



**THE OHIO STATE UNIVERSITY**  
COLLEGE OF ENGINEERING

# Introduction to Surveying

## CIVILEN 2410

**Credit Hours:**

3.00 - 3.00

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**Course Levels:**

Undergraduate (1000-5000 level)

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**Course Components:**

Lecture

Lab

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**Course Description:**

An introduction to surveying and geomatics, with an emphasis on basic spatial data collection and construction layout using ground-based measurement techniques. Must be taken as soon as possible upon entering the major.

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**Prerequisites and Co-requisites:**

Prereq or concur: 2050 or Stat 3450, 3460, or 3470; and enrollment in CivilEn or EnvEng major.

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**Course Goals / Objectives:**

- Have knowledge of the fundamental concepts of surveying and geomatics with special emphasis on measurement techniques important for civil engineering projects
  - Understand the range of applications in surveying, geomatics and spatial data collection
  - Develop a very practically-oriented understanding of errors in basic spatial measurements, together with an appreciation of basic measurement theory
  - Have knowledge of the fundamental concepts of spatial data measurement techniques for surveying and geomatics
  - Understand the basic principles of global positioning systems, photogrammetry, remote sensing, laser scanning and LIDAR for the application of metric (and other) photographs in measurement applications
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**Course Topics:**

- Fundamental concepts and applications of surveying and geomatics; nature of measurement; basic measurement theory; error sources and the nature of error; significant figures.
  - Standard distance measurements; leveling and electronic distance measurements
  - Bearings, directions, angles, azimuths; traverse computations and measurements
  - Area calculations; volume calculations
  - Universal and local spatial reference systems with emphasis on coordinate systems and their application in topographic surveys
  - Alignment transition curves including horizontal curves and vertical curves
  - Introduction to photogrammetry: concepts, overview, history; applied photogrammetry for basic surveying and geomatics.
  - Introduction to remote sensing; Introduction to geographic information systems (GIS); Introduction to global positioning systems (GPS) Introduction to laser scanning and LIDAR.
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**Designation:**

Elective