POSITIONING WITH GPS  
SURV 2567

Class Hours: 2.0  
Credit Hours: 3.0
Laboratory Hours: 3.0  
Date Revised: Spring 2011

Catalog Course Description:

This course covers GPS positioning techniques for surveying applications that require higher accuracy or are used in special situations. Network control and adjustment, the availability and use of reference stations, and sources of errors such as multipath, atmospheric interference, and satellite constellation geometry are presented. The field techniques and relevant computations are introduced and practiced.

Entry Level Standards:

Students should have knowledge and experience working in the Windows operating system environment, including the use of the Microsoft Office software components. Students should also have the ability to use a standard keyboard and maintain a rate of 10 words per minute. Students should also have mathematics, writing, and verbal skills at the college level.

Prerequisite:

SURV 2560 or surveying experience and consent of instructor

Textbook(s) and Other Course Materials:

GPS for Land Surveyors, latest edition, Jan Van Sickle, PLS, CRC Press

I. Week/Unit/Topic Basis:

1. Course objectives and class conduct  
   Review of Geodetic datums and Coordinates Systems  
   Chapter 5

2. Review of basics of control surveys  
   Class notes

3. Satellite positioning and GPS  
   Satellite Orbits, Ephemeris and Almanac  
   Chapter 3  
   Class notes

4. GPS Satellite Signal Structure  
   Chapter 1

5. Surveying with GPS  
   GPS Field Techniques  
   Chapter 4, PP 108-120

6. GPS Hardware and Processing Software  
   GPS Survey Planning and Specifications  
   Chapter 4, p.91-108  
   Chapter 6

7. Geodetic Control by GPS  
   GPS Field Observations  
   Chapter 7

8. Data Reduction and Processing  
   Exam I  
   Chapter 8
II. Course Goals*:

The course will:

A. Build the skills to utilize equipment, current field methods, and data processing in GPS positioning techniques. I, II, III & IV

B. Enhance the student’s knowledge of geodetic concepts such as geodetic datums and coordinate systems. I, II, III & IV

C. Build the skills to utilize least squares adjustment techniques. I, II, III & IV

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

III. Expected Student Learning Outcomes*:

The student will be able to:

1. Explain the theory of Global Positioning Technology. A, B

2. Set up a mapping grade GPS to collect autonomous data. A, B

3. Post process GPS data. A, B

4. Set up a survey grade GPS to collect point locations accurate to 0.1 meter. A, B

5. Collect road centerline data using an offset. A, B

6. Collect point data using a laser attachment to a GPS. A, B

7. Explain how GPS signals can be used to synchronize computer networks. A, B

8. Use a survey grade GPS system to collect a Triangular Irregular Network (TIN) data set. A, B

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

IV. Evaluation:

A. Testing Procedures: 60 - 65% of grade

Two tests will be administered counting for approximately 65% of the final grade. Tests will be true-false, multiple choice, and short answer essay.

B. Laboratory Expectations: 30 - 35% of grade
Students will be assigned group and/or individual projects. Grades will depend on the quality and precision of the completed project. 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: 5 – 10% of grade

**Quizzes:**
Quizzes may be given by the instructor. Most quizzes will be un-scheduled and randomly given. They cover the previous session’s materials 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 ½” x 11” 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.

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. 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.