

9/3/2024 DATE
☒ REQUIRED COURSE
☐ ELECTIVE COURSE

TEC DIVISION
☒ NEW COURSE
☐ REVISION

Lake Land College

Course Information Form

COURSE NUMBER:	APTC-055		TITLE: (30 Characters Max)		Smart Sensor and ID Systems I								
SEM CR HRS:	1.0	Lecture:	0.5		Lab:	1.0	ICCB Lab:	1.0	ECH:	1.5			
Course Level:	☐ Gen Ed/IAI ☐ Baccalaureate/Non-IAI				☒ Career/Technical ☐ Dev Ed/Not in Degree Audit		Clinical Practicum:	0.0	Work-based Learning:	0.0	WBL ECH:	0.0	
Course PCS & CIP:	12 - 15.0404		IAI Code:		N/A			Contact Hours (Minutes/Week)					
Repeatable (Y/N):	N	Pass/Fail (Y/N):	N	Variable Credit (Y/N):	N	Min:		Max:		16 Wks	75	8 Wks	150
Prerequisites:	AET-040, AETC-040 or previous electrical experience												
Corequisites:	None												
Catalog Description: (40 Word Limit)	Students will understand, operate and interface smart sensors (RFID readers, ethernet serial, barcode readers and smart stack lights) as well as IO-link photo, pressure and ultrasonic sensors. (Meets SACA Automation Specialist I C-213 Smart Sensor and Identification Systems 1 credential.)												

List the Major Course Segments (Units)	Contact Lecture Hours	Contact Lab Hours	Clinical Practicum	Work-based Learning
Standard 213.1 Connect and configure an IO-Link Master	1	2		
Standard 213.2 Connect and operate an IO-Link RFID reader system	1	2		
Standard 213.3 Interpret and operate a PLC program that uses an IO-Link RFID function block	1	2		
Standard 213.4 Connect and configure an Ethernet-serial interface	1	2		
Standard 213.5 Connect and operate a barcode reader	1	2		
Standard 213.6 Interpret and operate a PLC program that uses barcode reader function block	1	2		
Standard 213.7 Setup, operate and interpret a PLC program that uses an IO-Link photoelectric	1	2		
Standard 213.8 Setup, operate and interpret a PLC program that uses an IO-Link pressure sensor	1	2		
Standard 213.9 Setup, operate and interpret a PLC program that uses an IO-Link smart stack light	1	2		
Standard 213.10 Setup, operate and interpret a PLC program that uses an IO-Link ultrasonic sensor	1	2		
TOTAL	10	20	0	0

EVALUATION			
QUIZZES ☒	EXAMS ☒	ORAL PRES ☒	PAPERS ☒
LAB WORK ☒	PROJECTS ☐	COMP FINAL ☒	OTHER ☐

COURSE MATERIALS	
TITLE:	Elearning materials
AUTHOR:	Amatrol
PUBLISHER:	
VOLUME/EDITION/URL:	
COPYRIGHT DATE:	

MAJOR COURSE SEGMENT	HOURS	LEARNING OUTCOMES
		The student will be able to:

Standard 213.1 Connect and configure an IO-Link Master	3	Performance Indicator 1. Connect an IO-Link Master to Ethernet and IO-Link devices. 2. Configure an IO-Link Master in a PLC project. 3. Power on an IO-Link Master. 4. Interpret IO-Link Master status indicators. 5. Download IODD and EDS files for an IO-Link device. Knowledge Indicator 1. Describe the basic operation/applications of an IO-Link Master. 2. Describe the basic operation of an IO-Link Master in a PLC project. 3. Describe the wiring connections of an IO-Link Master. 4. Describe the functions of an IO Device Description (IODD) file and an Electronic Data Sheet (EDS) file.
Standard 213.2 Connect and operate an IO-Link RFID reader system	3	Performance Indicator 1. Connect an RFID reader to an IO-Link Master. 2. Power on, adjust, and test an IO-Link RFID reader. 3. Interpret RFID reader status indicators. Knowledge Indicator 1. Describe the basic RFID system operation. 2. Describe types of RFID tags and their applications. 3. Describe the factors that affect RFID operation.
Standard 213.3 Interpret and operate a PLC program that uses an IO-Link RFID function block	3	Performance Indicator 1. Enter and operate a PLC program that uses an IO-Link RFID function block. 2. Interpret the operation of a PLC program that uses an IO-Link RFID reader function block to identify and sort parts. Knowledge Indicator 1. Describe the operation of a PLC function block. 2. Describe the operation of an RFID PLC function block. 3. Describe the operation of a RFID PLC function block logic.
Standard 213.4 Connect and configure an Ethernet-serial interface	3	Performance Indicator 1. Connect and configure an Ethernet-Serial interface to a barcode reader and Ethernet network. 2. Power on an Ethernet-Serial interface. 3. Interpret Ethernet-Serial interface status indicators. Knowledge Indicator 1. Describe the basic operation of an Ethernet-Serial interface. 2. Describe Ethernet-Serial interface wiring connections.
Standard 213.5 Connect and operate a barcode reader	3	Performance Indicator 1. Connect barcode reader to an Ethernet-serial interface. 2. Power on, adjust, and test a barcode reader. Knowledge Indicator 1. Describe the basic barcode reader operation. 2. Describe the functions of barcode reader status indicators. 3. Describe the factors that affect barcode reader operation.

