Eastfield College
Career Technologies Division

Spring 2013
Industrial Automation II
MFGT 2459  Section 43501
4 Credit Hours

Lecture  Thursday  5:20 PM – 8:00 PM  Room L100
Lab      Tuesday  5:20 PM – 8:00 PM  Room L106

Instructor:  Clay Rawlins

Contact Information:
Office:   L101
Phone:  972-860-7683
Email address:  crawlins@dcccd.edu
Hours Available:  Posted Office Hours & by Appointment

Course Description

MFGT 1459  Industrial Automation I I (4)
This is a WECM Course Number.
Advanced topics in automated manufacturing. Includes electrical and electronic principles, electro-pneumatic and electro-hydraulic controls, logic control methods, and basic programming techniques.
(3 Lec., 3 Lab.)

Textbooks and Other Course Materials:

TEXT:  Programmable Logic Controllers, 4th Edition by Frank D. Petruzella

LAB BOOKS:  Lab Manual for Programmable Logic Controllers, 4th Edition,
with LogixPro PLC Simulator, by Frank D. Petruzella, McGraw-Hill, 2011

USB FLASH DRIVE:  2 GB or larger for storing course materials and programs

3-RING BINDER:  Suggest obtaining a 3-Ring Binder (1 " or larger)
to hold notes and handout materials.
### Developmental Courses

The Texas Success Initiative (TSI) is a statewide program designed to ensure that students enrolled in Texas public colleges and universities have the basic academic skills needed to be successful in college-level course work. The TSI requires assessment, remediation (if necessary), and advising of students who attend a public college or university in the state of Texas. The program assesses a student's basic academic skills in reading, writing, and math. Passing the assessment is a prerequisite for enrollment in many college-level classes such as English 1301/1302, History 1301/1302, Math 1414, etc. Students who do not meet assessment standards may complete prerequisite requirements by taking developmental courses in the deficient area and passing them with a grade of C or higher. In some cases retesting will also be required. It is up to each student to be aware and informed about requirements that are subject to change. Additional information is available from the TSI Office.

https://www1.dcccd.edu/cat0910/admiss/tsi.cfm?loc=4

### Course Objectives:

The purpose of this course is to provide the student with a thorough knowledge of the theory and application of industrial automation systems related to the following areas:

- A. Sensor and Actuator Interfacing
- B. PLC Control Circuits & Applications
- C. PLC Instructions
- D. PLC Installation Practices
- E. Analyzing & Editing Programming
- F. Troubleshooting Systems
- G. Process Control
- H. Data Acquisition Systems
- I. Computer Controlled Machines

Students will be provided with the facilities, equipment, instruction, and assignments necessary to enable them to analyze, troubleshoot and in some cases, program & design systems described.

**End-of-Course Outcomes:** Describe operations and applications of pneumatic and electro-pneumatic controls; describe operations and applications of hydraulic and electro-hydraulic controls; explain logic control methods used in manufacturing; describe motion control; and apply programming techniques.

**Student Learning Outcomes:** Students will connect and demonstrate functioning PLC control systems.

Students will demonstrate mastery of outcomes by

1. Writing a functioning PLC control program utilizing Sequencer instructions.
2. Writing a functioning PLC control program utilizing Shift Register instructions.
3. Connecting and demonstrating a functioning PLC control system.

All systems will function with no more than 30% error as evaluated by the instructor. Overall Course Average will be 70% or greater by 70% or more of the enrolled students.
Evaluation Procedures:

The relative weight of each of the grading components of the course is outlined below:

- 3 Tests (weighted equally): 50%
- Labs + Homework (weighted equally): 50%

The course grade will be calculated as follows:

\[
\text{Test Average} = \frac{\text{Test 1} + \text{Test 2} + \text{Test 3}}{3}
\]

\[
\text{Lab/HW Average} = \frac{\text{Lab 1} + \text{HW 1} + \ldots + \text{Lab 9} + \text{HW 9}}{18} \quad \text{(example for 9 labs + 9 HW)}
\]

\[
\text{Course Average} = (0.5 \times \text{Test Average}) + (0.5 \times \text{Lab/HW Average})
\]

<table>
<thead>
<tr>
<th>Course Average</th>
<th>Course Grade</th>
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</thead>
<tbody>
<tr>
<td>90 - 100</td>
<td>A</td>
</tr>
<tr>
<td>80 - 89</td>
<td>B</td>
</tr>
<tr>
<td>70 - 79</td>
<td>C</td>
</tr>
<tr>
<td>60 - 69</td>
<td>D</td>
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<tr>
<td>Less than 60</td>
<td>F</td>
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Obtaining Final Course Grades Using eConnect

Grade reports are no longer mailed. Convenient access is available online. Just use your student identification number when you log in to e-Connect. Web site address www.dcccd.edu.

