



Purpose: It is the intention of this Administrative-Master Syllabus to provide a general description of the course, outline the required elements of the course and to lay the foundation for course assessment for the improvement of student learning, as specified by the faculty of Wharton County Junior College, regardless of who teaches the course, the timeframe by which it is instructed, or the instructional method by which the course is delivered. It is not intended to restrict the manner by which an individual faculty member teaches the course but to be an administrative tool to aid in the improvement of instruction.

Course Title - Programmable Logic Controllers

Course Prefix and Number - ELMT 1301

Department – Electronics Engineering Technology

Division - Technology and Business

Course Type: (check one)

- Academic General Education Course (from ACGM – but not in WCJC Core)
- Academic WCJC Core Course
- WECM course (This course is a Special Topics or Unique Needs Course: Y or N)

Semester Credit Hours #: **Lecture hours #:** **Lab/Other Hours #:** **3:3:1**

Equated Pay hours for course – **3.5**

Course Catalog Description - An introduction to programmable logic controllers as used in industrial environments including basic concepts, programming, applications, troubleshooting of ladder logic, and interfacing of equipment.

Laboratory experience in programming and interfacing commercial PLCs.

Prerequisites/Co Requisites - None

List Lab/ Other Hours
Lab Hours 1
Clinical Hours
Practicum Hours
Other (list)

Prepared by: David Kucera

Date: 5-20-15

Reviewed by Department Head: David Kucera

Date: 5-20-15

Accuracy verified by Division Chair: David Kucera

Date :5-20-15

Approved by Dean or Vice President of Instruction: Leigh Ann Collins

Date: 12-18-15



I. Topical Outline – Each offering of this course must include the following topics (be sure to include information regarding lab, practicum, clinical or other non-lecture instruction):

The following performance will be expected of any student completing this course with a passing grade. There is no absolute time limit on the performance of these objectives, unless noted, but the grade received by the student will depend, in part, on the relative speed and precision of the student's performance in these tasks. Where subjective evaluations are indicated, the instructor will make these judgments based on his or her knowledge of the skills required to place a graduate with the expectation of successful on-job performance.

The student will be expected to perform the following tasks in written examination or laboratory demonstration:

- *Describe a Programmable Logic Controller.
- *Explain how instructions get into a PLCs memory.
- *Demonstrate ability to successfully test use BCD, Octal and Hexadecimal number systems.
- *Correctly explain the different data formats used in common PLCs.
- *Use ladder logic to solve algorithms.
- *Draw a correct ladder logic diagrams.
- *Program PLCs with correct ladder logic.
- *Describe sinking and sourcing as related to input modules.
- *Correctly explain TTL output modules.
- *Program and explain relay output modules.
- *Properly use surge suppression in output modules.
- *Explain basic relay instructions
- *Program a PLC for normally closed instruction.
- *Set up a PLC for normally open PLC instruction.
- *Use a PLC to perform timing and counting.

II. Course Learning Outcomes

Course Learning Outcome	Methods of Assessment
<p>Upon successful completion of this course, students will:</p> <ol style="list-style-type: none"> 1.Explain terminology 2.Select hardware components 3.Predict PLC operation based on ladder logic diagrams 4.Program a PLC to perform various control functions 	<p>Outcomes 1,2,3,4 are assessed by:</p> <ul style="list-style-type: none"> • Exams • Homework • Labs • Quizzes • Reassessed in Capstone Experience: CETT 2349 Final Project course

III. Required Text(s), Optional Text(s) and/or Materials to be Supplied by Student.

An appropriate electronics text covering PLCs. Example-Introduction to Programmable Logic Controllers by Dunning

Calculator – scientific with Sine, Cosine, Tangent capabilities..

IV. Suggested Course Maximum - 30 lecture, 15 laboratory

V. List any specific spatial or physical requirements beyond a typical classroom required to teach the course.

Lecture facilities for 30 students. Laboratory facilities for 18 students must include 9 bench positions each with a digital meter, logic probe, 20 MHz oscilloscope and probes, bread boarding facility with power supply and signal generator, and a stock of basic AC circuit components.

VI. Course Requirements/Grading System – Describe any course specific requirements such as research papers or reading assignments and the generalized grading format for the course

Evaluation of Performance:

Course grades will be determined by the percentage of course objectives for which the student can demonstrate mastery and by attendance as stated in the Departmental Policy sheet provided to the student. Mastery of course objectives will be determined by written examinations, an attendance grade as described in the Departmental Policy handout, a daily work grade which will include graded homework, graded laboratory work, and a comprehensive final exam.

Approximate Grade Evaluation Summary:

Major tests	60%
Attendance.....	10%
Lab reports, homework, and quizzes.	15%
Comprehensive Final examination	15%

Grade Scale:

- 90 to 100: A
- 80 to 89: B
- 70 to 79: C
- 60 to 69: D
- 0 to 59: F

VII. Curriculum Checklist

- **Academic General Education Course** (from ACGM – but not in WCJC Core)
No additional documentation needed

- **Academic WCJC Core Course**
Attach the Core Curriculum Checklist, including the following:
 - Basic Intellectual Competencies
 - Perspectives
 - Exemplary Educational Objectives

- **WECM Courses**
If needed, revise the Program SCANS Matrix & Competencies Checklist.