

Course	CE 21000 – Introduction to Geomatics
Type of Course	Required for the Civil Engineering program. Formally CE 200 Fundamentals of Surveying
Catalog Description	Basic surveying operations and computations; theories of errors and their analysis; fundamental concepts of horizontal, vertical, and angular measurement; horizontal and vertical control systems; traverse computations; location of man-made structures; use of topographic maps; computation of horizontal and vertical curves.
Credits	3
Contact Hours	5
Prerequisite Courses	MA 16500
Corequisite Courses	None
Prerequisites by Topics	Calculus I
Textbook	Paul R. Wolf and Charles D. Ghilani, <i>Elementary Surveying: An Introduction to Geomatics</i> , Pearson – Prentice Hall, Current Edition.
Course Objectives	The main objective of this course is to learn the principles of plane surveying and gain sufficient practical training on advanced surveying instruments and techniques.
Course Outcomes	Students who successfully complete this course will be able to: <ol style="list-style-type: none">1. Apply mathematics concepts in Geomatics. [1]2. Measure and layout elevations and relative heights between points. [1, 3,6]3. Understand units, significant figures, and field notes. [1]4. Understand the theory of errors in observations. [1]

5. Carry out profiling and grid leveling, for generation of profiles, contour maps, and earth works computations. [1,3,5,6]
6. Measure horizontal and vertical angles. [1,7]
7. Determine coordinates of traverse (control) and surveyed objects. [1,3,5,6]
8. Conduct quality control of the surveying works (e.g. checking of field results and computations), emphasizing ethical and professional responsibility. [3, 6]
9. Design basic horizontal alignment of a curve. [1,7]
10. Design basic vertical alignment of the curve. [1,7]
11. Function in a team during field work. [3,5]
12. Ability to use the techniques, skills, and modern surveying equipment and computer tools necessary for engineering practice. [1,5,6,7]

Lecture Topics

1. Introduction
2. Units, Significant Figures, and Field Notes
3. Theory of Errors in Observations
4. Leveling—Theory, Methods and Equipment
5. Leveling—Field Procedures and Computations
6. Distance Measurement
7. Angles, Azimuths, and Bearings
8. Total Station Instruments; Angle Measurements
9. Traversing
10. Traverse Computations
11. Coordinate Geometry in Surveying Calculations
12. Area
13. Horizontal Curves
14. Vertical Curves

Computer Usage

High

Laboratory Experience

High

Design Experience

Low

Coordinator

Promotes Saha, Ph. D.

Date

26 July 2022