PELLISSIPPI STATE COMMUNITY COLLEGE
MASTER SYLLABUS

GEODETIC SURVEYING
SURV 2560

Class Hours: 3.0  Credit Hours: 4.0
Laboratory Hours: 3.0  Revised: Fall 2013

Catalog Course Description:

This course presents the concepts of astronomy and geodesy that are relevant to the practice of geodetic surveying. The concepts include the theory and field techniques used to establish ground coordinate control. The course also includes a basic introduction to the earth’s geometric and physical characteristics as it relates to the datums and coordinate systems used in geodetic surveys.

Entry Level Standards:

Students must have writing, and verbal skills at the college level.

Prerequisites:

SURV2510 and MATH 1910

Textbook(s) and Other Course Materials:


I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>LAB</th>
<th>READING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction, class format, and requirements</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2</td>
<td>Introduction to spherical trigonometry and spherical coordinates</td>
<td>Spherical trig.</td>
<td>Handout</td>
</tr>
<tr>
<td>3</td>
<td>History of geodesy</td>
<td>Astronomy problems</td>
<td>CH1</td>
</tr>
<tr>
<td>4</td>
<td>Earth’s shape (parameters), unit of measure</td>
<td>Azimuth computations</td>
<td>CH2, 3</td>
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<tr>
<td>5</td>
<td>Map projections and plane coordinate systems</td>
<td>Coordinate conversion</td>
<td>CH15</td>
</tr>
<tr>
<td>6</td>
<td>Triangulation, trilateration, and precise traversing</td>
<td>Triangulation exercise</td>
<td>Handout</td>
</tr>
<tr>
<td>7</td>
<td>Understanding the geometry of reference ellipsoid; reference coordinate systems, datum conversion</td>
<td>Precise leveling</td>
<td>Handout</td>
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<tr>
<td>8</td>
<td>Gravity, exam review and <strong>exam I</strong></td>
<td>N/A</td>
<td>CH11</td>
</tr>
<tr>
<td>9</td>
<td>Geodetic systems and physical geodesy</td>
<td>Sun shots</td>
<td>CH5, 6</td>
</tr>
<tr>
<td>10</td>
<td>Traditional survey positioning techniques</td>
<td>Polaris shots (night time)</td>
<td>CH 4</td>
</tr>
<tr>
<td>11</td>
<td>World Geodetic System; derivation of WGS, ETRF, and ITRS</td>
<td>Geodetic computations</td>
<td>CH7</td>
</tr>
<tr>
<td>12</td>
<td>Satellite geodesy; early satellites, Doppler, Transit Doppler, State Plane Coordinates computation; exam review and <strong>exam II</strong></td>
<td>SPC computations</td>
<td>CH8 and Handout</td>
</tr>
<tr>
<td>13</td>
<td>Examples of modern projects</td>
<td>N/A</td>
<td>CH16</td>
</tr>
<tr>
<td>14</td>
<td>Introduction to GPS</td>
<td>Mission planning</td>
<td>CH10</td>
</tr>
<tr>
<td>15</td>
<td>Final Exam</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</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. Enhance the student’s understanding of the celestial sphere and the applications of spherical geometry. A, B, & E
2. Develop the student’s knowledge of the parameters of the earth’s shape. A, B, & E
3. Enable students to convert plane coordinates to geodetic coordinates. A, B, & E
4. Train the students to locate true north using the sun and Polaris. A, B, & E
5. Enable students to compute geodetic coordinates in WGS, ETRF, and ITRS geoids. A, B, & E

*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. Demonstrate competence in applications of spherical trigonometry to calculate Spherical coordinates 1, 2 & 3
   b. Perform accurate azimuth calculations 1, 2, 3, 4 & 5
   c. Convert plane coordinates to map projections. 1, 2 & 3
   d. Calculate control coordinates using triangulation. 1 & 2
   e. Determine true north by observing the sun and Polaris. 1, 2 & 4

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

VI. Evaluation:

A. Testing Procedures: 50% of grade
   Two tests will be administered.

B. Laboratory Expectations: 30% of grade
   Students will be assigned group and/or individual projects. The ability to work with others, the ability to make efficient use of equipment, and the level at which students perform will contribute to the grade.

C. Field Work:
   N/A

D. Other Evaluation Methods: 20% of grade
Quizzes and Homework

E. Grading Scale:

90 - 100 A
80 - 89 B
70 - 79 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.