

CET - Civil Engineering Technology

CET 120 Civil 2D Computerized Aided Drafting (3 Credit Hours)

This course is computer based drafting, where methods are taught with a major emphasis on practical application using two-dimensional AutoCAD software in the computer lab. This includes the basic principles of Civil Engineer drawings to include but not limited to: dimensioning and tolerances, spot elevations, contours, plan and profile view, section views, details, scaling, measurements. It will introduce students to site plan drawings, mechanical view, structural views, architectural views, roadway plan and profiles, as well as buried infrastructure plan and profiles. Finally, it will be the basis for preparation of a working set of plans, for use in all follow-on CET courses.

CET 200 Statics (3 Credit Hours)

Scalar methods and free body diagrams are employed in the analysis of discrete and distributed force systems and their application to bodies in external equilibrium. Friction, moment of inertia, and center of gravity are also included.

Pre- or corequisite: MATH 211

CET 205 Principles of Surveying (3 Credit Hours)

Basic plane surveying measurements and computations, survey control systems, elementary digital mapping and simple curves, and building construction survey and stakeout. Field exercises using standard surveying instrumentation, traverse and leveling techniques, topographic mapping and curve layout.

Prerequisites: MATH 163 and MET 120 or CET 120

CET 210 Fundamentals of Building Construction (3 Credit Hours)

Introduction to various materials and methods available for design and construction of buildings. Covers application and combination of traditional materials and methods, and recent innovations in construction systems.

CET 220 Strength of Materials (3 Credit Hours)

Mechanical behavior of materials subjected to various external loads. Stress-strain relationships are utilized to design members subjected to shear, axial, bending, and torsional loads. Deformations are predicted and Mohr's circle is introduced.

Prerequisites: MATH 211 and a C or better in CET 200

CET 260 Plan and Specifications (3 Credit Hours)

A detailed study of the form and content of typical plans and specification documents used in the construction industry. The use of computer-aided-drafting (CAD) in assembling a set of plans and specifications.

Prerequisites: CET 120 or MET 120 and CET 210

CET 295 Topics (1-3 Credit Hours)

Study of selected topics.

CET 296 Topics (1-3 Credit Hours)

Study of selected topics.

CET 301 Structural Analysis (3 Credit Hours)

Determination of forces, moments, and deflections in statically determinate and indeterminate beams, frames, and trusses due to various load cases and load combinations. Methods of analysis will include matrix stiffness analysis, moment distribution and other approximate and computer methods.

Prerequisites: CET 220 and MATH 211

CET 325 Introduction to Land Development (3 Credit Hours)

Applications of fundamental site engineering principles, land design principles and permitting issues. A brief historical review of exemplary subdivision, urban designs and their impact on current practice. Site surveying and engineering issues including hydrology, storm water management, site geometry, grading, design of roads, engineering design standards, and computer applications in site engineering are examined. The principles of siting and theories of design for aesthetic and efficient alignment of roads, layout of structures, and subdivision parcels are introduced.

Prerequisites: CET 210

CET 330 Fluid Mechanics (4 Credit Hours)

Elementary mechanics of fluids. Fluid properties; hydrostatics; fluid kinematics; equations of motion; energy equation; momentum principles; flow of liquids and gasses in closed conduits; flow in open channels and/or compressible flow. Laboratory will demonstrate principles from the lecture material. All experiment results will be submitted in a written report format, including presentation and interpretation of experimental data. Use of spreadsheets is required.

Prerequisites: CET 220 and MATH 211

CET 332 Water Resources Engineering (3 Credit Hours)

Hydrologic and Hydraulic principles are utilized in the planning, design, operation and construction of water management projects. The course addresses fundamental Hydrology - the occurrence and movement of surface water including weather and climate; precipitation; evaporation; transpiration; runoff; infiltration; stream flow; hydrograph analysis; erosion; and sedimentation. Additional topics covered will include water distribution, use of water, and sustainability of water as a natural resource.

Prerequisites: CET 330

CET 334 Computer Applications in Hydraulic Engineering (3 Credit Hours)

Application of computer software in solving water resources problems; program development or application of available packages to solve assigned water resources problems. Use and application of commercial software for analysis and design of water distribution networks and gravity sewer collection systems.

Prerequisites: CET 330

CET 335 Fluid Mechanics Laboratory (1 Credit Hour)

A laboratory to demonstrate the verification of fluid equations and principles as well as the characteristics of fluid machinery. All experimental results will be submitted in a report format, including presentation and interpretation of experimental data. Use of spreadsheets is required. This is an online asynchronous class open only to transfer students with credit for the lecture portion of CET 330.

