PELLISSIPPI STATE COMMUNITY COLLEGE
MASTER SYLLABUS
SURVEYING PRINCIPLES W/LAB
SURV 1550

Class Hours: 3.0 Credit Hours: 4.0
Laboratory Hours: 5.0 Revised: Spring 2013

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 Learning Support Math or have instructor approval.

Prerequisites:

MATH 1720 OR 1730 or consent of program coordinator.

Textbook(s) and Other Course Materials:

Textbook:

References:
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>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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</thead>
</table>
| 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 |
<table>
<thead>
<tr>
<th>No.</th>
<th>Lecture Topic</th>
<th>Lab Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Lecture: Taping and Chaining</td>
<td>Lab: Taping</td>
</tr>
<tr>
<td>5</td>
<td>Lecture: Tape Corrections; <strong>EXAM 1</strong></td>
<td>Lab: Measuring Angles with a Steel Tape</td>
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<tr>
<td>6</td>
<td>Lecture: Levels and Leveling</td>
<td>Lab: Diff Leveling - H.L.</td>
</tr>
<tr>
<td>7</td>
<td>Lecture: Levels and Leveling</td>
<td>Lab: Diff Leveling - H.L.</td>
</tr>
<tr>
<td>8</td>
<td>Lecture: Levels and Leveling; <strong>EXAM 2</strong></td>
<td>Lab: Diff Leveling - H.L.</td>
</tr>
<tr>
<td>9</td>
<td>Lecture: Intro to Angular Meas.; Transits and Theodolites</td>
<td>Lab: Diff Leveling - A.L.</td>
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<tr>
<td>10</td>
<td>Lecture: Errors in Ang. Meas.; <strong>EXAM 3</strong></td>
<td>Lab: Diff Leveling - A.L.</td>
</tr>
<tr>
<td>11</td>
<td>Lecture: Traverse Calculations</td>
<td>Lab: Traverse (Transit)</td>
</tr>
<tr>
<td>12</td>
<td>Lecture: Area Calculations</td>
<td>Lab: Traverse (Transit)</td>
</tr>
<tr>
<td>13</td>
<td>Lecture: Misc. Traverse Calc.</td>
<td>Lab: Traverse (Theodolite)</td>
</tr>
<tr>
<td>14</td>
<td>Lecture: Misc. Traverse Calc.</td>
<td>Lab: Lab Final</td>
</tr>
<tr>
<td>15</td>
<td><strong>FINAL EXAM</strong></td>
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</tbody>
</table>

**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. Expand student understanding of the common sources of error in surveying measurements and properly minimize them through calculations or field procedure. A, B, D, E

2. Guide students to accurately record all survey data. C

3. Enhance the students ability to accurately calculate and report all survey data. A, B, C, D, F

4. Guide students to properly use surveying equipment. A, D

5. Encourage students to make precise measurements in the field through proper field procedure. A, D, E

6. Encourage students to demonstrate self initiative to complete all assignments on time. 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. Differentiate between accuracy and precision. 1

b. Calculate the accuracy of field measurements. 1, 3

c. Calculate the precision of field measurements. 1, 3

d. Identify systematic errors for each type of equipment. 1

e. Identify accidental errors for each type of equipment. 1

f. Identify common human errors and how to avoid them. 1

g. Properly record all field data. 2, 3

h. Measure horizontal distances, within acceptable limits of precision, by pacing, use of steel tape, and use of a total station. 1, 2, 3, 4, 5
i. Calculate the appropriate corrections for measurements made with a steel tape. 1, 3

j. Measure vertical distances, within acceptable limits of precision, by differential leveling with a hand level, dumpy level and an automatic level. 1, 2, 3, 4, 5

k. Measure vertical and horizontal angles, within acceptable limits of precision, using a transit, theodolite and a total station. 1, 2, 3, 4, 5

l. Precisely measure a traverse. 1, 2, 3, 4, 5

m. Accurately calculate latitudes, departures and areas of traverses. 1, 3, 6

n. Adjust latitudes and departures by a compass or transit rule. 1, 3, 6

o. Compute traverse areas by more than one method. 1, 3, 6

p. Precisely measure and draw a profile. 1, 3, 6

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

VI. 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 material 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:

With few exceptions, students will work in groups to complete lab assignments. Each student will earn up to 5 points per lab for being present and actively contributing to the completion of the lab. Labs will be graded for completeness of field notes and accuracy of the survey data collected. Each lab must have a cover sheet and a scanned copy of the field notes along with necessary sketches and calculations. Labs must be turned in at the beginning of the first lab of the week following the completion of the lab.

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 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 who 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 going to Goins 127, 132, 134, 135, 131 or by phone:
539-7153 or TTY 694-6429. 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.