

# CIVIL TECHNOLOGY (CT)

*Beginning in the 2018-2019 academic year, the Civil Technology: Construction Management Concentration, Civil Technology: Surveying and Mapping Concentration and Civil Technology: Sustainable Energy Management Concentration programs will no longer be accepting new students. Current Thompson School students in these programs will continue to have access to the same high-quality education and resources until they graduate in 2019.*

Civil technology is a dynamic educational opportunity offering skill-based learning through classroom instruction, extensive hands-on laboratory experience and fieldwork, as well as opportunities to develop a strong portfolio. Students choose from one or more of the following concentrations: Construction Management, Surveying and Mapping, or Sustainable Energy Management.

The cornerstone of the educational experience is instruction in computer-aided design (CAD) and parametric modeling using the Thompson School's state-of-the-art CAD/GIS/BIM (building information management) labs. Students in surveying use the latest GPS and surveying equipment, and students studying geographical information systems (GIS) use the new GIS Instructional Lab. Additional coursework covers building science, building mechanical and electrical systems, construction contracting, materials, soils and foundation design, and methodologies of professional practice in the concentrations.

## Admissions Requirements

Applicants to the construction management, surveying and mapping, and sustainable energy management concentrations must present college preparatory English and at least two years of satisfactory work in college preparatory mathematics.

## Curriculum Fee

Civil technology, all concentrations: \$102<sup>1</sup>

<sup>1</sup> This one-time curriculum fee is required to cover lab materials, specialized equipment maintenance, and transportation that are unique to the applied nature of the concentration. The curriculum fee covers the entire two-year course of study for one concentration. Any non-TSAS student may be assessed specific course fees, details of which are included in each semester's Time and Room Schedule. All fees are subject to change.

<https://colsa.unh.edu/thompson-school-applied-science>

## Programs

- Civil Technology: Construction Management Concentration (A.A.S.) (<http://catalog.unh.edu/undergraduate/applied-science/programs-study/civil-technology/civil-technology-construction-management-concentration-aas>)
- Civil Technology: Surveying and Mapping Concentration (A.A.S.) (<http://catalog.unh.edu/undergraduate/applied-science/programs-study/civil-technology/civil-technology-surveying-mapping-concentration-aas>)
- Civil Technology: Sustainable Energy Management Concentration (A.A.S.) (<http://catalog.unh.edu/undergraduate/applied-science/>)

[programs-study/civil-technology/civil-technology-sustainable-energy-management-concentration-aas](https://colsa.unh.edu/undergraduate/applied-science/programs-study/civil-technology/civil-technology-sustainable-energy-management-concentration-aas))

## Courses

### Civil Technology (CT)

#### CT 423 - Introduction to Surveying and Mapping

**Credits:** 3

An introduction to the field of surveying and mapping and its fundamental principles, theories and methods. Specifically: horizontal and vertical distance measurements, angle and direction measurements, determination of positions, areas and topographic contours. Includes mapping, geographic information systems and the Global Positioning System, measurement accuracy, and statistical analysis.

**Co-requisite:** CT 425

#### CT 425 - Surveying and Mapping Lab

**Credits:** 2

A series of labs and recitations that provide an introduction to the field of surveying and mapping and its fundamental principles, theories and methods. Specifically: horizontal and vertical distance measurements, angle and direction measurements, determination of positions, areas and topographic contours. Includes mapping, geographic information systems and the Global Positioning System, measurement accuracy, and statistical analysis.

**Co-requisite:** CT 423

#### CT 427 - 2D Computer Aided Design

**Credits:** 4

The student designs fundamental design project work including site work and buildings, prepares plans using computer software (AutoCAD). Emphasis is on learning the software, basic design and plan requirements. Students then apply this knowledge to produce presentation drawings and develop proficient skills with this software. The student also works concurrently on course projects. 2-hr lec/2-hr rec.

#### CT 428 - 3D Design, Modeling and Visualization

**Credits:** 4

Provides foundational skills in critical thinking, design process and creative expression in three dimensions. Individual and group projects provide opportunities for enhancing spatial thinking, understanding and communication. Hand sketching, computer sketching, REVIT Building Information Modeling (BIM) software and ArcGIS Geographic Information System (GIS) software is utilized to develop a rich awareness of 3D spatial relationships in the natural and built environments.

#### CT 432 - Applied Environmental Technology

**Credits:** 4

The technical and administrative issues inherent to the management of our impact on the environment are covered. Topics to be covered include: examination of the evolution, design, and processes inherent to manage and treat stormwater, deliver potable water, collect and treat wastewater discharge, manage solid and hazardous waste, and promote recycling. Global climate change monitoring is also discussed when appropriate.

**CT 442 - Construction Surveying****Credits: 4**

This course applies methods and techniques learned in CT 423/424 to real world situations. The student works as part of a project team on a proposed construction site. Tasks and materials covered include: setting control, mapping of sites, design and layout of roadways, site planning, building and infrastructure layout, area and volume calculations. Class expands on use of survey equipment such as data collectors, RTK-GPS and land design computer software. Prereq: CT 423 and CT 424 with a grade of C- or better. 2-hr lec/1-hr rec/2-hr lab.

**CT 483 - Mechanical and Electrical Systems****Credits: 4**

Description, analysis and design application of conventional heating, ventilating, air conditioning, lighting and plumbing systems for residences. Electrical principles, laws, and installation with emphasis on the National Electrical Code. 2-hr lec/2-hr rec.

**CT 538 - Construction Contracting****Credits: 4**

Overview of administrative skills required to manage a construction concern. Emphasis on project management through the entire construction and design process. Building codes and the ADA code included. 2-hr lec/2-hr rec.

**CT 541 - Legal Aspects of Surveying****Credits: 4**

The legal issues involved when performing a property boundary survey are presented. Ownership of land, the search for boundary evidence, methods of performing research and resolving conflicting information and disputes are discussed. Other topics include: An introduction to legal principles, statutes, case law, terminology, liability, ethics and standards relating to surveying. A course-long project is undertaken whereby research, the search for evidence, a field survey, boundary determination and a plat are completed. Prereq: CT 423 and CT 424 with a grade of C- or better. 2-hr lec/2-hr rec.

**CT 543 - Advanced Surveying and Mapping****Credits: 4**

A continuation of surveying topics not covered in CT 423 and CT 424, CT 442 and CT 541. Specifically: Geodesy, Map Projection Systems, State Plane Coordinates, Control Surveys, Static and Real Time Satellite Positioning, Astronomic Observations, Equipment Testing, Site Detail Mapping, Laser Scanning, Observation Adjustment Theory and 3D Least Squares Adjustment. Prereq: C- or better in CT 423 and CT 424. 3-hr lec/3-hr lab.

**CT 548 - Advanced Surveying Computation****Credits: 4**

Emphasis on how to perform the typical surveying computations encountered in the field. Use of surveying and mapping software and plotters for topographic mapping and subdivision design. Advanced GIS theory and applications including Photogrammetry and Remote Sensing. Field equipment testing and adjustment. Prereq: CT 423 and CT 424, CT 442, CT 543, minimum grade of C- or better in all, or permission. 3-hr lec/2-hr lab.

**CT 551 - Statics and Materials****Credits: 4**

Determining and evaluating physical properties of common building construction materials: wood, steel and non-ferrous metals, cement, concrete, brick, and bituminous materials. Application of materials to design of structural elements in beam and column applications, under various load conditions. Emphasis on appropriate material selection and optimization of design. Prereq: MTH 203. 2-hr lec/2-hr rec.

**CT 554 - Soils and Foundations****Credits: 4**

Subsurface exploration, soil sampling, testing and evaluating subsurface materials, and their effect on foundations, site development, and construction. Hands-on laboratory component. Introduction to site excavation methods and foundation design. 2-hr rec/2-hr lab/rec.

**CT 557 - Land Design and Regulations****Credits: 4**

Hydrology of drainage and storm water runoff, basic concepts of hydraulic flow in pipes and channels, and overview of pump systems. Technical and regulatory requirements of designing residential water supply and septic disposal systems. Review of federal, state, and local ordinances with respect to construction and land development. 2-hr lec/2-hr rec.

**CT 576 - Building Science/Residential Construction****Credits: 4**

The study of inter-relationship of physical principles that affect the functionality and life span of a building; foundations, floor and framing systems, roofing styles and options, siding and interior finish work, and fenestrations. The materials and methodologies of residential construction with an emphasis on energy efficiency, air quality management, and moisture control. Includes safe and efficient operation of industry-standard power tools in hands-on shop environment (table saw, jointer, miter saw, etc.).

**CT 581 - Architecture I History and Design****Credits: 4**

Develops a basic understanding of American residential architectural history while developing architectural programming and design skills in a project based environment. Moderate CAD usage for project submissions 2-hr lec/2-hr rec.

**CT 582 - Architecture II****Credits: 4**

Studio application of principles and skills developed in the architectural concentration. Design of a complete shelter system into the design development phase. Prereq: CT 581. 2-hr lec/2-hr rec.

**CT 591 - Studies****Credits: 1-4**

Students who have the ability and adequate preparation to work independently may propose a contract to design a course or research project on a topic not available through existing course offerings. The purpose of this research is to explore new areas in the student's field of study or to pursue course material in greater depth. Work is supervised by an appropriate faculty/staff member and credit varies depending on the proposed project/research. Examples may include energy conservation, surveying, construction, or hydrographic surveying.

**CT 592 - Studies****Credits: 1-4**

Students who have the ability and adequate preparation to work independently may propose a contract to design a course or research project on a topic not available through existing course offerings. The purpose of this research is to explore new areas in the student's field of study or to pursue course material in greater depth. Work is supervised by an appropriate faculty/staff member and credit varies depending on the proposed project/research. Examples may include energy conservation, surveying, construction, or hydrographic surveying.

**CT 597 - Work Experience**

**Credits:** 0

Career-oriented work experience (10 weeks, full time) to include, but not limited to, architecture, construction, surveying, and mapping. Cr/F.

**Faculty**

<https://colsa.unh.edu/thompson-school-applied-science/people>