

Fox Valley Technical College

10605145 Embedded Programming 1

Course Outcome Summary

Course Information

Description	Introduces students to embedded computer systems through exploration of microcontroller operation, architecture and programming. Students will lay the groundwork for future courses and electronic projects while experimenting with programming language concepts and basic interfacing.
Career Cluster	Science, Technology, Engineering and Mathematics
Instructional Level	Associate Degree
Total Credits	1.00
Total Hours	27.00

Types of Instruction

Instruction Type	Credits/Hours
Lab	1 Credit/27 Hours

Course History

Revised By	Todd Van De Hey (vandehey)
Last Approval Date	12/10/2014

Purpose/Goals

The purpose of Embedded Programming 1 is to introduce students in the first semester to C programming concepts and provide an introduction to microcontroller concepts.

Learner Supplies

USB Storage Device (Jump Drive)

Employability Essentials

- Act Responsibly - Apply ethical standards in both personal and professional behavior.**
Status Active
- Adapt to Change - Anticipate changes and positively respond to them.**
Status Active

3. **Communicate Effectively and Respectfully - Apply appropriate writing, speaking, and listening skills across various settings to engage diverse audiences.**
Status Active
4. **Think Critically and Creatively - Apply independent and rigorous reasoning that leads to informed decisions, innovation and personal empowerment.**
Status Active
5. **Work Collaboratively - Work collaboratively with others to complete tasks, solve problems, resolve conflicts, provide information, and offer support.**
Status Active

Program Outcomes

1. **Apply electronic theory to practice.**
Status Active

Summative Assessment Strategies

- 1.1. TSA

Criteria

- 1.1. You mathematically analyze a circuit or system
- 1.2. You simulate a circuit or system
- 1.3. You construct a circuit or system according to schematics or other documentation
- 1.4. You perform circuit or system measurements to collect data
- 1.5. You analyze data to validate predicted outcome

2. **Operate test equipment.**
Status Active

Summative Assessment Strategies

- 2.1. TSA

Criteria

- 2.1. You demonstrate measurement of electrical and/or electronic signals
- 2.2. You demonstrate measurement of electrical and/or electronic quantities
- 2.3. You demonstrate measurement of electrical and/or electronic components
- 2.4. You use test equipment to generate electrical and/or electronic signals
- 2.5. You apply appropriate safety precautions

3. **Build electronic circuits and systems.**
Status Active

Summative Assessment Strategies

- 3.1. TSA

Criteria

- 3.1. You assemble a prototype for operation
- 3.2. You demonstrate soldering and de-soldering techniques
- 3.3. You apply appropriate antistatic precautions
- 3.4. You identify appropriate interfaces
- 3.5. You set up programmable devices and/or systems
- 3.6. You apply appropriate safety precautions

4. **Evaluate the operation of electronic circuits or systems.**
Status Active

Summative Assessment Strategies

- 4.1. TSA

Criteria

- 4.1. You determine the correct operation of circuits or systems
- 4.2. You identify incorrect operation of circuits or systems
- 4.3. You isolate causes of failures in circuits or systems
- 4.4. You correct failures in circuits or systems

5. Communicate technical information.

Status Active

Summative Assessment Strategies

- 5.1. TSA

Criteria

- 5.1. You interpret electrical and/or electronic diagrams
- 5.2. You create electrical and/or electronic diagrams
- 5.3. You interpret technical reports and documents
- 5.4. You use appropriate terminology in speaking and writing
- 5.5. You interpret documentation of electronic devices and systems
- 5.6. You locate necessary resources and pertinent information to perform work functions

Course Competencies

1. Utilize the C programming language.

Domain Cognitive Level Applying Status Active

Assessment Strategies

- 1.1. by completing assigned reading topics.
- 1.2. by completing assigned programming lab projects.
- 1.3. by completing unit quiz.

Criteria

- 1.1. you have submitted and demonstrated completed lab projects.
- 1.2. you have completed the unit quiz with a score of 70% or better.

Learning Objectives

- 1.a. Describe C program components.
- 1.b. Develop pseudo code and flowcharts.
- 1.c. Utilize C program branching and repetition.
- 1.d. Develop C programs to solve control tasks.
- 1.e. Troubleshoot software syntax and logic errors.

2. Utilize programmable device concepts and components.

Domain Cognitive Level Applying Status Active

Assessment Strategies

- 2.1. by completing assigned reading topics.
- 2.2. by completing assigned programming lab projects.
- 2.3. by completing unit quiz.

Criteria

- 2.1. you submitted and demonstrated completed lab projects.
- 2.2. you have completed the unit quiz with a score of 70% or better.

Learning Objectives

- 2.a. Construct a microcontroller based robot or system.
- 2.b. Describe a simplified block diagram of a microcontroller.
- 2.c. Utilize digital input and output.
- 2.d. Utilize analog input and output.
- 2.e. Apply counting and timing algorithms.
- 2.f. Describe state machines and program control.
- 2.g. Troubleshoot and modify hardware and sensors to complete a task.

Grading Information

Lab Programs (rubric)	60%	A = 90-100%
Quiz	30%	B = 80-89%
Program Portfolio	10%	C = 70-79%
		D = 60-69%
		F = < 60%

Grant Award

This workforce product was funded by a grant awarded by the U.S. Department of Labor's Employment and Training Administration. The product was created by the grantee and does not necessarily reflect the official position of the U.S. Department of Labor. The U.S. Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including, but not limited to, accuracy of information or its completeness, timeliness, usefulness, adequacy, continued availability, or ownership.

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Course Learning Plans and Performance Assessment Tasks

Type	Title	Source	Status
PAT	Unit 1	Course	Active
PAT	Unit 2	Course	Active
LP	Unit 1	Course	Active
LP	Unit 2	Course	Active