

ENGR 132: INTRODUCTION TO SURVEYING

Citrus College Course Outline of Record

Heading	Value
Effective Term:	Fall 2023
Credits:	3
Total Contact Hours:	90
Lecture Hours :	36
Lab Hours:	54
Hours Arranged:	0
Outside of Class Hours:	72
Prerequisite:	MATH 175 or higher.
Strongly Recommended:	ENGL 101.
Transferable to CSU:	Yes
Transferable to UC:	No
Grading Method:	Standard Letter

Catalog Course Description

Surveying methods along with the care and use of instruments such as steel tape, engineer's level, theodolite and total station are introduced. Includes route location, layout and staking, earthwork, horizontal and vertical measurements, area and volume computations. Analysis and adjustments of systematic and random errors, stadia surveying and mapping are also introduced. 36 lecture hours, 54 lab hours.

Course Objectives

- Select and use surveying instruments to perform simple surveying tasks.
- Create accurate records of all field data in a clear and orderly manner.
- Apply corrections to measurements to adjust field data.
- Create survey maps from adjusted field data.
- Compute areas from maps.
- Demonstrate collaborative skills through active participation in lab activities.
- Demonstrate proper care of delicate surveying instruments.

Major Course Content

1. Introduction to surveying
 - a. Surveying history
 - b. Surveying and modern civil engineering
 - c. Field work, field notes and safety
2. Surveying mathematics
 - a. Mathematical concepts used in surveying
 - i. 2D planar geometry
 - ii. Trigonometry applications
 - b. Area computations
 - i. coordinates
 - ii. double meridian distances
 - iii. trapezoidal rule
 - iv. Simpson's rule.
3. Surveying Measurements

- a. Measurement of distances by pacing and chaining
 - b. Use of taping equipment for horizontal distance measurements
 - c. Differential, precise and profile leveling
 - d. Effects of Earth's curvature and refraction
 - e. Gathering profile leveling data along a route and prepare a profile
4. Survey locating
 - a. Azimuth and bearings
 - b. Magnetic compass, declination and local attraction
 - c. Angles and directions with theodolite and total stations
 - d. Traverse adjustments using latitudes and departures
 5. Stadia surveying and topographic surveying and mapping

Lab Content

1. Surveying mathematics applications
2. Surveying field work
 - a. Field safety review
 - b. Instrumentation care and use
 - c. Collaborative processes
 - d. Field data recording
3. Survey measuring
 - a. Estimating distances by pacing and determining pace length
 - b. Taping equipment use for measurements
 - c. Use of differential and precise leveling techniques near building sites
 - d. Profile leveling data along a route and prepare a profile
4. Operating theodolite and total station
 - a. Performing interior angle traverse using a theodolite
 - b. Measuring distances and angles of a traverse using total station
5. Using stadia surveying technique for obtaining elevations of points
6. Using polar planimeter to determine areas
7. Recording and analyzing the field data to prepare a topographic map using field data

Suggested Reading Other Than Required Textbook

Articles from the Journal of Surveying Engineering and other surveying periodicals

Examples of Required Writing Assignments

Being given an article to read, a one page written assignment will be assigned to relate concepts discussed in class to real-world applications.

Examples of Outside Assignments

Answering questions at each end of section: - Convert the given magnetic bearing of a line to its true azimuth - Obtain the elevation of a new benchmark from the given benchmark and record in the field book using standard rules - Compute the area of the given lot by using available distance and bearings and record in the field book - Draw a contour map of a given area and show spot elevations

Instruction Type(s)

Lab, Lecture, Online Education Lecture