

# Civil Engineering Technology

---

## **CT102 Engineering Drawing and Microstation CAD**

**Cr-3**

This course includes both basic technical drawing techniques and MicroStation CAD to support engineering design. Topics include line types, dimensioning, scaling, auxiliary views, sectioning, and notations. This course also introduces the use of MicroStation software. Topics include operational concepts; main palette use; projecting elements; entity construction and editing; entity manipulations; and text and dimensioning parameters.

## **CT121 Statics**

**Cr-3**

This course is a study of force systems and their actions on bodies at rest. Topics include force systems, equilibrium, distributed forces, centroid, moment of inertia, and friction. Prerequisite: MA121 Fundamentals of College Mathematics 1. (Spring, Summer semester)

## **CT141 Introduction to Civil Engineering Technology**

**Cr-2**

This course introduces the many aspects of Civil Engineering to students who are interested in pursuing a career in either the Civil Engineering and/or Surveying Technology field. It also introduces students to the various tools required for use in these fields as well as the fields of engineering or engineering technology program. The use of personal computers is introduced as engineering tools for work enhancement. Experience is provided with a variety of microcomputer software applications, including word processing, electronic spreadsheets, presentations, file management, and database software. Engineering and surveying ethics are also introduced.

## **CT151 Surveying 1**

**Cr-4**

This course introduces surveying, and includes the topics in the care and use of surveying instruments, field note procedures, land surveying, topographic surveying, construction surveying, and mapping from field notes. Fieldwork includes the use of measurement equipment, levels, transits, the odolites, total stations, and Global Positioning System (GPS). Corequisite: MA121 Fundamentals of College Mathematics 1.

## **CT153 Introduction to Global Positioning Systems (GPS)**

**Cr-3**

Introduction to the data collection methods, applied concepts, and interdisciplinary applications of Global Positioning Systems (GPS) and its operations.

## **CT221 Strength of Materials: Civil**

**Cr-4**

This course introduces the fundamental concepts used to design structural members. Topics include the relationship between stress and strain, design of beams, shear and moment diagrams, deflection of beams, and columns. Practicums include computational work, related to problem analysis, and the performance of tests on various construction materials such as steel, concrete, and asphalt. Prerequisite: CT121 Statics. (Fall Semester)

## **CT222 Soil Mechanics and Foundations**

**Cr-4**

This course introduces soil mechanics and its application to problems encountered in civil engineering. Topics include the flow of water through soils, soil strength and compressibility, the effect of water on these properties, and geo-synthetics. The theories of soil mechanics are applied to the design of foundations and retaining walls. This course explores the methods of performing field explorations. Laboratory tests commonly used to evaluate the engineering properties of soils are studied and performed. Corequisite: CT221 Strength of Materials: Civil. (Fall Semester)

## **CT225 Structural Steel Design**

**Cr-3**

This course explores the design of structural members and connections using structural steel. Prerequisite: CT221 Strength of Materials: Civil. (Spring semester)

## **CT226 Reinforced Concrete Design**

**Cr-3**

This course explores reinforced concrete beams, slabs, columns, footings, and walls. Prerequisite: CT221 Strength of Materials: Civil. (Spring semester)

## **CT231 Transportation Engineering**

**Cr-3**

This course covers transportation modes, including the interlocking relationships among transportation, economics, community, and the environment. Emphasis is placed on the process behind a transportation project including planning, design, construction and maintenance especially on highway design. Prerequisite: MA121 Foundations of College Mathematics 1.

## **CT232 Environmental Engineering**

**Cr-3**

This course covers basic practices in hydraulics and hydrology, as well as environmental topics encountered in the civil engineering field. Prerequisites: MA121 Fundamentals of College Mathematics 1 and CT151 Surveying 1.

## **CT242 Mechanical & Electrical Systems for Buildings**

**Cr-3**

This course explores the features of mechanical and electrical systems typically included as part of the utility of service grouping in modern buildings, including design principles, materials and equipment, installation, operation, and maintenance. All mechanical aspects of supporting a building are covered, including air handling, HVAC, heat loads and losses, electricity, plumbing, and water delivery.

## **CT243 Construction Management**

**Cr-2**

This course covers the legal problems, building codes, specifications and efficient construction methods relating to construction projects. Topics include estimating costs of construction projects and construction scheduling.

## **CT253 Global Positioning and High Order Controls**

**Cr-4**

This course introduces engineering field surveys, equipment, and methods. Topics include azimuth determination, control and level nets, surveying with data recording total stations, and position determination with Global Positioning Systems (GPS), including computer exposure for data reductions. Prerequisite: CT151 Surveying 1.

## **CT263 Digital Mapping**

**Cr-3**

This course covers remote sensing along with metric analysis and interpretation of digital images. Photo interpretations and digital image analysis include satellite and aerial platforms. Topics include concepts and theories of geographic information systems and traditional photogrammetry. Prerequisite: CT151 Surveying 1 or CT265 Introduction to Geographic Information Systems.

## **CT265 Introduction to Geographic Information Systems**

**Cr-3**

This course introduces the techniques and concepts of GIS. The mapping software package ArcGIS is used to display, analyze, and query spatial data sets. Topics include coordinate systems/datums, symbology, classifications, digital imagery, and global positioning systems. (Fall semester)

**CT266 Capstone Geographic Information Systems** **Cr-3**

This independent study capstone course involves the creation of a project using GIS. Proposals must have instructor approval. Projects incorporate collecting GPS data, building an attribute geo-database, and are completed using ArcGIS software. Final presentations are required, which explain data collection techniques, analysis, and project success. Prerequisite: CT265 Introduction to Geographic Information Systems (GIS). (Spring semester)

**CT267 Advanced Geographic Information Systems** **Cr-3**

This course focuses on advanced topics and applications in analyzing and visualizing geospatial data. Topics include spatial modeling, advanced editing, geodatabase creation, and three-dimensional modeling. Prerequisite: CT265 Introduction to Geographic Information Systems.

**CT299 Capstone Design Project - Civil** **Cr-3**

In this course students collaboratively design and present a project that integrates program course knowledge with long-range planning and economic, budgetary, environmental, scheduling, and public concerns. Students present the final design to a group of professionals formally. Prerequisites: CT102 Engineering Drawing and MicroStation CAD, CT151 Surveying I, CT222 Soil Mechanics and Foundations, and CT231 Transportation Engineering. Corequisite: CT232 Environmental Engineering.

**CT300 Independent Study in Civil Engineering Technology** **Cr-1**

This course allows for the definition of a new product or service; the development of the design and prototype, a marketing plan and strategy, and a production/implementation system to provide a successful technology business. Start-up community/business resources are identified to help provide the needs of the new business. Additional fees may be assessed to reflect additional costs associated with the usage of equipment and materials. Prerequisite: Program Committee approval for the project. (Students must provide the Committee with project description.)