Eastfield College Email Policy

Faculty and students must have and use a DCCCD account for all correspondence relating to academic coursework. For information on setting up a DCCCD student email account go to: http://www.dcccd.edu/netmail/home.html
Course Outline:

<table>
<thead>
<tr>
<th>WEEK</th>
<th>DATE</th>
<th>TOPIC</th>
<th>REFERENCE</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>1-22</td>
<td>Course Introduction</td>
<td>Handouts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PLC Review</td>
<td></td>
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<tr>
<td>2</td>
<td>1-29</td>
<td>Interfacing Voltages</td>
<td>Handouts</td>
</tr>
<tr>
<td>3</td>
<td>2-5</td>
<td>Program Control</td>
<td>Chapter 9</td>
</tr>
<tr>
<td>4</td>
<td>2-12</td>
<td>Control &amp; Data Manipulation</td>
<td>Chapter 9, 10</td>
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<tr>
<td>5</td>
<td>2-19</td>
<td>Data Manipulation</td>
<td>Chapter 10</td>
</tr>
<tr>
<td>6</td>
<td>2-26</td>
<td>Review and Test 1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>3-5</td>
<td>Math Instructions</td>
<td>Chapter 11</td>
</tr>
<tr>
<td>8</td>
<td>3-12</td>
<td>Sequential Control &amp; Shift Registers</td>
<td>Chapter 12</td>
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<tr>
<td></td>
<td>3-18</td>
<td>Spring Break</td>
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<tr>
<td>9</td>
<td>3-25</td>
<td>Sequential Control &amp; Shift Registers (continued)</td>
<td>Chapter 12</td>
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<td>10</td>
<td>4-2</td>
<td>PLC Installation Practices</td>
<td>Chapter 13</td>
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<tr>
<td>11</td>
<td>4-9</td>
<td>Review and Test 2</td>
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<tr>
<td>12</td>
<td>4-16</td>
<td>System Troubleshooting</td>
<td>Chapter 13</td>
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<tr>
<td>13</td>
<td>4-23</td>
<td>Process Control &amp; Data Acquisition</td>
<td>Chapter 14</td>
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<td>14</td>
<td>4-30</td>
<td>Computer Controlled Machines</td>
<td>Chapter 15</td>
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<tr>
<td>15</td>
<td>5-7</td>
<td>Course Review</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>5-14</td>
<td>Test 3 (Final Exam)</td>
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The instructor reserves the right to alter content or sequence of presentation of course material as shown in the above tentative calendar in order to meet course objectives.
**Attendance Policy:**

Students are expected to regularly attend all classes in which they are enrolled. Students have the responsibility to consult with the instructor when an absence occurs. Senate Bill 738 authorizes students to be absent for religious holy days. Students planning such absences are required to submit written notification to their instructors during the first 5 days of the term. Students absent for approved religious holy days will be allowed to complete work missed.

Students who are receiving any form of financial aid should check with the Financial Aid Office prior to withdrawing from classes. Withdrawals may affect your eligibility to receive further aid and could cause you to be in a position of repayment for the current semester. Students who fail to attend or participate after the drop date are also subject to this policy.

**Financial Aid Statement for Distance Learning Classes**

If you are receiving Financial Aid grants or loans and are enrolled in a Distance Learning class, you must show participation in this class prior to the certification date by either e-mailing or contacting the instructor or logging on to eCampus. Do not drop or stop attending any class without consulting the Financial Aid Office. Changes in your enrollment level and failing grades may require that you repay financial aid funds.

