###### COURSE SYLLABUS

###### Semester:  Year: 2013

**Mission Statement:**

Richard J. Daley College provides high-quality education which leads to academic success, career development, and personal enrichment that fulfill diverse community needs.

###### Course (Discipline): Manufacturing Technology Number: 291 Section:       IAI#:

**Course Title:** Programmable Logic Controllers (PLC)  **Length of Course (Weeks):** 16

**Credit Hours:** 3 **Lecture Hours:** 2 **Lab Hours:** 2 **Contact Hours:** 4

**Meeting Day(s):**       **Times:**       **Building:**       **Classroom #:**

**Syllabus can be found on Blackboard website at** [**https://ccc.blackboard.com/webapps/login/**](https://ccc.blackboard.com/webapps/login/)**.**

###### Dean, College to Careers in Advanced Manufacturing \_\_Ray Prendergast\_\_\_\_\_\_\_

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#### Office hours:

**Course Description**:

This course covers the basic concepts and skills needed to program and use programmable logic controllers (PLC’s) in automated systems in industry. The topics include an overview of basic terminology, ladder logic programming, memory structure, and processing. Students will use PLC’s to control electro-mechanical devices, pneumatic actuators, and other industrial components. Writing assignments, as appropriate to the discipline, are part of the course.

**Course Prerequisites**:

Grade of C or better in 340MFGT 191, or Consent of Department Chairperson.

**Students Course is Expected to Serve:**

Students enrolled in the Manufacturing Technology program who are interested in Factory Automation.

**Course Objectives**:

1. Understand the operation of latching relays, timers, and counters.
2. Design and develop working programs for simple industrial applications of PLCs.

**Student Learning Outcomes:**

Upon completion of this the student will be able to:

1. Identify and define a programmable logic controller.
2. Identify the difference between a PC and a PLC.
3. Explain the terms commonly used with PCs and PLCs.
4. Develop a ladder logic program for a PLC that controls an electric motor or an electro-pneumatic system.
5. Implement a ladder logic program that start, stops and actuates an industrial device per an assigned ladder diagram.
6. Troubleshoot a PLC system that has been faulted by the instructor.
7. Restore functionality to all of the faulted components including relays, timers, and the ladder logic program.
8. Identify the top two brands of PLC’s.

**Recommended Texts and Course Materials:**

***Text:***

Petruzella, F.D. (2011). *Programmable Logic Controllers, 4th Edition*. Columbus, OH: McGraw- Hill Science / Engineering. ISBN 978-0073510880.

Amatrol, Inc. (2001). Integrated Systems Technology PLC Learning Activity Packages. Jeffersonville, IN: Author.

***Materials:***

**Additional Course Requirements:** (N/A means this section does not apply to this course.)

N/A

**Recommended Methods of Instruction:**

The methods of instruction will include lecture, classroom discussion/answering questions, and small group work in the PLC lab.

**Recommended Methods of Evaluation:**

Midterm and final course grades will be based on the following evaluation methods:

Chapter tests

Lab and Class Projects

Midterm examination

Final examination

Attendance

Grading Scale:

90-100% = A

 80-89 = B

 70-79 = C

 60-69 = D

 Below 60 = F

See the Policy on grade designations and grade appeals at:

<http://www.ccc.edu/colleges/daley/departments/Pages/Grade-Appeal-Policy-and-Procedure.aspx>

**NOTE:** Type or copy and paste the link above into a web browser to view its content.

### Topical Outline / Course Calendar:

1 Introduction to course and PLCs – An Overview

2 PLC Hardware Components

3 Number Systems and Codes

4 Fundamentals of Ladder Logic, and Basic Binary Operations

5 Basic PLC Programming

6 Creating, Saving, and Running Basic Programs

7 Developing fundamental PLC wiring diagrams

8 Review and Midterm

9 Instruction comments, reports, and PLC documentation

10 Programming Timers and Counters

11 Troubleshooting and Preventive Maintenance.

12 Programming Control Instructions

13 Data Manipulation Instructions

14 Math Instructions

15 Sequencer and Shift Register

16 Final Examination

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