

Course Description

SUR1101C | Surveying 1 | 4.00 credits

This course covers the theories and practices of surveying and the use of the principal types of surveying instruments in horizontal and vertical planes. Problems include measuring distance, using a compass, sextant, transit traverse, stadia, and basic mapping. Field and laboratory practice are required. Prerequisites: MAC1114 or MAC1147

Course Competencies

Competency 1: The student will demonstrate an understanding of the history and context of surveying by:

1. Identifying the historical drivers for surveying
2. Listing significant events in the development of surveying
3. Identifying and analyzing current uses and the importance of surveying to society

Competency 2: The student will demonstrate hands-on skills in the use of essential measuring tools by:

1. Performing field measurement exercises using essential measuring tools
2. Determining the individual pacing value in the field
3. Performing a traverse survey using tapes/chains and will correctly record field data

Competency 3: The student will demonstrate the correct use of field notes by:

1. Recording field data in the correct format
2. Performing field calculations using field notebooks
3. Demonstrating accuracy and precision in note taking
4. Performing data error checks and correctly recording the results

Competency 4: The student will demonstrate an understanding of the units of measurement used in surveying by:

1. Analyzing and calculating derived information from field data
2. Manipulating field data to determine areas, lengths, and volumes
3. Collecting field measurements of angles, bearings, and azimuths

Competency 5: The student will demonstrate proficiency in performing primary field surveys by:

1. Performing field differential leveling surveys
2. Collecting field measurements of angles, bearings, and azimuths
3. Performing computations to analyze field data and analyze horizontal distance corrections
4. Performing field exercises to collect data for traverse computations, latitudes and departures, error of closure, and compass rule adjustments
5. Performing field exercises to collect grid survey data
6. Calculating material volumes from grid survey data
7. Performing set surveys
8. Creating contour maps using set survey data
9. Calculating elevations from field data
10. Determining elevations by the use of instruments

Competency 6: The student will demonstrate an understanding of Horizontal Control Networks by:

1. Analyzing and identifying stationing layouts
2. Setting up upgrade stake systems in the field
3. Calculating grades and performing rise and fall calculations

Competency 7: The student will demonstrate an understanding of the layout of Horizontal Curves by:

1. Analyzing curve setup data from design information
2. Calculations are performed to determine deflection angles, point of curvature, point of tangency, point of intersection, middle ordinate, and long and short chord lengths
3. Performing field layouts of horizontal curves using standard surveying instruments
4. Performing Horizontal curve layout using the Central angle and chord method
5. Performing Horizontal Curve layout using “moving up” technique

Competency 8: The student will demonstrate an understanding of the layout of Vertical Curves by:

1. Analyzing curve setup data from design information
2. Calculating the parabola equation to determine vertical curve information
3. Calculating vertical curve information using the tangent of sets from grade lines
4. Calculating the highest and lowest points of a vertical curve

Competency 9: The student will demonstrate proficiency in the ability to collect and interpret topographic information by:

1. Analyzing field and archived data to generate topographic maps

Competency 10: The student will demonstrate an understanding of introductory topics in the use of Total Stations out by:

1. Identifying the essential functions of the Total stations
2. Setting up the instrument
3. Taking sample readings and recording them correctly

Competency 11: The student will demonstrate an understanding of introductory topics in GIS data systems by:

1. Identifying the potential uses of the GIS system
2. Demonstrating an ability to access GIS Information
3. Analyzing the basic information provided from a GIS database
4. Identifying the mode and method of operation of the GPS constellation

Learning Outcomes:

- Formulate strategies to locate, evaluate, and apply information