**COLLEGE OF DUPAGE**

**ELECTROMECHANICAL 1190-001**

**INTRO TO PROGRAMMABLE LOGIC CONTROLLERS**

Instructor: Adam Beemer Spring 2014

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TEC Room 2025 M/W 12-1:50PM

**REQUIRED TEXTS**

-Programmable Logic Controllers 3rd Ed., Petruzella, Frank D. ISBN: 0078298520

-Lab Manual for Programmable Logic Controllers w/ LogixPro PLC Simulator 3rd Ed. ISBN: 0073269220

**REQUIRED SOFTWARE**

-LogixPro by The Learning Pit (included in lab manual) or can be purchased at www.thelearningpit.com

**COURSE OBJECTIVES**

State the definition of a Programmable Logic Controller (PLC).

Identify the differences between a PLC and a computer.

Identify the three major components of a PLC

State the definition of the terms commonly associated with PLC’s.

Identify the components of the processor unit.

Design and develop ladder logic from ladder diagrams.

Discriminate between various numbering systems.

Identify the operation and function of latching relays, timers, counters, sequencers, and data manipulators. Design and develop programs for various activities.

Identify data transfer functions within the PLC.

Identify arithmetic functions within a PLC.

Develop data transfer and data compare programs for the PLC.

Develop state diagrams for the PLC.

Develop logic flow diagrams for the PLC.

Debug and troubleshoot both state and logic diagram programs. Utilize the state diagrams for process troubleshooting.

Understand the electronic and mechanical parts of an automated system.

Interpret electrical wiring diagrams and symbols.

Install, program, and troubleshoot Programmable Logic Controllers  PLCs.

Understand and explain the principal operations of the mechatronic subsystems in a complex system.

Understand and implement safety regulations required for operation of the system.

Diagnose and resolve equipment problems by utilizing technical assessment skills that include planning, reliability, logical thinking, and ability to use drawings, schematics and documentation.

**ASSIGNMENTS, LABS & EXAMINATIONS**

Weekly Assignments, homework, will be assigned after lectures and are typically due the following week. Labs will be done in class during lab time and a due date for each lab will be pre-announced. There will be a Mid-term and Final examination given on pre-announced dates.

**CLASS PREPERATION, ATTENDANCE, & TARDINESS POLICY**

Class preparation and attendance are essential if students are to receive maximum benefit from this class. Class preparation includes completion of reading and assignments by the due dates. Class attendance is strongly encouraged but your course grades will not be affected by periodic absences or tardiness, provided that the required work is completed and submitted on or before the due dates. Tardy students may enter the room in a fashion that will not disrupt a class in progress.

**MAKE-UP POLICY**

If you cannot attend class on the scheduled date for an exam, please let me know beforehand so that a make-up can be arranged. Failure to pre-arrange a make-up may result in the loss of points for the exam. Allowing a make-up exam is the sole discretion of the instructor. Assignments and Labs may be turned in late with points being deducted.

**ACADEMIC INTEGRITY/DISHONESTY POLICY**

Any violations of College of DuPage Board policies 5050 & 5715 regarding academic integrity and/or dishonesty will be referred automatically to the appropriate College authorities for disposition. See appropriate pages in the college catalog for definitions and regulations.

**WITHDRAWAL POLICIES**

Withdrawing from a course: You may withdraw up until the “Last Day to Withdraw without Instructor Permit” (see the Registration Calendar) through myACCESS or in person at the Registration office, Student Resource Center (SRC), Room 2048.

After the “Last Day to Withdraw without Instructor Permit” date (see the Registration Calendar), you may withdraw only with your instructor’s written permission. The instructor’s permission to withdraw must be brought or faxed to the Registration office. The registration fax number is (630) 790-3785. You will NOT be automatically withdrawn.

Medical Withdrawals: Requests for medical withdrawals should be made to the office of the Director of Admissions, Registration and Records, SRC 2048B, (630) 942-4284. Requests should be made in writing and accompanied by documentation from a physician or medical institution to verify the medical condition, date of onset and estimated length of treatment. Request forms for medical withdrawals are reviewed individually. Refunds are issued when appropriate within the guidelines of the College of DuPage refund policy. You will receive written notification of the decision within two (2) weeks from the office of the Director of Admissions, Registration and Records.

