CNST-2110: BASIC SURVEY PRACTICES

Cuyahoga Community College

Viewing: CNST-2110 : Basic Survey Practices

Board of Trustees:
September 2023

Academic Term:
Fall 2024

Subject Code
CNST - Construction Engineering Tech

Course Number:
2110

Title:
Basic Survey Practices

Catalog Description:
Study of construction site engineering using survey instruments for elevation contours, drainage, and grading for construction. Laser-levels, transits, and total stations will be utilized. Emphasis on instrument applications and field data recording.

Credit Hour(s):
3

Lecture Hour(s):
2

Lab Hour(s):
3

Requisites

Prerequisite and Corequisite
MATH-1540 Trigonometry or qualifying math placement to enroll in MATH-1610; and CNST-1290 Construction Print Reading; or departmental approval.

Outcomes

Course Outcome(s):
Correctly utilize various types of surveying equipment/instruments.

Objective(s):
1. Identify and describe usage of various types of instruments required for site engineering in building construction.
2. Read instruments and record accurate field data in a structured format.
3. Lay out boundary plots, building footings, drainage systems, road grades systems and road grades.

Course Outcome(s):
Identify and discuss the application of different surveying equipment for different types of surveys.

Objective(s):
1. Identify, discuss and differentiate between the various types of surveys.
2. Generalize how Global Positioning System (GPS) works for construction surveys, and point out the advantages of GPS.
3. Identify the types of surveys required for construction site engineering.

Methods of Evaluation:

1. Class assignments
2. Quizzes
3. Lab assignments
4. Exams
5. Participation and discussion
6. Written assignments

Course Content Outline:

1. Mathematics review
    a. Trigonometry functions
    b. English system - Metric system conversion
    c. Unit length conversions
2. Surveying fundamentals
    a. Survey types
        i. distance measurement
        ii. angle measurement
        iii. units of measure
        iv. stationing
    b. Random and systematic errors
    c. Accuracy and precision
    d. Field notes
3. Survey taping
    a. Tapes and accessories
    b. Taping techniques
    c. Field notes
4. Transits and theodolites
    a. Transit operation
    b. Laying out and measuring angles
    c. Triangulation techniques
    d. Field notes
5. Leveling and vertical control surveys
    a. Types of levels
    b. Level operation
    c. Level rods
    d. Leveling techniques
    e. Benchmarks for leveling
    f. Profile and cross-section leveling
    g. Field notes
6. Electronic surveying measurements
    a. Electronic distance measurement (EDM)
    b. Total station operation
    c. Construction layout with total stations
    d. Computerized surveying data systems
7. Topographic surveying
    a. Precision and techniques
    b. Cross-sections and profiles
    c. Contours
8. Global positioning system (GPS)
    a. Background and history
    b. Receivers
    c. Satellites and signals
    d. Position measurements
9. Road and highway construction surveys
    a. Pre-engineering surveys
    b. Design criteria and road classification
    c. Construction layout and staking

d. Line and grade layout
e. Plan and profile

10. Building construction surveys
    a. Single-story construction
    b. Electronic-laser leveling
    c. Multistory construction
    d. Final as-built surveys

Resources

Kavanagh, Barry. *Surveying with Construction Applications*. 8th ed. Upper Saddle River, New Jersey: Prentice-Hall, 2013.

Fatzinger, James. *Blueprint Reading for Construction.* Upper Saddle River, New Jersey: Prentice-Hall, 2004.

Ghilani, Charles D. *Cover: Elementary Surveying: An Introduction to Geomatics Elementary Surveying: An Introduction to Geomatics*. 16th. Pearson, 2022.

Resources Other

- Cuyahoga County Right-of-Way Plats (2022) https://fiscalofficer.cuyahogacounty.us/en-US/PlatSearch.aspx
- Cuyahoga County Official Documents Search (2022) https://cuyahoga.oh.publicsearch.us/
- Cuyahoga County GIS (2022) https://gis.cuyahogacounty.us/Html5Viewer/?viewer=cegis
- Ohio Revised Code, Chapter 4733: Professional Engineers and Professional Surveyors (2021) https://codes.ohio.gov/ohio-revised-code/chapter-4733 (https://codes.ohio.gov/ohio-revised-code/chapter-4733/)
- Ohio Administrative Code, Chapter 4733: State Board of Registration for Professional Engineers and Surveyors (2022) https://codes.ohio.gov/ohio-administrative-code/4733 (https://codes.ohio.gov/ohio-administrative-code/4733/)
- ODOT Location and Design Manuals (2022) https://www.dot.state.oh.us/drrc/Pages/Engineering-Reference-Resource-Center.aspx

Instructional Services

OAN Number:

Transfer Assurance Guide OET015

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