

**ELEC 53.11 Course Outline as of Spring 2011****CATALOG INFORMATION**

Dept and Nbr: ELEC 53.11      Title: BASICS OF PLC'S  
 Full Title: Introduction to Programmable Logic Controllers  
 Last Reviewed: 3/18/2002

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	2.00	Lecture Scheduled	2.00	17.5	Lecture Scheduled	35.00
Minimum	2.00	Lab Scheduled	0	17.5	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	2.00		Contact Total	35.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 70.00

Total Student Learning Hours: 105.00

Title 5 Category: AA Degree Applicable

Grading: Grade Only

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly:

**Catalog Description:**

An introductory course in Programmable Logic Controllers. This course is designed for students who desire a fundamental understanding of PLCs. The course is divided into three areas of concentration, including the basics of electronics, control components, and PLC programming.

**Prerequisites/Corequisites:****Recommended Preparation:**

Completion of ELEC 53.10.

**Limits on Enrollment:****Schedule of Classes Information:**

Description: An introductory course in Programmable Logic Controllers. This course is designed for students who desire a fundamental understanding of PLCs. The course is divided into three areas of concentration, including the basics of electronics, control components, and PLC programming. (Grade Only)

Prerequisites/Corequisites:

Recommended: Completion of ELEC 53.10.

Limits on Enrollment:

Transfer Credit:

Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>	Effective:	Inactive:
<b>CSU GE:</b>	<b>Transfer Area</b>	Effective:	Inactive:

<b>IGETC:</b>	<b>Transfer Area</b>	Effective:	Inactive:
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<b>CSU Transfer:</b>	Effective:	Inactive:
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<b>UC Transfer:</b>	Effective:	Inactive:
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**CID:**

**Certificate/Major Applicable:**

Certificate Applicable Course

## **COURSE CONTENT**

### **Outcomes and Objectives:**

The student will:

1. Analyze DC circuits with respect to current, voltage and resistance.
2. Analyze the characteristics of AC circuits with respect to AC generators.
3. Analyze control circuits.
4. Identify the characteristics of magnetic contactors and starters.
5. Identify the characteristics of control switches, relays, switches and sensors.
6. Analyze PLC numbering systems.
7. Analyze connecting external devices to a PLC.
8. Program a PLC.

### **Topics and Scope:**

1. Basic Electronics
  - A. Conductors, Insulators, and Semiconductors
  - B. Current, Voltage, and Resistance
  - C. Ohm's Law
  - D. Power Law
  - E. Series, Parallel, and Series/Parallel Circuits
  - F. AC Generators
  - G. Inductive and Capacitive Reactance
  - H. Series/Parallel RLC Circuits
  - I. Transformers
2. Basic Controllers
  - A. Control Circuits
  - B. Electrical Symbols
  - C. Manual Starters

- D. Magmatic Contactors and Starters
- E. Control Transformers
- F. Control Relays
- G. Timing Relays
- H. Limit Switches
- 3. Basic PLCs
  - A. Numbering Systems
  - B. Terminology
- C. Connecting External Devices
- D. Programming
- E. Discrete Input/outputs
- F. Analog Input and outputs
- G. Timers
- H. Counters

### Assignment:

1. Textbook readings.
2. Textbook homework problems.
3. Handout homework problems.

### Methods of Evaluation/Basis of Grade:

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments are more appropriate for this course.

Writing  
0 - 0%

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems, Quizzes

Problem solving  
30 - 70%

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None

Skill Demonstrations  
0 - 0%

**Exams:** All forms of formal testing, other than skill performance exams.

Multiple choice, True/false, Matching items, Completion

Exams  
30 - 70%

**Other:** Includes any assessment tools that do not logically fit into the above categories.

None

Other Category  
0 - 0%

**Representative Textbooks and Materials:**

Hall, Programmable Logic Controllers. Prentice Hall, 1998.

Dunn, Gary, Introduction to Programmable Logic Controllers. Delmar  
Thompson Learning, 2001.