

# University of Toledo

## Construction Engineering Technology

### Master Syllabus

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**Course Title:** Surveying

**Course Code & Number:**

CET-1210

**Credit Hour Total:** 3 **Weekly Contact Hours Lecture:** 2 **Lab Hours:** 2

**Prerequisite(s):** MATH-1330

**Text:** Elementary Surveying 14<sup>th</sup> Ed.  
Wolf & Ghilani ISBN: 978-0133758887  
Special Custom Edition (Chapters: 1-12, 23, 26)

**Software:** None

**Course Coordinator:** Loy

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#### A. **Course Description** (Approved catalog description.)

Study of construction and land surveying techniques, including the use of a steel tape, level, transit, and total station. Laboratory will stress surveying measurement and layout techniques. Laboratory exercises will also introduce software applications to surveying.

#### B. **Related Program Outcomes:**

Upon successful completion of the Construction Engineering Technology program, graduates will have:

##### ABET/Student Outcomes

- a. an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities;
- e. an ability to function effectively as part of a team;
- f. an ability to identify, analyze, and solve broadly-defined engineering technology problems;
- g. an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature;

##### Program Criteria Outcomes

1. Effective communication skills related to the construction environment through the proper usage of oral, written and graphic techniques.
2. A development of mathematical skills sufficient to solve and analyze technical problems associated with construction projects including building, highway and heavy construction.
9. Proficiency in the use of surveying equipment to collect data and lay out projects to solve engineering problems.

Evidence of the success of these outcomes is provided by the collection and analysis of:

- Survey Field Book Review

- Field Traverse Project
- Bearing & Azimuth Calculation Problem

### C. **Course Objectives:**

Upon completion of this course students will have the ability to:

1. Make trigonometric calculations related to surveying.
2. Prepare and interpret field notes.
3. Measure horizontal distances by taping.
4. Calibrate a tape.
5. Perform correction calculations of tape and EDM measurements length, temperature, slope, and tension.
6. Set up and operate the transit.
7. Read a compass and vernier
8. Determine magnetic declination.
9. Measure horizontal angles, including measurement by repetition and closing the horizon.
10. Calculate compass bearings and azimuths.
11. Set up and operate a level.
12. Handle and read a rod, including the use of targets.
13. Complete a level circuit and establish elevations of benchmarks and turning points.
14. Perform stake out of measured distances using Total Station Equipment.

### D. **Course Outline- Major Content Areas**

1. History of Surveying & Field Notes
2. Distance Measurement
3. Leveling Theory, Methods & Equipment
4. Angles, Bearings & Azimuths
5. Introduction to and Use of the Compass
6. Transit, Theodolite and Total Station Introduction and Operations
7. Volumes
8. Construction Staking

### E. **Suggested Laboratory Tests**

1. Taping short distances (Less than 100 feet)
2. Taping long distances
3. Transit set-up and horizontal angle turning
4. Multiple Horizontal angle turning
5. Leveling and closure
6. Measuring vertical angles and distances

7. Performing offset distance measurements
8. Introduction to total station operations
9. Introduction to surveying software and data collectors