CNST-2500: CONSTRUCTION SURVEYING

Cuyahoga Community College

Viewing: CNST-2500 : Construction Surveying

Board of Trustees:
September 2023

Academic Term:
Fall 2024

Subject Code
CNST - Construction Engineering Tech

Course Number:
2500

Title:
Construction Surveying

Catalog Description:
Methods and procedures for construction surveying. Methods and procedures for establishing line, grade, horizontal circular and spiral curves, combinations of circular and spiral curves, vertical curves, parabolic curves, offset staking for rough and finished grade, and earthwork volume determination. Cross-sectioning methods and earthwork. Manual calculations and use of computer software. Introduction to AutoDesk Civil 3D software.

Credit Hour(s):
3

Lecture Hour(s):
2

Lab Hour(s):
2

Requisites

Prerequisite and Corequisite
CNST-1410 Architectural CAD I, and CNST-2110 Basic Survey Practices; or department approval.

Outcomes

Course Outcome(s):
Perform construction surveying calculations.

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. Perform traverse calculations and closures complete with the determination of enclosed area.
2. Perform the necessary calculations for the development of parabolic vertical curves.
3. Perform preliminary and finish grade staking calculations for a short access drive (approximately 600 feet) and complete cut sheets.
4. Perform earthwork calculations by average end area method.
5. Perform acreage calculations for curved road right-of-ways.

Course Outcome(s):
Use electronic distance measurement equipment and tape.

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. Perform and record and reduce data from Electronic Distance Measurement (EDM) equipment.
2. Perform the necessary calculations for the layout of circular and spiral horizontal curves.

Course Outcome(s):

Use AutoDesk Civil 3D to perform construction surveying calculations.

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. Perform earthwork calculations by average end area method.
2. Perform acreage calculations for curved road right-of-ways.
3. Perform with the aid of Computer Aided Drafting (CAD)/(Autodesk Civil 3-D) package to prepare a plat of an access drive.

Methods of Evaluation:

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

Course Content Outline:

1. Linear distance measurements
   a. Taping a simple circular curve
   b. Taping of compound and reverse curves
   c. Taping of spiral curves
2. Determine access drive centerline
   a. Traverse measurements
   b. Electronic distance measurement,(total station)
   c. Traverse closure calculations
   d. Error of closure calculations and traverse adjustment
   e. Control monumentation
3. Introduction to AutoDesk Civil 3D
   a. Review of AutoCAD
   b. Setting up drawing space
   c. Working in coordinate geometry (COGO)
   d. Importing survey points into a drawing
   e. Creating and adding data to a surface
   f. Adding contour, breakline, and boundary data to surface
   g. Survey features in AutoDesk Civil 3D
4. Perform manual computations and perform calculations in AutoDesk Civil 3D
   a. Compute the vertical alignment for access drive
   b. Produce typical cross-sections with ditches
   c. Compute earthwork volumes
   d. Calculate offset points for layout of access drive using total station
   e. Calculate proposed right-of-way for access drive

Resources

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

Crawford, Wesley. (2002) *Construction Surveying and Layout: A Step-By-Step Field Engineering Methods Manual*, Creative Construction Publishing.

Hansen, Karen & Kent Zenobia. (2022) *Civil Engineer's Handbook of Professional Practice*, Wiley.

Tieman, Rob. (2023) *Transportation Project Management*, Wiley.

AutoDesk Civil 3D 2022 tutorial. 2022. https://help.autodesk.com/view/CIV3D/2022/ENU/

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