Class Hours:  1  Credit Hours:  2
Laboratory Hours:  3  Date Revised:  Spring 2011

Catalog Course Description:
LabVIEW will be emphasized in solving problems in instrumentation and control. This course covers basic data acquisition and control techniques.

Entry Level Standards:
The student needs a basic knowledge of digital and analog electronics, along with knowledge of Windows.

Prerequisites:
EET 1210

Co-requisites:
None

Textbook(s) and Other Course Materials:
Learning with LabView with Software, Bishop, Addison Wesley, latest edition.

I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Transducers, sensors, and actuators</td>
</tr>
<tr>
<td>2</td>
<td>Signal conditioning</td>
</tr>
<tr>
<td>3</td>
<td>Introduction to LabVIEW creating a VI</td>
</tr>
<tr>
<td>4</td>
<td>LabVIEW Programming Techniques</td>
</tr>
<tr>
<td>5</td>
<td>The For Loop</td>
</tr>
<tr>
<td>6</td>
<td>The While Loop</td>
</tr>
<tr>
<td>7</td>
<td>Shift Registers</td>
</tr>
<tr>
<td>8</td>
<td>Global and Local variables</td>
</tr>
<tr>
<td>9</td>
<td>Global and Local variables continued</td>
</tr>
<tr>
<td>10</td>
<td>Strings</td>
</tr>
</tbody>
</table>
II. Course Goals*:

The course will

A. Have a basic understanding of transducers, sensors and actuators. (I, II, III, IV, V)
B. Understand basic signal conditioning theory. (I, II, III, IV, V)
C. Be able to create Virtual Instruments (VI's) using LabView for Windows. (I, II, III, IV, V)
D. Create programs which use the For Loop and the While Loop. (I, II, III, IV, V)
E. Understand the use of Global and Local variables. (I, II, III, IV, V)
F. Create programs using strings arrays. (I, II, III, IV, V)
G. Understand how Case and Sequence structures are used. (I, II, III, IV, V)
H. Acquire and display real data. (I, II, III, IV, V)
I. Control real instruments. (I, II, III, IV, V)
J. Demonstrate, as an individual and as a team member, library/information skills, time management skills, problem-solving skills, material management skills, and communication skills. (III, V)

*Roman numerals after course objectives reference goals of the Engineering Technology program (Career Program Goals and General Education Goals are listed http://www.pstcc.edu/departments/curriculum_and_instruction/syllabi/ )

III. Expected Student Learning Outcomes*:

Students will: be able to:

1. Understand the capabilities of various sensors and transducers. A
2. Understand actuators and their part in control systems. A
3. Understand the requirements of signal conditioning. B
4. Understand the necessity for shielding and grounding. B
5. Explain basic sampling theory. B
6. Explain what is meant by a virtual instrument (VI). C
7. Use LabVIEW editing techniques. C
8. Create, save and open a VI. C
9. Understand how to use a While Loop. D
10. Display data in waveform charts. D
11. Understand how to use a for Loop. D
12. Use shift register. D
13. Generate arrays. E
14. Create multiple plot graphs. E
15. Understand what is meant by Polymorphism. E
16. Use the Bundle and Cluster functions. E
17. Create string controls and indicators. F
18. Understand file I/O operations. F
19. Use the Case Structure. G
20. Use the Sequence Structure. G
21. Write a data acquisition program to acquire data from a real system using VI instruments. H
22. Analyze and display data in a real system. H
23. Write a program to control instruments used to test a real system. I

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

IV. Evaluation:

A. Testing Procedures: 25% of grade

Exams (3-4)

B. Laboratory Expectations: 75% of grade

The laboratories for all EET courses are an essential part of conveying the concepts to the student. The labs will closely follow the classes in content and in time of presentation so that the student is actually verifying concepts learned in class. A laboratory report will be required for each lab. The laboratory grade will be determined by a combination of performance within the lab and the quality and demonstrated comprehension of the lab report. There will be at least ten labs during the semester to go along with the classroom material.

C. Field Work:

None

D. Other Evaluation Methods:
E. Grading Scale:

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>93 - 100</td>
<td>A</td>
</tr>
<tr>
<td>88 - 92</td>
<td>B+</td>
</tr>
<tr>
<td>83 - 87</td>
<td>B</td>
</tr>
<tr>
<td>78 - 82</td>
<td>C+</td>
</tr>
<tr>
<td>70 - 77</td>
<td>C</td>
</tr>
<tr>
<td>60 - 69</td>
<td>D</td>
</tr>
<tr>
<td>Below 60</td>
<td>F</td>
</tr>
</tbody>
</table>

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: