stress and plane problems, yield criteria and failure theories, bending of beams, energy methods, curved flexural members, unsymmetric bending, torsion, shear center and axisymmetrically loaded members.

Prerequisites: CIVE 1160 with a minimum grade of D- and (MATH 2860 with a minimum grade of D- or MATH 3860 with a minimum grade of D- or MATH 3820 with a minimum grade of D-)

Term Offered: Spring, Fall

CIVE 4320 Computer-Aided Analysis of Structures

[3 credit hours]

Matrix analysis of continuous beams, trusses and frames by force method and displacement method. Methods of consistent deformation and slope deflection will be discussed to complement the matrix analysis. Computer applications.

Prerequisites: CIVE 3310 with a minimum grade of D-

CIVE 4340 Experimental Mechanics

[3 credit hours]

Application of experimental techniques to stress analysis. Comparison of experimental and analytical methods. Theory of electrical resistance strain gages. Methods of photoelasticity including photostress. Data acquisition systems and their use.

Prerequisites: CIVE 2110 with a minimum grade of D-

Term Offered: Spring

CIVE 4430 Structural Steel Design II

[3 credit hours]

Study of local failure in beams, biaxial bending, plate girders, composite beams, semi-rigid composite connections and beam columns.

Prerequisites: CIVE 3410 with a minimum grade of D-

Term Offered: Spring

CIVE 4440 Reinforced Concrete Design II

[3 credit hours]

Analysis and design of columns under axial compression and biaxial bending. Consideration of bar cut-off, development lengths. Design of two-way slabs and building frames in reinforced concrete. Deflection of beams. Shear design provisions for deep beams.

Prerequisites: CIVE 3420 with a minimum grade of D-

CIVE 4480 Reinforced Masonry Design

[3 credit hours]

Study of the design of reinforced and unreinforced masonry design, beams and walls and columns. Working stress design, strength design and empirical design are studied.

Prerequisites: CIVE 3420 with a minimum grade of D-

Term Offered: Spring, Fall

CIVE 4550 Traffic Control

[3 credit hours]

To provide a detailed understanding of the basic concepts of traffic engineering together with driver-roadway-vehicle system characteristics. Capacity analysis of freeways, rural highways, multilane and two lane highways. Traffic control devices and traffic signal design and capacity. Traffic studies and data collections; volume, speed and travel time, accident and parking studies. Introduction to other tools to mitigate traffic congestion.

Prerequisites: CIVE 3510 with a minimum grade of D-

Term Offered: Fall

CIVE 4610 Hydrology And Water Resources

[3 credit hours]

This course is directed to application of fluid mechanics, hydrology, and hydraulics to the discipline of water resources engineering. Topics covered include flow in closed conduits, flow in open channels, pump systems, surface water hydrology, and computational modeling for hydraulic systems. At the successful completion of this course, the student will learn to apply the fundamental principles to the practical solution of both analysis and design problems in closed and open conduit flows.

Prerequisites: (CIVE 3610 with a minimum grade of D- and MIME 4000 with a minimum grade of D-)

Term Offered: Spring, Fall

CIVE 4630 Indoor Air Quality

[3 credit hours]

Characterization of indoor air pollutants, predictions of indoor air quality levels and indoor air quality control. Four to five design problems involving indoor air quality will be discussed/solved in the class. Special emphasis on the indoor radon and asbestos problems in the United States. Use of USEPA program.

Term Offered: Fall**CIVE 4680 Environmental Law**

[3 credit hours]

An overview of the major federal environmental statutes: Clean Air Act, Clean Water Act, RCRA, CERCLA, etc. and legal perspective of why they were developed. Exposure to some basic legal principles which will be integrated into the overall study of environmental law. Provides a practical perspective on how the law can be applied to situations encountered by environmental engineers and scientists in the real world.

Term Offered: Fall**CIVE 4690 Sustainability Engineering**

[3 credit hours]

Course develops students' abilities to apply the principles of sustainability to engineered systems. Course topics include sustainability definition and data, life cycle assessment based design, planetary boundaries, greenhouse gas emissions, green construction.

Term Offered: Spring, Fall**CIVE 4710 Advanced Engineering Systems Modeling**

[3 credit hours]

A systematic approach to the analysis of complicated engineering system involving uncertain and probabilistic phenomena. Decision-making with multiple objectives, monte carlo simulation, reliability based design, and Markov process are studied.

Prerequisites: (CIVE 3120 with a minimum grade of D- and MIME 4000 with a minimum grade of D-)

Term Offered: Fall**CIVE 4720 Boundary Control and Legal Principles**

[3 credit hours]

Establishment and Re-establishment of Land Boundaries, Locating Points and Line for Boundaries, Historical Development of Boundaries, Introduction of Rectangular System of Public Land Surveys, Systems to Describe Properties, Application of Legal Principles to Boundary Analysis. Prerequisites: (CIVE 1100 or CET 1210) AND (CIVE 1110 or CET 2030).

Prerequisites: (CIVE 1100 with a minimum grade of D- or CET 1210 with a minimum grade of D-) and (CIVE 1110 with a minimum grade of D- or CET 2030 with a minimum grade of D-)

Term Offered: Fall**CIVE 4750 Senior Design Projects**

[0-3 credit hours]

To provide real world civil engineering design experience through a design problem as would be developed in an actual civil engineering consultant's office.

Term Offered: Spring, Fall**CIVE 4770 Legal and Ethical Aspects of Surveying**

[3 credit hours]

Study of Statute and Common Law pertaining to Surveying and Property Rights, Interpretations and Methods to Describe Real Property, Minimum Standards for Surveys, Ethics for Professional Surveyors. Prerequisites: (CIVE 1100 or CET 1210) AND (CIVE 1110 or CET 2030)

Prerequisites: (CIVE 1100 with a minimum grade of D- or CET 1210 with a minimum grade of D-) and (CIVE 1110 with a minimum grade of D- or CET 2030 with a minimum grade of D-)

Term Offered: Fall**CIVE 4900 Seminars In Civil Engineering**

[1-3 credit hours]

An opportunity for qualified upperclassmen to pursue a relevant area of Civil Engineering of particular personal interest under the supervision of a faculty member.

Term Offered: Spring, Summer, Fall**CIVE 4980 Special Topics**

[1-3 credit hours]

A special topic at the undergraduate level in Civil or Environmental Engineering to be offered as a course during a term by a faculty member. This is intended for students nearing graduation. Credits will correspond to regular class meeting of one lecture hour per week per credit hour.

Term Offered: Spring, Summer, Fall**CIVE 4990 Independent Study**

[1-3 credit hours]

An opportunity for a qualified upper class person to pursue a relevant area of Civil Engineering under the supervision of a faculty member.

Term Offered: Spring, Summer, Fall