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| Department: | Electrical Technology | Lesson Plan: | I2P-LP03 |
| Curriculum: | Electrical Automation Technology | CLO: | 4 |
| Course: | Intro to Automation | | |
| Unit: | Intro to PLCs | | |
| Subject: | **Inputs/Outputs and Order of Operation** | | |
| Description | Inputs and Outputs plus the Order of Operation | | |

**General Characteristics**

This lesson is written for a class of eleven male students and one female student attending Ranken’s Electrical Automation Technology program taught at the Wentzville location room T105. This lesson is a part of the *AC Circuits* unit that falls within the *Electrical Applications* course. The instructor shall be Matthew Leigh.

**Entry Competencies**

* The student should be proficient at designing and wiring manual motor controls.
* The student should be proficient in the knowledge of Ohm’s Law.
* The student should understand the following terms; normally-closed, normally-open, seal, contacts.
* The student should have a basic knowledge of the use of a computer.

**Learning Styles**

This group of students prefers the instructor teach from the white-board. They have stated that it helps them take notes. I shall use a Power-Point presentation as well, but mostly for graphics that I am unable to draw on the board free-hand. This lesson shall have three components;

1. Visual/Auditory – A review of the terms PLC, dry-contact. Review of the intro to binary from the previous lesson, intro to binary.
2. Tactile – Student shall use computers and RSLogix 500 to perform the shop job.
3. Kinesthetic – Students shall be given a shop job build an understanding of the inputs table and the order of operation.

Several students within the class have an issue with silence. I provide a Bluetooth speaker that students my play school appropriate music during the time they work on the tactile and kinesthetic portions of the lesson. If a student so chooses, they may use headphones during these times as well.

**Objectives**

* The student shall be able to explain the relationship between an input signal coming in on a specific address and the location that it shall be stored within the input table.
* The student shall be able to identify channel locations within the input table.
* The student shall be able to access the input table through the RSLogix 500 software.

**Media and Materials**

The review of the binary number system shall be a combination of a PowerPoint presentation and white-board demonstrations/calculations. The students will be given worksheets to do in class to critique lesson understanding. Finally, the students shall perform a hands-on lab using resistors and inductors and their multimeters and an oscilloscope to measure results from their worksheet calculations. This will allow the student the opportunity to interpret RL circuit concepts presented in this lesson.

**Setup**

* Printout worksheets for students (Have answer key handy)
* Prep oscilloscopes and power supplies for the lab.
* Perform a practice run on PowerPoint and whiteboard calculations

**Lecture**

Review AC sinewave (\* means see student participation)

1. Degrees in a Sinewave\*
2. Sinewave as a circular function
3. Unit circuit
4. Sine, Cosine and Tangent

Inductors

1. Terminology
   1. Winding\*
   2. Iron-core\*
   3. Permeability\*
2. Calculations
   1. ELI – voltage leads current
   2. Phase angle = Theta
   3. RL relationship to Theta
3. Parallel Circuit
   1. Voltage is common
   2. Total resistance is product over the (vector) sum
      1. Vector sum
   3. Current divider

**Student Participation**

* Who can tell me how many degrees in one cycle of a sinewave?
* What type of function is a sinewave?
* Draw unit circle on the board, ask a student to identify specific components.
* Review the sine, cosine and tangent formulas.

**Evaluation**

The student’s comprehension of this lesson shall be evaluated in two ways. In class, after given ample time to complete the worksheet of the lab, we shall review the answers. Students shall come to the board a demonstrate the calculations. Second, the instructor will conduct an informal review with each student during the construction and measurement portions of the lab. The instructor will assess any deficiencies the student or possibly the lesson may have to construct a course of action to solidify the concept.