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 they relate 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:

SURV 2510 and MATH 1910

Textbook(s) and Other Course Materials:


I. Week/Unit/Topic Basis:

1. LEC: Introduction, class format, and requirements

2. LEC: Introduction to spherical trigonometry and spherical coordinates
   LAB: Spherical trig.
   READING: Handout

3. LEC: History of geodesy
   LAB: Astronomy problems
   READING: CH1

4. LEC: Earth’s shape (parameters), unit of measure
   LAB: Azimuth computations
   READING: CH2, 3

5. LEC: Map projections and plane coordinate systems
   LAB: Coordinate conversion
   READING: CH15

6. LEC: Triangulation, trilateration, and precise traversing
   LAB: Triangulation exercise
   READING: Handout

7. LEC: Understanding the geometry of reference ellipsoid; reference coordinate systems, datum conversion
LAB: Precise leveling
READING: Handout

8 LEC: Gravity, exam review and exam I
READING: CH11

9 LEC: Geodetic systems and physical geodesy
LAB: Sun shots
READING: CH5, 6

10 LEC: Traditional survey positioning techniques
LAB: Polaris shots (night time)
READING: CH 4

11 LEC: World Geodetic System; derivation of WGS, ETRF, and ITRS
LAB: Geodetic computations
READING: CH7

12 LEC: Satellite geodesy; early satellites, Doppler, Transit Doppler, State Plane Coordinates
computation; exam review and exam II
LAB: SPC computations
READING: CH8 and Handout

13 LEC: Examples of modern projects
READING: CH16

14 LEC: Introduction to GPS
LAB: Mission planning
READING: CH10

15 Final Exam

II. Course Goals*:

The course will:

A. Enhance the student’s knowledge of the celestial sphere and the applications of spherical
gometry.  I, II & III

B. Expand the student’s understanding of the parameters of the earth’s shape. I, II & III

C. Build the skills to convert plane coordinates to geodetic coordinates. I, II, III & IV

D. Build the skills to locate true north using the sun and Polaris. I, II, III & IV

E. Build the skills to compute geodetic coordinates in WGS, ETRF, and ITRS geoids. I, II, III
& IV

*Letters after course objectives reference the goals of the Engineering Technology program.

III. Expected Student Learning Outcomes*:

The student will be able to:

1. Demonstrate competence in applications of spherical trigonometry to calculate Spherical
coordinates  A, B, E
3. Convert plane coordinates to map projections. A, B, C
4. Calculate control coordinates using triangulation. A, B
5. Determine true north by observing the sun and Polaris. A, B, D

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

IV. Evaluation:

A. Testing Procedures: 50% of grade

Two tests will be administered. Tests will be True – False, Multiple Choice or Short Answer Essay

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

V. 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 the Learning Division, 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 the Learning Division.

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.

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 www.pstcc.edu/departments/swd/.

D. Other Policies:

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.