**INCOMPLETE GRADE POLICY**

The instructor of record may give an incomplete or “I” grade when a student has been unable to complete the course within the prescribed time due to unforeseen circumstances. The student is responsible for contacting the instructor of record or, when the instructor of record is no longer employed at the college, the appropriate dean regarding course completion. Course work must be completed within the time limits prescribed by the instructor of record but not to exceed twelve (12) months from the end of the term in which the “I” grade was assigned. The “I” grade may be changed within the time limit prescribed by the instructor of record. If the “I” has not been changed by the instructor of record at the end of the twelve (12) month period, the “I” will automatically change to an “F.” During the time the “I” is on the student’s record, it will not be calculated into the grade point average.

**CLASSROOM POLICIES/STUDENT CONDUCT**

In order to achieve the course objectives, it is essential that you enjoy the class in addition to complying with the above requirements and the rules and policies of College of DuPage contained in the catalog and other College material. If you are having course/College related problems, please feel free to talk to me so that we can resolve them to your satisfaction and benefit. All class work is done individually, but students may assist fellow classmates.

**GRADING**

**(100%-90%=A, 89%-80%=B, 79%-70=C, 69%-60%=D, 59%-0%=F)**

Attendance/Participation 10%

Homework 10%

Midterm 15%

Final 15%

Labs 50%

Total 100%

**LABS**

All lab assignments can be done in pairs or individually.

Lab requirements are defined in each lab.

The First 7 Chapters of Labs are due by the Midterm (Wednesday March 5th)

The Final 6 Chapters of Labs are due by the Final Exam Review (Wednesday May 7th)

Homework is due per designated schedule. See Calendar

**CALENDAR**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Date** | **Topic** | **Chapter Covered** |  |  |  |
| **Week** | **Mon.** | **Wed.** | **Mon.** | **Wed.** |  |
| **1** |  | 1/15 |  | Syllabus Review Chapter 1 | 1 |
|  |  |  |  | Lab 1 |  |
| **2** | 1/20  NO CLASSES MLK DAY | 1/22 |  | Lab 2 | 2 |
| **3** | 1/27 | 1/29 | Homework 1 Due | Lab 3 | 3 |
| **4** | 2/3 | 2/5 | Homework 2 Due | Lab 4 | 4 |
| **5** | 2/10 | 2/12 | Homework 3 Due | Lab 5 | 5 |
| **6** | 2/17 | 2/19 | Homework 4 Due | Lab 6 | 6 |
| **7** | 2/24 | 2/26 | Homework 5 Due | Lab 7 | 7 |
| **8** | 3/3 | 3/5 | Homework 6 Due Mid Term Review | Mid Term Exam |  |
|  |  |  | Make up Labs | 1st Set of Labs Due |  |
| **9** | 3/10 | 3/12 | Homework 7 Due | Lab 8 | 8 |
| **10** | 3/17 | 3/19 | Homework 8 Due | Lab 9 | 9 |
| **11** | 3/24 | 3/26 | Homework 9 Due | Lab 10 | 10 |
| **-** | 3/31 | 4/2 | SPRING BREAK | NO CLASSES | NO CLASSES |
| **12** | 4/7 | 4/9 | Homework 10 Due | Lab 11 | 11 |
| **13** | 4/14 | 4/16 | Homework 11 Due | Lab 12 | 12 |
| **14** | 4/21 | 4/23 | Homework 12 Due | Lab 13 | 13 |
| **15** | 4/28 | 4/30 | Homework 13 Due | Make up Labs | 14 |
| **16** | 5/5 | 5/7 | Homework 14 Due Make up Labs | 2nd Set of Labs Due Final Review |  |
| **-** | 5/12 | Final Exam | ***\*Calendar subject to change with student progress.*** |  |  |

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“This workforce solution was funded by a grant awarded by the U.S. Department of Labor’s Employment and Training Administration. The solution was created by the grantee and does not necessarily reflect the official position of the U.S. Department of Labor. The Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timelines, usefulness, adequacy, continued availability, or ownership. This solution is copyrighted by the institution that created it. Internal use, by an organization and/or personal use by an individual for  non-commercial purposes, is permissible. All other uses require the prior authorization of the copyright holder.”