SURVEYING PRINCIPLES W/LAB
CET 1212

Catalog Course Description:
The basic theory and applications of measurement with steel tape, transit, level, and total station. Topics include pacing, horizontal and vertical distance measurements, traverse computations and field notes.

Entry Level Standards:
Students must be adept in applying their background in trigonometry and geometry to the solution of surveying tasks. They should be thorough and neat in their record keeping and willing to work in teams. Must have completed DSPM 0850 or have instructor approval.

Prerequisites:
None

Textbook(s) and Other Course Materials:

Text:

Reference:
Surveying Practice, Phillip Kissam
Surveying, Charles Breed

Other:
- Field Note Book
- Scientific Calculator
- Paper - Pencil
- Flashlight (night students only)

I. Week/Unit/Topic Basis:

<table>
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<th>Week</th>
<th>Topic</th>
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| 1    | Lecture: Introduction  
      | Lab: Definitions & History |
| 2    | Lecture: Definitions & History; Types of Surveys; Field Notes  
      | Lab: Error Theory |
| 3    | Lecture: Math Review; Accuracy/Precision & Error  
      | Lab: Pacing; Intro to Steel Tape |
Lecture: Taping and Chaining
Lab: Taping

Lecture: Tape Corrections; EXAM 1
Lab: Measuring Angles with a Steel Tape

Lecture: Levels and Leveling
Lab: Diff Leveling - H.L.

Lecture: Levels and Leveling
Lab: Diff Leveling - H.L.

Lecture: Levels and Leveling; EXAM 2
Lab: Diff Leveling - H.L.

Lecture: Intro to Angular Meas.; Transits and Theodolites
Lab: Diff Leveling - A.L.

Lecture: Errors in Ang. Meas.; EXAM 3
Lab: Diff Leveling - A.L.

Lecture: Traverse Calculations
Lab: Traverse (Transit)

Lecture: Area Calculations
Lab: Traverse (Transit)

Lecture: Misc. Traverse Calc.
Lab: Traverse (Theodolite)

Lecture: Misc. Traverse Calc.
Lab: Lab Final

FINAL EXAM

II. Course Objectives*:

A. Understand the common sources of error in surveying measurements and properly minimize them through calculations or field procedure. A, B, E, F, I, J, K

B. Accurately record all survey data. F, G

C. Accurately calculate and report all survey data. F, G, I, J, K

D. Properly use surveying equipment. B, M

E. Make precise measurements in the field through proper field procedure. B, I, J, M

F. Demonstrate self initiative to complete all assignments on time. E

*Letters after course objectives reference CET Program Outcomes (as required by ABET).

III. Instructional Processes*:

Students will:
1. Actively listen to class lectures and participate in class activities that develop and reinforce comprehension of the theories, concepts, principles and applications of distance measurement using surveying instruments. *Communication Outcome, Technology Literacy Outcome, Active Learning Strategies*

2. Observe class demonstrations on the proper care and use of surveying equipment and then integrate cognitive and manipulative skills to successfully complete laboratory assignments. *Technological Literacy Outcome, Mathematics Outcome, Active Learning Strategies*

3. Work individually and in teams to complete lab assignments related to the theories, concepts and principles covered in the lecture portion of the course. *Communication Outcome, Technological Literacy Outcome, Active Learning Strategies*

4. Keep accurate, complete and neat field notes for all laboratory assignments. *Communication Outcome, Active Learning Strategies*

5. Collect, analyze and tabulate data in an orderly format using EXCEL Spreadsheets, WordPerfect/Word or other appropriate software. *Communication Outcome, Technological Literacy Outcome, Mathematics Outcome, Active Learning Strategies, Transitional Strategies*

*Strategies and outcomes listed after instructional processes reference TBR’s goals for strengthening general education knowledge and skills, connecting coursework to experiences beyond the classroom, and encouraging students to take active and responsible roles in the educational process.*

