

PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

**ADVANCED SURVEYING W/ LAB
CET 2212**

Class Hours: 2.0

Credit Hours: 4.0

Laboratory Hours: 6.0

**Date Revised: Spring
02**

Catalog Course Description:

Use of total stations, data collectors, GPS systems, surveying software, and AutoCAD. Field applications of traversing, topo-mapping, profiling and cross-sectioning, and construction stakeout. Related topics in surveying astronomy, photogrammetry, and horizontal and vertical curves.

Entry Level Standards:

Students with previous surveying experience may be admitted with instructor approval providing they can demonstrate proficiency with trigonometry, geometry, and algebra as well as the use of automatic and dumpy levels, transits and theodolites.

Prerequisites:

None

Textbook(s) and Other Reference Materials Basic to the Course:

Text:

Surveying, Jack C. McCormac, Prentice-Hall Publishing Co., 4th edition.

Reference:

Surveying Principles and Applications, Kavanagh

Surveying Theory and Practice, Davis, et.al.

Surveying Practice, Kissam

Other:

- Field Note Book
- Scientific Calculator
- Emerphis Tables
- 2 - 3 1/2" Floppy Disk
- Paper - Pencil
- Flashlight (night students only)

I. Week/Unit/Topic Basis:

Week	Topic
1	Lecture: Review traverse calculations (Lat, Dep & Area) Lab: Traverse Calculations

- 2 Lecture: Review traverse calculations (Misc.)
 Lab: Use of GTS 300 Total Station & FC48 Data Collector
- 3 Lecture: Topographic Surveying
 Lab: Traverse Survey (Point to Point & Radial)
- 4 Lecture: Topographic Surveying
 Lab: Introduction to Computer Applications
- 5 Lecture: Earth Volume Calculations
 Lab: Large Area Topo Computer Applications
- 6 Lecture: Earth Volume Calculations
 Lab: Large Area Topo Computer Applications
- 7 Lecture: Lunar & Solar Calculations
 Lab: Lunar and Solar Observations
- 8 Lecture: Horizontal Curves
 Lab: Highway Centerline Stakeout
- 9 Lecture: Vertical Curves
 Lab: Highway Cross Section
- 10 Lecture: Vertical Curves; EXAM 2
 Lab: Computer Applications
- 11 Lecture: Construction Surveying
 Lab: Computer Applications
- 12 Lecture: Property Surveying
 Lab: Computer Applications
- 13 Lecture: Photogrammetry
 Lab: Field Trip
- 14 Lecture: GPS/GIS
 Lab: Computer Applications
- 15 Lecture: Review
 Lab: Review
- 16 FINAL EXAM

II. Course Objectives*:

- A. Understand the methods, equipment, field data and computations necessary for traverses, contour mapping, building stakeout and stakeout of horizontal and vertical curves. II, III
- B. Select the proper method and equipment for any surveying task. III, IV
- C. Accurately calculate all surveying data manually and by computer. II, III
- D. Efficiently use a Topcon GTS 300D Total Station with a FC48 Data Collector. IV

*Roman numerals after course objectives reference goals of the CET program.

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, Problem Solving & Decision Making 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. *Problem Solving & Decision Making Outcome, Information Literacy 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, Problem Solving & Decision Making Outcome, Information Literacy Outcome, Active Learning Strategies, Transitional Strategies*
4. Keep accurate, complete and neat field notes for all laboratory assignments. *Communication Outcome, Numerical Literacy Outcome, Information Literacy 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, Problem Solving & Decision Making Outcome, Technological Literacy Outcome, Numerical Literacy Outcome, Information Literacy Outcome, Active Learning Strategies*

*Strategies and outcomes listed after instructional processes reference Pellissippi State'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. Accurately calculate latitudes, departures and areas of traverses. A,C
2. Adjust Lat. and Dep. by the compass or transit rule. A,C
3. Compute traverse areas by one or more methods. A,C
4. Utilize computer software to complete Traverse Calculations. A,C,D
5. Collect and Convert appropriate field data into topographic maps. A,B,C,D
6. Utilize computer software to draw topographic maps. B,C,D
7. Accurately compute earthwork volumes. A,C
8. Compute and stake out a horizontal and vertical curve. A,B,C,D
9. Utilize computer software to upload stakeout data. A,B,C,D

10. Compute and stake out slope and grade stakes. A,B,C,D
11. Determine true North from Astronomical observations. A,C
12. Properly select the equipment, plan the survey and obtain the necessary field data for traverses, profiles, cross sections and mapping. A,B
13. Properly select the equipment, plan the survey and obtain the necessary field data for construction site layout. A,C
14. Survey a traverse with a closure $> 1/7500$. A,B,C,E
15. Demonstrate proficiency and knowledge in the use of a total station. D
16. Demonstrate proficiency and knowledge in the use of a data collector. D
17. Demonstrate ability to upload/download survey data from computer software to data collector. C,D
18. Demonstrate ability to complete standard drawings on the computer. C,D
19. Demonstrate knowledge in the use of AUTODESK software. C,D
20. Demonstrate knowledge in the use of autocad. D

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

V. Evaluation:

A. Testing Procedures:

Three examinations are scheduled. They will be True/False, Multiple Choice, Matching, Short Answer Essay and Problem Solving. There will also be take-home problem solving exams.

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.

B. Laboratory Expectations:

Quizzes:

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

Homework:

A minimum of one written report will be required. It will require outside reading and research.

Topics will be provided by the instructor.

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 = 35% - 40%

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 graphic representation of data.

Attendance/Equipment Usage 15%-20%

Computations and drawings 15%-20%

Field Notes 40%-50%

Lab Final 20%

Grades are based on the following:

90 - 100 A

85 - 89 B+

80 - 84 B

75 - 79 C+

70 - 74 C

60 - 69 D

Below 60 F

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.

It is the student's responsibility to attend every scheduled class activity on time. Students are responsible to get assignments missed and to make-up any work missed during an absence.

B. Academic Dishonesty:

To use any form of unauthorized aid (notes, text, etc.) during a quiz or obtain any form of help from another student during testing is considered a form of cheating. Any time any form of cheating is observed the student will receive a 0 on that quiz or test.

C. Other Policies:

Dress: You will be doing most field work outside. You will be walking in tall grass, mud, etc. Dress appropriate for the weather. Shirts (no tank tops) and shoes must be worn at all times. Shorts may be worn during hot weather.