Miami Dade College

Course Competencies Template - Form 112

GENERAL INFORMATION	
Name:	Phone #:
Course Prefix/Number: EST2544C	Course Title: Programmable Logic Controllers 2
Number of Credits: 3	
Degree Type	☐ B.A. ☐ B.S. ☐ B.A.S ☐ A.A. ☒ A.S. ☐ A.A.S. ☐ C.C.C. ☐ A.T.C. ☐ V.C.C
Date Submitted/Revised: 09-05-2007	Effective Year/Term: 2007-2
☒ New Course Competency ☐ Revised Course Competency	

General Education courses must align with the General Education Outcomes. The above course links to the following outcome(s):

☐ Communication	☐ Social Responsibility
☒ Numbers / Data	☐ Ethical Issues
☒ Critical thinking	☒ Computer / Technology Usage
☒ Formulation of strategies	☐ Aesthetic / Creative Activities
☐ Cultural / Global Perspective	☐ Environmental Responsibility

Course Description (limit to 50 words or less, **must correspond with course description on Form 102**):

This course is a continuation of EST2542C for students who are familiar with basic PLC operations and concepts. Students acquire skills for troubleshooting and maintaining logic controllers in a simulated industrial environment. Topics covered are program control instructions, data manipulation instructions, math instructions, sequencer and shift registers, PLC installation and troubleshooting, process control and data acquisition, computer-controlled machines and processes. Prerequisite(s): EST2542C. A.S. degree credit only. (2 hr. lecture, 2 hr. lab)

Prerequisite(s): EST2542C	Corequisite(s):

Course Competencies: (for further instruction/guidelines go to: http://www.mdc.edu/asa/curriculum.asp)

Competency 1: The student will demonstrate an understanding of how to set up and operate the Allen-Bradley PLC simulator by:

1. Installing the simulation software.
2. Navigating the PLC simulator program menus and screen commands.
3. Initiating the control process.
4. Running a demonstration program.

Revision Date: 09-24-2007

Approved By Academic Dean Date: _____ Reviewed By Director of Academic Programs Date: _____

Competency 2: The student will demonstrate how to apply ladder logic given a real world scenario by:

1. Opening sample code.
2. Interpreting the sample code by describing what operations it is designed to perform.
3. Writing modifications to the code in order to reprogram the controller to meet given requirements.
4. Testing the code to ensure that it performs according to specifications.
5. Documenting the newly edited code.

Competency 3. The student will demonstrate an understanding of how switches are used for analog control by:

1. Interpreting schematics that utilize NEMA symbols.
2. Defining the operating requirements for the switch.
3. Converting the switch schematic into ladder logic code.
4. Executing an application using simulation software to activate a load.

Competency 4. The student will demonstrate how to interpret and edit instructions by:

1. Locating the counter and timer within the code.
2. Explaining master control instructions.
3. Interpreting the code to determine the current configured values.
4. Editing a given set of instructions to meet specified requirements.
5. Documenting specified changes.
6. Verifying that the edited code produces the specified result utilizing computer simulation.

Competency 5: The student will demonstrate how to apply compare instructions, data manipulation instructions, and control instructions given a real world scenario by:

1. Defining compare instructions, data manipulation, and control instructions.
2. Explaining how and when each type of instruction is used.
3. Opening sample code.
4. Interpreting the sample code by describing what operations it is designed to perform.
5. Writing modifications to the code in order to reprogram the controller to meet given requirements.

6. Testing the code to ensure that it performs according to specifications.
7. Documenting the newly edited code.

Competency 6. The student will demonstrate an understanding of analog control and the relationship between PLCs and proportional integral devices (PID) by:

1. Describing how PLCs implement proportional, integral, and derivative process control.
2. Listing and explaining hardware for PID control.
3. Describing typical field devices connected to PID modules.
4. Explaining how PID algorithms are configured in PLC software.
5. Identifying other configuration functions available for analog control.
6. Describing the execution of a typical PID program.

Competency 7. The student will demonstrate the ability to troubleshoot PLC problems by:

1. Defining PLC enclosures, identifying factors that adversely affect proper operation, such as dust, humidity, temperature, etc., and describing how to install them properly.
2. Identifying sources of Electrical noise (EMI) and how to reduce the effects of EMI.
3. Defining leaky inputs/outputs and explaining how to correct them with a bleeder resistor.
4. Explaining NEC (National Electric Code) grounding requirements.
5. Explaining voltage variations and surges and describing preventative measures.
6. Listing the preventative maintenance tasks and scheduling required for optimal system function.
7. Discussing how to connect a personal computer and a PLC to establish communications between them.