

**J. Sargeant Reynolds Community College  
Course Content Summary**

**Course Prefix and Number: ELE 239**

**Credits: 3**

**Course Title: Programmable Controllers**

**Course Description (including lecture hours, lab hours, total contacts)**

Deals with installation, programming, interfacing, and concepts of troubleshooting programmable controllers. Co- or Prerequisites: ETR 156 and ELE 211 or ETR 164 and ETR 273 or equivalent, or permission of instructor. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week

**General Course Purpose**

This is an elective course for the Electronics Technology Career Studies Certificate.

**Course Prerequisites/Corequisites** (*Entry-level competencies **required** for enrollment*)

Co- or Prerequisite: ETR 156 and ELE 211 or ETR 164 and ETR 273 or equivalent, or permission of instructor.

**Course Objectives** (Each item should complete the following sentence.)

Upon completing the course, the student will be able to:

- a. describe the components and modules that make up a PLC control system
- b. discuss the operation of the PLC central processing unit
- c. discuss the operation of the input and output modules
- d. identify the installation and testing of a new PLC and describe the major steps in creating a PLC program
- e. identify the use and programming of PLC equipment
- f. describe the function of the five common register types and how each is used in PLC operations
- g. identify the conversion from one number system to another number system
- h. compare word descriptions, relay/PLC ladder diagrams, and digital gate diagrams, and translate from one to another
- i. develop a PLC ladder circuit
- j. convert control problems to PLC logic diagrams
- k. describe the contact (input) and coil (output) functions of the PLC
- l. identify the PLC time delay on function and other derived timing functions
- m. discuss the use of different and multiple counters used in PLC applications

**Major Topics to be Included**

- a. Relay and solid state logic
- b. Programmable Controller systems
- c. CPU and I/O operation
- d. Creating ladder diagrams
- e. Programming procedures
- f. Programming on-off inputs to produce on-off outputs
- g. Timers and counters
- h. Registers and addresses
- i. Number conversions

**Effective Date of Course Content Summary (Month, Date Year):** May, 2009