

Western Technical College

10663170 Electronics Project

Course Outcome Summary

Course Information

Description	As a capstone project, this course is designed to enhance and verify the program outcomes of the Electronic and Computer Engineering Technology program. The student will complete a project that includes a description of the project, cost, timetable, expected outcomes, recommendations and a final presentation. The project will focus on the interfacing and or programming of the PC, microprocessor or microcontroller.
Career Cluster	Science, Technology, Engineering and Mathematics
Instructional Level	Associate Degree Courses
Total Credits	3
Total Hours	108

Textbooks

No textbook required.

Program Outcomes

1. Apply electronic theory to practice.
2. Operate test equipment.
3. Build electronic circuits and systems.
4. Evaluate the operation of electronic circuits or systems.
5. Communicate technical information.
6. Demonstrate effective programming skills.

Course Competencies

1. **Analyze analog and digital circuits using simulation software.**

Assessment Strategies

- 1.1. Project

Criteria

You will know you are successful when

- 1.1. you use the grapher function in Multi-Sim to graph simulated circuit response.

- 1.2. you use the Bode plotter in Multi-Sim to plot simulated circuit response.
- 1.3. you use the function generator in Multi-Sim to develop analog signals.
- 1.4. you use the oscilloscope in Multi-Sim to display analog and digital waveforms.
- 1.5. you use the logic analyzer in Multi-Sim to display digital waveforms.
- 1.6. you create working schematic diagrams using Multi-Sim.
- 1.7. you use the multimeter to measure AC and DC voltages and currents.
- 1.8. you draw conclusions from experimental data.
- 1.9. you draw conclusions from the comparison of simulated data to experimental data.

Learning Objectives

- 1.a. Use Multi-Sim simulation software to analyze analog and digital circuits
- 1.b. Compare simulated data to experimental data

2. Apply resources to develop and research electronics project.

Assessment Strategies

- 2.1. Project

Criteria

You will know you are successful when

- 2.1. you acquire data sheets from several electronics manufacturers.
- 2.2. you organize diverse materials into a single purpose.
- 2.3. you use advanced internet search functions such quotation marks, or advanced search features to refine search parameters.

Learning Objectives

- 2.a. Acquire materials from a number of sources
- 2.b. Organize diverse materials into a single purpose
- 2.c. Enhance internet search skills

3. Analyze analog and digital circuits using experimental data.

Assessment Strategies

- 3.1. Project

Criteria

You will know you are successful when

- 3.1. you create graphs of experimental data.
- 3.2. you create tables of experimental data.
- 3.3. you use proper number of significant digits when recording data.
- 3.4. you draw conclusions from experimental data.
- 3.5. you draw conclusions from the comparison of simulated data to experimental data.

Learning Objectives

- 3.a. Compile experimental data in an accurate and usable form
- 3.b. Compare simulated data to experimental data

4. Prepare a comprehensive technical report.

Assessment Strategies

- 4.1. Technical Report

Criteria

You will know you are successful when

- 4.1. you compose distinct introduction, body, and conclusion.
- 4.2. you focus on content that is appropriate for the desired audience.
- 4.3. you form conclusions from experimental and simulated data.
- 4.4. you make recommendations to improve project design.
- 4.5. you create report using Word or other word processing program.
- 4.6. you incorporate graphs and tables using Excel or other spreadsheet programs into report.

Learning Objectives

- 4.a. Develop all aspects of introduction, body, and conclusion

- 4.b. Identify target audience characteristics
- 4.c. Form conclusions from experimental and simulated data
- 4.d. Recommend improvements to project design
- 4.e. Use Word or other word processing program
- 4.f. Use Excel or other spreadsheet programs to complete graphs, or perform calculations

5. Deliver an oral presentation on the project.

Assessment Strategies

- 5.1. Oral Presentation

Criteria

You will know you are successful when

- 5.1. you use Power Point or other presentation software to enhance presentation.
- 5.2. you focus on content that is appropriate for the desired audience.
- 5.3. you present information and result in a logical manner.
- 5.4. you are prepared to answer questions.

Learning Objectives

- 5.a. Use Power Point or other presentation software to enhance presentation
- 5.b. Identify target audience characteristics
- 5.c. Present information and results in a logical manner
- 5.d. Answer questions accurately
- 5.e. Respond to verbal and non-verbal audience feedback

6. Complete a data acquisition and control project.

Assessment Strategies

- 6.1. Project

Criteria

You will know you are successful when

- 6.1. you follow industry standards for design, safety, and testing.
- 6.2. you develop a timeline for the project.
- 6.3. you develop a budget for the project.
- 6.4. you develop the project criteria or specifications.
- 6.5. you complete an engineering notebook.
- 6.6. you create accurate and complete drawings and schematics.
- 6.7. you choose the appropriate programming language for the specific project.
- 6.8. you verify interface circuitry works as designed.
- 6.9. you verify program processes the data as expected.

Learning Objectives

- 6.a. Follow industry standards for design, safety, and testing
- 6.b. Develop a timeline for the project
- 6.c. Develop a budget for the project
- 6.d. Create a list of specific project requirements
- 6.e. Complete an engineering notebook on the project
- 6.f. Create accurate project drawings and schematics
- 6.g. Use appropriate programming language for specified project
- 6.h. Construct interface circuitry between the PC or micro-controller
- 6.i. Use a programming language to process data from and/or control an external system

7. Troubleshoot analog and digital circuitry and systems.

Assessment Strategies

- 7.1. Project

Criteria

You will know you are successful when

- 7.1. you measure analog and digital signals.
- 7.2. you use the correct test equipment in the troubleshooting process.

- 7.3. you use accepted troubleshooting techniques to locate defective part or parts.
- 7.4. you determine if the problem is hardware or software related.

Learning Objectives

- 7.a. Measure analog and digital signals using the appropriate test equipment
- 7.b. Use test equipment in the troubleshooting process
- 7.c. Use accepted troubleshooting techniques
- 7.d. Determine if problem is hardware or software related

8. Work effectively as part of a team.

Criteria

You will know you are successful when

- 8.1. you respect other team members methods.
- 8.2. you complete your share of tasks on time.
- 8.3. you accept other team members critique.
- 8.4. you provide formative (constructive) feedback to other team members.
- 8.5. you share your ideas and methods with other team members.

Learning Objectives

- 8.a. Work successfully in a group or team
- 8.b. Accept responsibility for completing tasks
- 8.c. Appreciate individual differences