LANGUAGE INFORMATION FORM

DISCIPLINE      Land Surveying
COURSE TITLE      Analysis of Survey Measurements I

CATALOG DESCRIPTION
Introduction to the nature of surveying instruments and their use. Analysis of the effect that instruments and observers have on measurements. Explanation of random error propagation and estimates of uncertainty. Introduction to adjustment of data.

PREREQUISITES
SRVY 135 and MATH 115

EXPECTED STUDENT OUTCOMES IN THE COURSE
Upon completion of this course, the student will be able to:
1. Demonstrate knowledge of surveying instruments and how they are used.
2. Explain surveying measurement theory.
3. Explain measurement accuracy and uncertainty and how they can be controlled.
4. Evaluate angular, distance and elevation measurements.
5. Adjust angular, distance and elevation measurements.
6. Explain the difference between systematic and random errors.
7. Use least squares adjustments to solve simplified problems.
CLASS-LEVEL ASSESSMENT MEASURES

Student accomplishment of expected student outcomes will be assessed using the following measures. (Identify which measures are used to assess which outcomes.)

1. Midterm and final exams (1-7)
2. Quizzes (1-7)
3. Homework problems (1-7)

PROGRAM-LEVEL OUTCOMES ADDRESSED

General Education Outcomes
Specify which general education outcomes, if any, are substantially addressed by the course by completing the “Course/Program Assessment Matrix” to show the relationship between course and program outcomes and assessment measures.

Occupational Program Outcomes
Specify which occupational program outcomes, if any, are substantially addressed by the course by completing the “Course/Program Assessment Matrix” to show the relationship between course and program outcomes to assessment measures.
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.

I. Introduction to surveying measurements
   A. Definitions
   B. History of surveying

II. Errors and mistakes
   A. Sources of error
   B. Precision vs. accuracy

III. Surveying instruments and their use, correct procedure and set up
   A. Total Station
   B. Auto Level
   C. GPS

IV. Surveying measurement theory
   A. Significant figures
   B. Estimates of uncertainty
   C. Theory of random error propagation

V. Analysis and adjustment of distance measurement
   A. Taped
   B. Stadia
   C. EDM measurement

VI. Analysis and adjustment of angle measurement
   A. Instrument errors
   B. Personal and natural errors
   C. Correction of errors

VII. Introduction to angle encoders, title sensors and compensators

VIII. Analysis of elevation measurements

IX. Analysis of indirect measurements
A. Traverse triangulation
B. Area measurements

X. Surveyor as expert measurer
A. Controlling uncertainty in measurements
B. Isolating and avoiding blunders

XI. Introduction to adjustment of measurement data
A. Including an introduction to weighing measurements
B. Theory of least squares