Fox Valley Technical College

10605148 Embedded Programming 3

Course Outcome Summary

Course Information

Description	Continues with topics from Embedded Programming 2 and further explores embedded controller systems operation, architecture and programming. Successful students will exit this course prepared to develop and implement larger projects involving more advanced topics relative to microcontrollers.
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 (vandehet)
Last Approval Date	5/6/2015

Pre/Corequisites

Corequisite   Embedded Programming 2 (10-605-146)

Textbooks

Beginner's Guide to Programming the PIC32
Thomas Kibalo
Create Space Independent Publishing Platform
ISBN: 9781491046982
2013

Learner Supplies

USB Storage Device (Jump Drive)

Employability Essentials

1.   Act Responsibly - Apply ethical standards in both personal and professional behavior.
Status   Active

2.   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 device configuration and C programming to perform basic digital and analog IO.**
      Domain   *Cognitive*   *Level*   *Understanding*   *Status*   *Active*

Assessment Strategies
    1.1.   by completing assigned reading topics.
    1.2.   by completing assigned lab projects.
    1.3.   by completing unit exam.

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

Learning Objectives
    1.a.   Describe the basic MPLAB X user interface and PIC32MX microcontroller.
    1.b.   Utilize source code segmentation and digital Port control.
    1.c.   Evaluate switch debouncing, polling, and interrupt control.
    1.d.   Utilize the PIC32MX Analog to Digital Converter (ADC) and common library functions for analog input and conversion.
    1.e.   Evaluate Liquid Crystal Display (LCD) software and hardware interfaces.

2.   **Utilize advanced microcontroller peripherals and C programming constructs.**
      Domain   *Cognitive*   *Level*   *Analyzing*   *Status*   *Active*

Assessment Strategies
    2.1.   by completing assigned reading topics.
    2.2.   by completing assigned lab projects.
    2.3.   by completing unit exam.

Criteria
    2.1.   you have submitted and demonstrated completed lab projects.

2.2.   you have completed the unit exam with a score of 70% or better.

Learning Objectives

2.a.   Evaluate the timer peripheral for counting, delay, and interrupt applications.

2.b.   Utilize the Universal Asynchronous Receiver Transmitter (UART) peripheral and Peripheral Pin Select (PPS) configuration for serial communications.

2.c.   Evaluate the high speed Synchronous Peripheral Interface (SPI) and serial EEPROM application.

2.d.   Utilize Pulse Width Modulation (PWM) and the PIC32MX Output Compare Modules (OC) for tone and motor control.

2.e.   Evaluate the Real-Time Clock and Calendar (RTCC) peripheral and Secondary Oscillator Input (SOSCI) to display data on an LCD.

Grant Award

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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