**Repeating This Course: (Third Attempt to Enroll in a Course)**

Effective for Fall Semester 2005, the Dallas County Community Colleges will charge additional tuition to students registering the third or subsequent time for a course. All third and subsequent attempts of the majority of credit and Continuing Education/Workforce Training courses will result in additional tuition to be charged. Developmental Studies and some other courses will not be charged a higher tuition rate. Third attempts include courses taken at any of the Dallas County Community Colleges since the Fall 2002 Semester. See Third Attempt to Enroll in a Course at: [http://www.dcccd.edu/thirdcourseattempt/](http://www.dcccd.edu/thirdcourseattempt/)
Academic Honesty Statement

Scholastic dishonesty is a violation of the Code of Student Conduct. Scholastic dishonesty includes, but is not limited to, cheating on a test, plagiarism, and collusion.

As a college student, you are considered a responsible adult. Your enrollment indicates acceptance of the DCCCD Code of Student Conduct published in the DCCCD Catalog at http://www1.dcccd.edu/cat0506/ss/code.cfm

Academic dishonesty includes, but is not limited to, cheating on tests, plagiarism and collusion. Cheating includes copying from another student’s test or homework paper, using materials not authorized, collaborating with or seeking aid from another student during a test, knowingly using, buying, selling, stealing, or soliciting the contents of an unadministered test, and substituting for another person to take a test. Plagiarism is the appropriating, buying, receiving as a gift, or obtaining by any means another’s work and the unacknowledged submission or incorporation of it in one’s own written work. Collusion is the unauthorized collaboration with another person in preparing written work for fulfillment of course requirements. Academic dishonesty is a serious offense in college. You can be given a failing grade on an assignment or test, can be failed for the class, or you can even be suspended from college.

Food and Drink Policy
Food, drinks, and tobacco products are prohibited in Eastfield College classrooms.

ADA Statement

Students with a physical, mental or learning disability who require accommodations should contact the college Disability Services Office in C237. Call 972.860.8348 or email efcdso@dcccd.edu. For more information: http://www.eastfieldcollege.edu/SSI/DSO/index.html

Religious Holidays
Absences for observance of a religious holy day are excused. A student whose absence is excused to observe a religious holy day is allowed to contract with the instructor to take a make-up examination or complete an assignment within a reasonable time after the absence.

Withdrawal Policy

If you are unable to complete this course, it is your responsibility to withdraw formally. The withdrawal request must be received in the Registrar’s Office by April 18, 2013. Failure to do so will result in your receiving a performance grade, usually an “F.” If you drop a class or withdraw from the college before the official drop/withdrawal deadline, you will receive a “W” (Withdraw) in each class dropped. For more information about drop deadlines, refer to the current printed Credit Class Schedule, contact the Admissions/Registrar’s Office at 972-860-7167 (Room C119), or contact the division office.
STOP BEFORE YOU DROP

For students who enrolled in college level courses for the first time in the fall of 2007, Texas Education Code 51.907 limits the number of courses a student may drop. You may drop no more than 6 courses during your entire undergraduate career unless the drop qualifies as an exception. Your campus counseling/advising center will give you more information on the allowable exceptions. Remember that once you have accumulated 6 non-exempt drops, you cannot drop any other courses with a “W”. Therefore, please exercise caution when dropping courses in any Texas public institution of higher learning, including all seven of the Dallas County Community Colleges. For more information, you may access: https://www1.dcccd.edu/coursedrops

Family Educational Rights and Privacy Act of 1974 (FERPA)
In compliance with the Family Educational Rights and Privacy Act of 1974 (FERPA), the College may release information classified as “directory information” to the general public without the written consent of the student. Directory information includes: (1) student name, (2) student address, (3) telephone numbers, (4) date and place of birth, (5) weight and height of members of athletic teams, (6) participation in officially recognized activities and sports, (7) dates of attendance, (8) educational institution most recently attended, and (9) other similar information, including major field of student and degrees and awards received. Students may protect their directory information at any time during the academic year. If no request is filed, directory information is released upon written inquiry. No telephone inquiries are acknowledged. No transcript or academic record is released without written consent from the student, except as specified by law.

Classroom Etiquette

Enrollment in this class indicates acceptance of the standards of conduct published in the current edition of the Eastfield College Catalog. Any disruptive behavior in the classroom is not acceptable and will not be tolerated. Laptops or desktop computers should not be used during class time except as needed for instructional purposes. Please silence all cell phones or pagers during class sessions. If you are late to class, please come in quietly and take your seat. Do not make a habit of arriving late since this can be distracting to other students. If you must leave early, please let the instructor know prior to class. Excessive tardiness or leaving early may affect your final grade since class attendance and participation is important.

The instructor reserves the right to amend this syllabus as necessary.