

**Course Outline**  
**SURV 101**  
**Surveying Instruments**  
3 Semester Hours  
2 Lecture Hours  
3 Lab Hours

**The Community College of Baltimore County**

**Description**

**Surveying Instruments**

Introduces the instruments of surveying and their use in the art of determining the relative positions of points and lines on the earth's surface. Covers procedures for keeping proper field notes; causes of errors and mistakes in measurements; methods of determining accurate linear measurements; and procedures for determining distances and elevations by direct and indirect methods; examines proper use of the transit, theodolite, compass, electronic total station, engineer's level, auto compensating level, alidade, scientific calculator, and global positioning systems. Recommend to be taken concurrently with SURV 111.

3 credits: 2 lecture hours and 3 laboratory hours per week. Credit by exam available.

**Overall Course Objectives**

Upon completion of this course the student will be able to:

1. use a scientific calculator to perform data conversions and basic calculations with 90% accuracy.
2. measure a horizontal distance by pacing, stadia, taping, total station, and global positioning systems (GPS) to industry standards of accuracy.
3. set-up elevation determining instruments, read a leveling rod, and complete a level run to industry standards of accuracy.
4. set-up direction determining instruments, set up directional targets, and measure horizontal and vertical directions to industry standards of accuracy.
5. install a surveying monument to industry standards of accuracy.
6. use a surveyor's compass to determine a magnetic direction and correct that measurement for local magnetic declination to determine a true direction to industry standards of accuracy.
7. conduct a traverse with the appropriate surveying instruments to industry standards of accuracy.
8. stakeout a horizontal curve using appropriate surveying instruments to industry standards of accuracy.
9. stakeout a building location using appropriate surveying instruments to industry standards of accuracy.
10. use GPS equipment to establish point positions (static observation) to industry standards of accuracy.
11. apply knowledge about basic land, construction, and property surveying concepts and techniques to answer questions on tests with a minimum 60% accuracy.
12. apply knowledge about industry standards to answer questions on tests with a minimum 60% accuracy.

**Major Topics**

- I. Scientific Calculator
  - A. Algebraic/RPN Function
  - B. Key Functions
  - C. Entering Formulas and Data Conversions
- II. Distance Measurement
  - A. Principles and Procedures
  - B. Equipment
- III. Elevation Measurement
  - A. Principles and Procedures
  - B. Equipment
- IV. Direction Measurement
  - A. Principles and Procedures
  - B. Equipment
- V. GPS
  - A. Principles and Procedures
  - B. Equipment
- VI. Stake Out
  - A. Principles and Procedures
  - B. Equipment
- VII. Basic Land, Construction, and Property Surveying Concepts and Techniques
- VIII. Industry Specifications and Standards of Accuracy

### **Course Requirements**

Grading/exams: Grading Procedures will be determined by the individual faculty member but will include the following:

1. Quizzes, tests, exams: Individual instructors will notify students of procedures, but as a minimum, two tests or weekly quizzes will be required.
2. Comprehensive Midterm Exam: The course will require a comprehensive Midterm Exam.
3. Comprehensive Final Exam: The course will require a comprehensive final exam.
4. Fieldwork and Exercises: Individual instructors will notify students of procedures, but as a minimum, students will be graded upon participation and accuracy.

### **Other Course Information**

This course is a core course in Surveying and Construction Technology Degree and Certificate Programs.

This course is taught in a classroom and outdoor environment.