Prerequisites: CET 330

CET 340 Soils and Foundations (3 Credit Hours)

A study of the engineering properties of soil including stress, shear strength, and bearing capacity. Movement of water through soils, consolidation and settlement of structures and the design of shallow and deep foundations are also covered. Use of Excel spreadsheets is a requirement.

Prerequisites: CET 330

CET 341W Soils Testing Laboratory (2 Credit Hours)

Course includes standard methods for inspecting, sampling, testing, and evaluating soils. Students use typical test equipment and perform tests on samples of local soils. A written report is required for each experiment. This is a writing intensive course.

Prerequisites: a grade of C or better in ENGL 211C or ENGL 221C or ENGL 231C

Corequisites: CET 340

CET 345W Materials Testing Laboratory (2 Credit Hours)

Standard methods of inspecting and testing structural materials used in construction are followed. A written report is required for each experiment. This is a writing intensive course.

Prerequisites: grade of C or better in ENGL 211C or ENGL 221C or ENGL 231C

Corequisites: CET 220

CET 355 Sustainable Building Practices (3 Credit Hours)

The course will examine industry trends in sustainable building practices. It explores the green building strategies used in the design and construction of sustainable buildings. The role of site selection, water efficiency, energy, materials and resources, and indoor environmental quality will be explored.

Prerequisites: Junior standing

CET 365 Building Information Modeling (BIM) (3 Credit Hours)

This course is an introduction to building information modeling (BIM) and its implementation in building design and construction. Topics include the fundamentals of information modeling; business benefits of BIM; impacts of BIM on design and construction processes; integrated design process and project delivery; popular software applications and basic modeling techniques; and popular areas and best practices of BIM implementation.

Prerequisites: CET 260

CET 367 Cooperative Education (1-3 Credit Hours)

Available for pass/fail grading only. Student participation for credit based on the academic relevance of the work experience, criteria, and evaluative procedures as formally determined by the department and Career Management prior to the semester in which the work experience is to take place. (offered fall, spring, summer) (qualifies as a CAP experience)

Prerequisites: Approval by the CET program director and Career Development Services (CDS) in accordance with the policy for granting credit for Cooperative Education programs; a student who needs to add additional credit to maintain full-time status should contact the program director

CET 368 Internship (1-3 Credit Hours)

Available for pass/fail grading only. Academic requirements will be established by the department and will vary with the amount of credit desired. Allows students to gain short duration career-related experience.

Prerequisites: approval by department and Career Development Services

CET 369 Practicum (1-3 Credit Hours)

Available for pass/fail grading only.

Prerequisites: approval by department and Career Development Services

CET 395 Topics (1-3 Credit Hours)

Topics in Civil Engineering Technology.

Prerequisites: permission of the instructor

CET 396 Topics (1-3 Credit Hours)

Topics in Civil Engineering Technology.

Prerequisites: permission of the instructor

CET 400 Computer Applications in Structural Design (3 Credit Hours)

Use and application of commercial software for analysis and design of building and non-building type structures. Determination of compliance with strength, serviceability, and fabrication requirements. Introduction to computer modeling in 2D and 3D, pre and post processors, interpretation of results and development of professionally written reports.

Pre- or corequisite: CET 301

CET 405 Environmental Loads (3 Credit Hours)

Familiarize the student with the analysis of environmental design loads required for the design of building and non-building type structures in the United States. A thorough study of loading categories and load combinations for ASD and LRFD is also covered. Extensive use of the International Building Code (IBC) and the Minimum Design Loads for Building and Other Structures (ASCE 7) is expected.

Prerequisites: CET 301

CET 408 Hydraulic Engineering (3 Credit Hours)

Analysis of hydraulics problems associated with the design of civil engineering structures. Uniform, steady flow in open channels; hydraulic models; design problems for dams; spillways and hydraulic structures; hydraulic machinery and other related topics will be discussed. Use of spreadsheets is required.

Prerequisites: CET 330

CET 410 Reinforced Concrete Design (3 Credit Hours)

Structural analysis and design of reinforced concrete members. Topics include flexural analysis and design of structures, including slabs, beams and columns using strength design procedures.

Prerequisites: Junior standing

Pre- or corequisite: CET 301

CET 415 Design of Structural Systems (3 Credit Hours)

This course focuses on assembly design as opposed to member design as learned in structural design courses. The students are able to work on the overall stability of structures using one or more building materials such as concrete, wood, steel, cold-formed steel, and/or masonry. The use of building codes, standards and specifications is required. The main objective of this class is to adequately prepare the student for the senior design project. The course also offers an introduction to low-rise building design.

