

PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

**DATA ACQUISITION & CONTROL
EET 2910**

Class Hours: 0.0

Credit Hours: 2.0

Laboratory Hours: 4.0

**Date Revised: Fall
2001**

Note: This course is not intended for transfer credit.

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 a knowledge of Windows.

Prerequisites:

EET 1210 and EET 2310

Textbook(s) and Other Reference Materials Basic to the Course:

LabVIEW Student Edition by Lisa Wells, Prentice Hall

I. Week/Unit/Topic Basis:

Week	Topic
1	Lecture: Transducers, sensors, and actuators Lab: Introduction to LabVIEW
2	Lecture: Signal conditioning Lab: Editing Techniques
3	Lecture: Introduction to LabVIEW creating a VI Lab: Building a VI
4	Lecture: LabVIEW programming techniques Lab: VI's and sub VI's
5	Lecture: The For Loop Lab: The For Loop
6	Lecture: The While Loop Lab: The While Loop
7	Lecture: Shift Registers

	Lab: Arrays
8	Lecture: Global and Local variables Lab: Arrays and Graphs
9	Lecture: Global and Local variables continued Lab: Case Structure
10	Lecture: Strings Lab: Sequence Structure
11	Lecture: Arrays Lab: String Arrays
12	Lecture: Case and Sequence Structures Lab: Data acquisition
13	Lecture: Clusters Lab: Instrument control
14	Lecture: Writing and Reading Files Lab: Special problem
15	Lecture: Data Acquisition Lab: Special problem
16	Lecture: Instrument Control, Final Exam Lab: Final Exam

II. Course Objectives*:

- A. Have a basic understanding of transducers, sensors and actuators. I, III, VI, VII
- B. Understand basic signal conditioning theory. I, II, III, VI,
- C. Be able to create Virtual Instruments (VI's) using LabView for Windows. III, IV, V
- D. Create programs which use the For Loop and the While Loop. II, III
- E. Understand the use of Global and Local variables. II, III, IV
- F. Create programs using strings arrays. I, II, III, IV
- G. Understand how Case and Sequence structures are used. I, II, III
- H. Acquire and display real data. I, II, III, IV
- I. Control real instruments. I, II, III, IV

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

III. Instructional Processes*:

Students will:

1. Participate in classroom discussions which challenge their abilities to think creatively and visualize complex spatial and mathematical relationships to solve problems. *Problem*

Solving and Decision Making Outcome

2. Work in teams to conduct laboratory experiments and also to solve special problem assignments. These activities are designed to foster interpersonal skills in teamwork and develop and enhance leadership skills, students' abilities to express ideas, and students' abilities to reach consensus solutions for the team through negotiation. *Active Learning Strategy, Problem Solving and Decision Making Outcome, Personal Development Outcome*
3. Use electronic test equipment to test electrical circuits constructed from schematics in the laboratory and acquire data. Use computers with applications software to simulate, analyze, and predict the behavior of electrical circuits. Compare expected responses to experimental responses of electrical circuits. Use the Internet for special assignments such as locating data sheets on electronic components. Use computers with word processing software to prepare reports. *Technological Literacy Outcome, Information Literacy Outcome, Numerical Literacy Outcome*
4. Prepare reports on laboratory experiments which include methodology, mathematical analyses of electrical circuit models, a comprehensive comparison of calculated results with experimental results, and conclusions. *Communication Outcome, Numerical Literacy Outcome*
5. Discuss the importance of personal qualities such as personal responsibility, time management principles, self-esteem, sociability, self-management, integrity and honesty in school and in the workplace, and dynamics of change in the workplace. *Personal Development Outcome, Cultural Diversity and social Adaptation Outcome, Transitional Strategy*

*Strategies and outcomes listed after instructional processes reference Pellissippi State's goals for strengthening general education knowledge and skills, connecting coursework to experiences beyond the classroom, and encouraging students to take active and responsible roles in the educational process.

IV. Expectations for Student Performance*:

Upon successful completion of this course, the student should 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 VXI 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
24. Design a test set up for a given problem. I

*Letters after performance expectations reference the course objectives listed above.

V. Evaluation:

A. Testing Procedures: 25% of grade

A student' s grade is based on tests and laboratory activities.

B. Laboratory Expectations: 75% of grade

A student' s grade is based on tests and laboratory activities.

C. Field Work:

N/A

D. Other Evaluation Methods:

N/A

E. Grading Scale:

93 - 100	A
85 - 92	B
70 - 84	C
60 - 69	D
Below 60	F

VI. Policies:

A. Attendance Policy:

Pellissippi State Technical Community College expects students to attend all scheduled instructional activities. As a minimum, students in all courses must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course (Pellissippi State Catalog). Individual departments/programs/disciplines, with the approval of the vice president of Academic and Student Affairs, may have requirements that are more stringent.

Attendance is required to all lab sessions unless excused by the instructor. Students missing more than four unexcused sessions will receive an "F" and no credit will be received. Students tardy past half an hour will be considered absent.

B. Other Policies:

The student is encouraged to read the regulations for student conduct in the PSTCC Catalog and Handbook.