

# CNST-2570: GEODETIC SURVEYING

---

## Cuyahoga Community College

### Viewing: CNST-2570 : Geodetic Surveying

**Board of Trustees:**

September 2023

**Academic Term:**

Fall 2024

**Subject Code**

CNST - Construction Engineering Tech

**Course Number:**

2570

**Title:**

Geodetic Surveying

**Catalog Description:**

Planning and execution of control surveying, cadastral surveying, network adjustment and topographic surveying using total stations and data collections, satellite positioning (Global Navigation Satellite System) and advanced imagery systems. Introduction to remote sensing such LIDAR and laser scanning.

**Credit Hour(s):**

3

**Lecture Hour(s):**

2

**Lab Hour(s):**

2

## Requisites

**Prerequisite and Corequisite**

CNST-2500 Construction Surveying; or department approval.

## Outcomes

**Course Outcome(s):**

Plan and execute a basic Global Navigation Satellite Systems (GNSS) Survey.

**Essential Learning Outcome Mapping:**

Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

**Objective(s):**

1. Introduction to Geodetic Positioning including traditional astronomic methods and Global Navigation Satellite Systems (GNSS) methods.
2. Mapping (Code Position) GNSS applications.
3. Planning and executing a network static GNSS survey using survey grade receivers.
4. Processing static GNSS Data.
5. Checking advanced conventional (Spirit) surveying equipment for adjustment. field verifying GNSS spatial data using conventional (Spirit) surveying equipment and comparison to National Spatial Data Accuracy Standards.
6. Planning and executing GNSS Real Time Kinematic (RTK) topographic and property boundary survey using survey grade receivers. Use of conventional (Spirit) surveying equipment to obtain the position of points that cannot be obtained by GPS.

---

**Course Outcome(s):**

Use other remote sensing scanning and compare to GNSS results.

**Essential Learning Outcome Mapping:**

Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

**Objective(s):**

1. Comparing Network Static GNSS Network Positions to GNSS Real Time Kinematic Point Positions.
2. Use of "Close-In" remote sensing such as laser scanning to gather detailed spatial data.
3. Gathering detailed spatial data using LIDAR (Light Detection and Ranging) scanning.

---

**Methods of Evaluation:**

1. Exams
2. Quizzes
3. Homework
4. Laboratory Activities

**Course Content Outline:**

1. Introduction to Geodetic Positioning
  - a. Traditional Astronomic Methods
  - b. Global Navigation Satellite Systems (GNSS) methods
  - c. United States Geological Survey (USGS) national control points
  - d. Conventional methods
  - e. LIDAR (Light Detection and Ranging) scanning
  - f. Mapping (Code Position) GNSS Applications.
2. Static GNSS Survey
  - a. Planning and Executing a Network Static GNSS Survey using Survey Grade Receivers
  - b. Processing Static GNSS Data
  - c. Check Advanced Conventional (Spirit) Surveying Equipment for Adjustment
  - d. Field Verifying GNSS Spatial Data using Conventional (Spirit) Surveying Equipment
  - e. Comparison to National Spatial Data Accuracy Standards
3. GNSS Real Time Kinematic (RTK) Survey
  - a. Planning and Executing GNSS Real Time Kinematic (RTK) Topographic and Property Boundary Survey using Survey Grade Receivers
  - b. Use of Conventional (Spirit) Surveying Equipment to obtain position of points that cannot be obtained by GPS
4. LIDAR (Light Detection and Ranging)
  - a. Introduction to LIDAR scanning to gather detail spatial data
  - b. Use of "Close-In" remote sensing such as laser scanning to gather detail spatial data

**Resources**

Ghilani, Charles D. (2021) *Elementary Surveying: An Introduction to Geomatics*, Pearson.

---

McManamon, Paul. (2019) *LiDAR Technologies and Systems*, SPIE--The International Society for Optical Engineering.

---

Parece, Tammy, et al. (2020) *Working with Lidar Using ArcGIS Pro*, Independently Published.

---

**Resources Other**

USGS Ground Control Points (2023) <https://www.usgs.gov/landsat-missions/ground-control-points>

Cuyahoga County GIS (2023) <https://gis.cuyahogacounty.us/html5viewer/?viewer=cegis>

ODOT Surveying/Mapping Specs (2023) <https://www.transportation.ohio.gov/working/engineering/cadd-mapping/survey-mapping-specs>

Top of page  
Key: 5123