PELLISSIPPI STATE COMMUNITY COLLEGE  
MASTER SYLLABUS  
ADVANCED SURVEYING W/ LAB  
SURV 2510

Class Hours: 2.0  
Credit Hours: 4.0  
Laboratory Hours: 6.0  
Revised: Fall 2013

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 Course Materials:

Text:

Reference:
Surveying Principles and Applications, Kavanagh  
Surveying Theory and Practice, Davis, et.al.  
Surveying Practice, Kissam

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

I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
</table>
| 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)

Lecture: Topographic Surveying
Lab: Introduction to Computer Applications

Lecture: Earth Volume Calculations
Lab: Large Area Topo  Computer Applications

Lecture: Earth Volume Calculations
Lab: Large Area Topo  Computer Applications

Lecture: Lunar & Solar Calculations
Lab: Lunar and Solar Observations

Lecture: Horizontal Curves
Lab: Highway Centerline  Stakeout

Lecture: Vertical Curves
Lab: Highway Cross Section

Lecture: Vertical Curves; EXAM 2
Lab: Computer Applications

Lecture: Construction Surveying
Lab: Computer Applications

Lecture: Property Surveying
Lab: Computer Applications

Lecture: Photogrammetry
Lab: Field Trip

Lecture: GPS/GIS
Lab: Computer Applications

15  FINAL EXAM

II. Engineering Technology General Outcomes (Educational objectives)

I.  Apply basic engineering theories and concepts creatively to analyze and solve technical problems

II.  Utilize with a high degree of knowledge and skill equipment, instruments, software, and technical reference materials currently used in industry.

III. Communicate effectively using developed writing, speaking, and graphics skills.

IV.  Assimilate and practice the concepts and principles of working in a team environment.

V.  Obtain employment within the discipline or matriculate to a four year program in engineering or industrial technology

III. Engineering Technology Concentration Competencies*

Students will:

A.  Apply the knowledge, techniques, skills, and modern tools for the concentration of study
to specifically defined engineering technology activities

B. Demonstrate the knowledge of mathematics, science, engineering and technology to engineering technology problems using developed practical knowledge

C. Conduct and report the results of standard tests and measurements, and conduct, analyze and interpret experiment or project results

D. Function effectively as a member of a technical team

E. Identify, analyze and solve specifically defined engineering technology-based problems

F. Employ written, oral and visual communication in a technical environment

* At the program level all 6 competencies apply to roman numerals I – V of the Engineering Technology General Outcomes (Educational objectives) listed above.

IV. Course Goals*:

The course will

1. Enable the students to understand the methods, equipment, field data and computations necessary for traverses, contour mapping, building stakeout and stakeout of horizontal and vertical curves. A, B, C, D, & F

2. Enhance the student’s ability to select the proper method and equipment for any surveying task. A & E

3. Foster the ability to accurately calculate all surveying data manually and by computer. A, B, C, D, & F

4. Build the skills to efficiently use a Topcon GTS 300D Total Station with a FC48 Data Collector. A, D & E

5. Demonstrate self-initiative to complete all assignments on time. D & F

*Capital letters after course goals reference the competencies of the Engineering Technology concentrations listed above.

V. Expected Student Learning Outcomes*:

Students will be able to:

a. Accurately calculate latitudes, departures and areas of traverses. 1 & 3

b. Adjust Lat. and Dep. by the compass or transit rule. 1 & 3

c. Compute traverse areas by one or more methods. 1 & 3

d. Utilize computer software to complete Traverse Calculations. 1, 3 & 4

e. Collect and Convert appropriate field data into topographic maps. 1, 2, 3 & 4

f. Utilize computer software to draw topographic maps. 2, 3 & 4

g. Accurately compute earthwork volumes. 1 & 3
h. Compute and stake out a horizontal and vertical curve. 1, 2, 3 & 4
i. Utilize computer software to upload stakeout data. 1, 2, 3 & 4
j. Compute and stake out slope and grade stakes. 1, 2, 3 & 4
k. Determine true North from Astronomical observations. 1 & 3
l. Properly select the equipment, plan the survey and obtain the necessary field data for traverses, profiles, cross sections and mapping. 1 & 3
m. Properly select the equipment, plan the survey and obtain the necessary field data for construction site layout. 1 & 3
n. Survey a traverse with a closure > 1/7500. 1, 2, 3 & 5
o. Demonstrate proficiency and knowledge in the use of a total station. 4
p. Demonstrate proficiency and knowledge in the use of a data collector. 4
q. Demonstrate ability to upload/download survey data from computer software to data collector. 3 & 4
r. Demonstrate ability to complete standard drawings on the computer. 3 & 4
s. Demonstrate knowledge in the use of AUTOdesk software. 3 & 4
t. Demonstrate knowledge in the use of AUTOcad. 4

*Numbers after Expected Student Learning Outcomes reference the course goals listed above.

VI. 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

VII. Policies:

A. Attendance Policy:

Pellissippi State expects students to attend all scheduled instructional activities. As a minimum, students in all courses (excluding distance learning courses) must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course. Individual departments/programs/disciplines, with the approval of the vice president of Academic Affairs, may have requirements that are more stringent. In very specific circumstances, an appeal of the policy may be addressed to the head of the department in which the course was taken. If further action is warranted, the appeal may be addressed to the vice president of Academic Affairs.

B. Academic Dishonesty:

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.
- Plagiarism, including but not limited to paraphrasing, summarizing, or directly quoting published or unpublished work of another person, including online or computerized services, without proper documentation of the original source.
- Purchasing or otherwise obtaining prewritten essays, research papers, or materials prepared by another person or agency that sells term papers or other academic materials to be presented as one’s own work.
- Taking an exam for another student.
- Providing others with information and/or answers regarding exams, quizzes, homework or other classroom assignments unless explicitly authorized by the instructor.
- Any of the above occurring within the Web or distance learning environment.

Please see the Pellissippi State Policies and Procedures Manual, Policy 04:02:00 Academic/Classroom Conduct and Disciplinary Sanctions for the complete policy.

C. Accommodations for disabilities:

Students that need accommodations because of a disability, have emergency medical information to share, or need special arrangements in case the building must be evacuated should inform the instructor immediately, privately after class or in her or his 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 sending email to disabilityservices@pstcc.edu, or visiting Goins 127, 132, 134, 135, 131. More information is available at http://www.pstcc.edu/sswd/.

D. Other Policies:

**Safety and Equipment Abuse:**
Repeated safety violations will result in a reduction of final grade, at the instructor’s discretion. Flagrant violations which result in equipment damage or personal injury could result in automatic failure of the course.