**DATE SUBMITTED**
8/2013

**DATE DICC APPROVED**

**CATALOG NO.**
SRVY 135

**DATE LAST REVIEWED**
Oct. 7, 2009

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**COURSE INFORMATION FORM**

<table>
<thead>
<tr>
<th>DISCIPLINE</th>
<th>Land Surveying</th>
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<tbody>
<tr>
<td>COURSE TITLE</td>
<td>Elementary Surveying</td>
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<th>CR.HR</th>
<th>LECT HR</th>
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<th>CLIN/INTERN HR</th>
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**CATALOG DESCRIPTION**

Introduction to the care and use of optical surveying instruments; transits, total stations and auto levels. Use of cloth tapes, steel tapes and electronic distance machines. Reduction of slope measurements to horizontal and vertical components. Measurement, field data reduction and adjustment of a closed traverse. Horizontal and vertical curves, earthwork, and coordinates. Extensive field work, field notes, and electronic data collection. Introduction to systematic and random errors.

**PREREQUISITES**

Math 130 or Math 150 with a minimum grade of C or appropriate score on placement test.

**EXPECTED STUDENT OUTCOMES IN THE COURSE (ESO)**

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

1. Care for and use basic surveying instruments.
2. Perform the duties of a member of a survey crew.
3. Perform the calculations for horizontal and vertical curve layout.
4. Perform the fieldwork for Civil Engineering design projects.
5. Perform the measurement, data reduction and adjustment of a closed traverse.
6. Perform the measurement, data reduction and adjustment of an elevation level loop.
7. Explain angle and distance measurement techniques and the various units used.

**GENERAL EDUCATION OUTCOMES (ESO)**

Specify which general education outcomes, if any, are substantially addressed by the course. Numbers in parentheses identify the Expected Student Outcomes linked to the specific General Education Outcome.

<table>
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<tr>
<th>Outcomes</th>
<th>ESO</th>
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Revised 10/2/13
PROGRAM-LEVEL OUTCOMES

CAREER AND TECHNICAL EDUCATION PROGRAM OUTCOMES
Specify which Career and Technical program outcomes, if any, are substantially addressed by the course by completing the “Career and Technical Education template” to show the relationship between course and program outcomes to assessment measures.

1. Students will demonstrate the ability to utilize both surveying equipment and software in accordance with industry standards.
2. Students will apply technical skills and critical thinking skills to solve surveying related problems.
3. Students will work with others by engaging in real world field exercises that relate to land surveying.
4. Students will demonstrate the highest level of professional ethics while applying effective business practices.

CLASS-LEVEL ASSESSMENT MEASURES
Student accomplishment of expected student outcomes may be assessed using the following measures. (Identify which measures are used to assess which outcomes.)

1. Homework – Outcomes 1-7
2. Quizzes – Outcomes 1-7
3. Lab reports – Outcomes 1-7
4. Crew presentations – Outcomes 1-7
5. Exams – Outcomes 1-7
Individual instructors may order this outline as fits the needs of their individual courses. In addition, they may place more emphasis on some areas than on others. What is assured is that this particular list is covered in the course. Other topics may be added to a course as the instructor sees fit, and as time and interest allow. An *asterisk can be used to mark an item as optional.

Introduction and discussion of the course outline, expectations, types of surveys.

I. Reduction of slope measurements to horizontal distances, systematic taping errors
   A. Corrections for: slope, sag, tape length, temperature, tension
   B. Electronic distance machines and their operation

II. Elevation leveling, use and care of auto levels, field notes and data reduction, level loop adjustment
   A. How to read level rods
   B. How to keep notes
   C. Adjustment of a loop, by number of setups, proportional distance

III. Use and care of optical survey instruments, note keeping, measuring sets of angles, directions of lines
   A. How to read Vernier instruments
   B. Use of electronic instruments
   C. How to keep notes and average angles

IV. Field measure a closed loop traverse, reduce data, adjust closed traverse
   A. Field measure a closed loop traverse
   B. Adjust the traverse and reduce data to coordinates

V. Horizontal curves and vertical curves, calculations and field layout
   A. How to calculate necessary data for a horizontal curve
   B. How to calculate the necessary data for a vertical curve
   C. Calculate the angles, distances and elevations of points along a curve

VI. Slope staking calculations and field layout

VII. Topographic surveys, data collection, mapping
   A. Gather field data required for a topographic survey
   B. Draft a map of the topographic survey