Prerequisites: CET 450 or CET 410 or CET 452

CET 420 Hydrology and Drainage (3 Credit Hours)

Hydrologic and hydraulic principles are utilized in the planning, design, operation and construction of water management projects. Topics include elements of stormwater drainage pertaining to hydrology, hydraulics of open channel and pipe flow, stormwater management, and issues pertinent to state stormwater regulations and the Chesapeake Bay Preservation Act.

Prerequisites: CET 330

CET 428 Buried Infrastructure (3 Credit Hours)

This is a capstone design course in the field of water resources. It incorporates pressurized pipe flow, gravity flow, and hydrology into the design of municipal infrastructure for water, sewer and stormwater projects. Topics will also cover rehabilitation and replacement of aging infrastructure in urban and neighborhood settings. Use of spreadsheets is required.

Prerequisites: CET 332 or CET 334 or CET 325

CET 435 Design of Reinforced Concrete Foundations (3 Credit Hours)

Analysis and design of reinforced concrete foundations typically used in buildings and bridges. Topics include loads and loading groups, methods of analysis and design, abutments, and isolated and continuous footings. The class will be focused on the load and resistant factor design method. Use of the ASCE 7, ACI and AASTHO codes is necessary.

Prerequisites: CET 340 and CET 410

CET 440 Contract Documents (3 Credit Hours)

The basic concepts of contracts and the standard contract documents used in construction. Also included is a study of the dispute resolution process in arbitration.

Prerequisites: CET 210

CET 445 Construction Planning and Scheduling (3 Credit Hours)

The basic elements of planning and scheduling building construction projects. All elements of building construction, including the precedence methods of scheduling. Use of computers and planning and scheduling software are emphasized.

Prerequisites: CET 210

CET 450 Structural Steel Design (3 Credit Hours)

Structural analysis and design of steel structures, including beams, girders, columns, composite sections, trusses, rigid frames and connections using the LRFD method. Analysis of statically-determinate cantilever (hungspan) systems also are covered.

Prerequisites: Junior standing

Pre- or corequisite: CET 301

CET 452 Wood Design (3 Credit Hours)

Analysis and design of wooden structural elements of buildings to satisfy design codes. Included are shearwall design and connections as well as beams, columns and other elements.

Pre- or corequisite: CET 301

CET 456 Resilience and Sustainability (3 Credit Hours)

An investigation of emerging construction industry trends in resilience and sustainability. Evaluation of applications for vulnerable, small-scale and rural projects. Quantify increases in project value by incorporating life cycle analysis, planning for continuity of function, and deliberate risk management.

Prerequisites: CET 355

CET 458 Managing the Climate Crisis (3 Credit Hours)

This course provides a structured framework for developing resilience. It focuses on addressing the impacts of the climate crisis like flooding, heat, water, and wildfire through principles, designs, and real-world solutions. This is achieved by examining hard engineering structures, nature-based design, and hybrid solutions to protect communities and create a resilient design future.

Prerequisites: Junior standing

CET 460 Construction Cost Estimating (3 Credit Hours)

Evaluation and analysis of the basic elements of estimating construction costs for buildings. Elements of take off and pricing for Division 1 through Division 6 are covered. Use of computers and estimating software are emphasized.

Prerequisites: CET 210

CET 465 Construction Project Management (3 Credit Hours)

An introduction to the procedures and methods that are used by a contractor during the construction phase of a project. Special emphasis on planning, managing and documenting project activities. Topics include job site layout and control, subcontracting and purchasing and changes and claims/progress payments.

Prerequisites: CET 210

CET 468 Construction Finance (3 Credit Hours)

A study of financial management in construction for civil engineering projects based on conceptual and construction plans. The emphasis of the course is on building construction but equally applicable to other construction type projects. Development of techniques required to effectively monitor the financial aspects of construction projects. This course is practice oriented. Use of spreadsheets is highly recommended.

Prerequisites: Junior Standing

CET 470 Infrastructure, Heavy Highway and Equipment (3 Credit Hours)

Methods and resources used to construct traditional civil infrastructure systems. Equipment utilization.

Prerequisites: CET 205 and CET 210

CET 485 Bridge Design (3 Credit Hours)

Familiarize the student with the analysis and design of simple and continuous span bridge structures utilizing the Load and Resistance Factor Design (LRFD) methodology. Determination of the most common design loads used in bridge design. Introduction to the AASHTO Specification for Structural Bridge Design used in United States.

Prerequisites: CET 410 or CET 450

CET 495 Topics (1-3 Credit Hours)

Topics in civil engineering technology.

Prerequisites: permission of the instructor

CET 496 Topics (1-3 Credit Hours)

Topics in civil engineering technology.

Prerequisites: permission of the instructor