**IV. Expectations for Student Performance**: 

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

1. Differentiate between accuracy and precision. C

2. Calculate the accuracy of field measurements. B,C

3. Calculate the precision of field measurements. A,B,D,E

4. Identify systematic errors for each type of equipment. A

5. Identify accidental errors for each type of equipment. A

6. Identify common human errors and how to avoid them. A

7. Properly record all field data. B

8. Measure horizontal distances, within acceptable limits of precision, by pacing, use of steel tape, and stadia. B,D,E

9. Calculate the appropriate corrections for measurements made with a steel tape. A,C,D

10. Measure vertical distances, within acceptable limits of precision, by differential leveling with a hand level, dumpy level and an automatic level. B,D,E

11. Measure vertical and horizontal angles, within acceptable limits of precision, using a transit, theodolite and a total station. C,D,E

12. Precisely measure a traverse. C,D,E
13. Accurately calculate latitudes, departures and areas of traverses. C
14. Adjust latitudes and departures by a compass or transit rule. C
15. Compute traverse areas by more than one method. C
16. Precisely measure and draw a profile. C,D,E

*Letters after performance expectations reference the course objectives listed above.

V. Evaluation:

A. Testing Procedures:

Four examinations are scheduled. They will be True/False, Multiple Choice, Matching, Short Answer Essay and Problem Solving. Examinations will normally be given as scheduled. Should a student have a planned vacation, operation, etc. occur during a scheduled exam, every effort should be made to take the exam prior to the scheduled absence. When a student misses an exam due to illness, he must contact the instructor immediately upon return and make-up the exam within one week. There will be a lab field final - no make-up.

B. Laboratory Expectations:

Quizzes:
Quizzes may be given by the instructor. Most quizzes will be un-scheduled and randomly given. They cover the previous session’s materials or the reading assignment for that day. There is no make-up or extra credit given for quizzes missed.

Homework:
Students may also be required to hand in answers to select questions at the end of each chapter or other appropriate homework at the instructor's discretion. All written assignments must be handed in on 8 1/2 x 11” engineering notepad paper, paper with smooth edges, or forms provided by your instructor. All written assignments will be assessed a 10% penalty for each school day it is late. All student work submitted for evaluation may be retained by the instructor.

C. Field Work:

N/A

D. Other Evaluation Methods:

A subjective evaluation based on attendance, classroom participation and attitude may be included.

E. Grading Scale:

CLASSROOM (55-60%)
Final grades will be computed from the grades obtained on homework, quizzes and examinations as follows:
Quizzes & Homework = 20% - 25%
Examinations = 15% - 25% Each
LAB (40-45%)
Final grades will be determined by grades obtained on field exercises. Each exercise is graded on completeness of field data, precision of field measurements, accuracy of calculations and
VI. Policies:

A. Attendance Policy:

Pellissippi State Technical Community College expects students to attend all scheduled instructional activities. As a minimum, students in all courses must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course (Pellissippi State Catalog). Individual departments/programs/disciplines, with the approval of the vice president of Academic and Student Affairs, may have requirements that are more stringent.

B. Academic and Classroom Misconduct:

Academic misconduct committed either directly or indirectly by an individual or group is subject to disciplinary action. Prohibited activities include but are not limited to the following practices: Cheating, including but not limited to unauthorized assistance from material, people, or devices when taking a test, quiz, or examination; writing papers or reports; solving problems; or completing academic assignments. In addition to other possible disciplinary sanctions that may be imposed as a result of academic misconduct, the instructor has the authority to assign either (1) an F or zero for the assignment or (2) an F for the course.

C. Accommodations for disabilities:

If you need accommodations because of a disability, if you have emergency medical information to share, or if you need special arrangements in case the building must be evacuated, please inform the instructor immediately. Please see the instructor privately after class or in his/her office. Students must present a current accommodation plan from a staff member in Services for Students with Disabilities (SSWD) in order to receive accommodations in this course. Services for Students with Disabilities may be contacted by going to 127 or 131 or by phone: 694-6751 (Voice/TTY) or 539-7153.

D. Use of Equipment:

Any act of misuse, vandalism, malicious or unwarranted damage or destruction, defacing, disfiguring, or unauthorized use of property/equipment belonging to Pellissippi State is subject to disciplinary sanction.