Standard 213.6 Interpret and operate a PLC program that uses barcode reader function block	3	Performance Indicator 1. Enter and operate a PLC program that uses a barcode reader function block. 2. Interpret the operation of a PLC program that uses a barcode reader function block to identify and sort parts. Knowledge Indicator 1. Describe the operation of a barcode reader PLC function block. 2. Describe the operation of a barcode reader PLC function block logic. 3. Describe the basic operation of an Ethernet-Serial interface in a PLC project.
Standard 213.7 Setup, operate and interpret a PLC program that uses an IO-Link photoelectric sensor	3	Performance Indicator 1. Connect, power on, adjust, and test an IO-Link photoelectric sensor. 2. Configure an IO-Link photoelectric sensor in a PLC project. 3. Interpret the operation of a PLC program that uses an IO-Link photoelectric sensor. 4. Design a PLC program that uses an IO-Link photoelectric sensor. Knowledge Indicator 1. Describe the operation of an IO-Link photoelectric sensor. 2. Describe IO-Link photoelectric sensor parameters. 3. Describe the operation of IO-Link photoelectric sensor tags in a PLC project.
Standard 213.8 Setup, operate and interpret a PLC program that uses an IO-Link pressure sensor	3	Performance Indicator 1. Connect, power on, adjust and test an IO-Link analog pressure sensor. 2. Use analog pressure sensor keypad to view parameters and data. 3. Configure an IO-Link analog pressure sensor in a PLC project. 4. Interpret the operation of a PLC program that uses an IO-Link analog pressure sensor with function block. 5. Design and test a PLC program that uses an IO-Link analog pressure sensor. Knowledge Indicator 1. Describe the operation of an IO-Link analog pressure sensor. 2. Describe IO-Link analog pressure sensor parameters. 3. Describe the operation of IO-Link analog pressure sensor tags in a PLC project.
Standard 213.9 Setup, operate and interpret a PLC program that uses an IO-Link smart stack light	3	Performance Indicator 1. Connect and power on an IO-Link smart stack light. 2. Interpret the operation of a PLC program that uses an IO-Link smart stack light. 3. Design and test a PLC program that uses an IO-Link smart stack light. Knowledge Indicator 1. Describe the operation of IO-Link smart stack light. 2. Describe the operation of IO-Link smart stack light tags in a PLC project.

Standard 213.10 Setup, operate and interpret a PLC program that uses an IO-Link ultrasonic sensor	3	Performance Indicator 1. Connect, power on, adjust and test an IO-Link ultrasonic sensor. 2. Configure an IO-Link ultrasonic sensor in a PLC project. 3. Use ultrasonic sensor keypad to view parameters and data. 4. Interpret the operation of a PLC program that uses IO-Link ultrasonic sensor. 5. Design and test a PLC program that uses an IO-Link ultrasonic sensor. Knowledge Indicator 1. Describe the operation of an IO-Link ultrasonic sensor. 2. Describe IO-Link ultrasonic sensor parameters. 3. Describe the operation of IO-Link ultrasonic sensor tags in a PLC project.
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Outcomes*	Outcome Title	At the successful completion of this course, students will be able to:
Course Outcome 1	IO-Link Ethn Serial	Connect and configure an IO-Link Master and Ethernet to Serial interface.
Course Outcome 2	IO-Link RFID PLC	Connect and operate an IO-Link RFID reader system that is connected to a PLC.
Course Outcome 3	Ethn Ser Barcode PLC	Connect and operate an Ethernet to serial barcode reader system that is connected to a PLC.
Course Outcome 4	IO-Link Photo Sensor	Setup, operate and interpret a PLC program that uses an IO-Link photoelectric sensor, pressure sensor, smart stack light and ultrasonic sensor.
Primary Laker Learning Competency	Creative Thinking & Problem Solving: Students think creatively to solve problems.	
Secondary Laker Learning Competency	Communication: Students communicate through the exchange of information.	

*Course and program outcomes will be used in the software for outcomes assessment and should include at least 1 primary and 1 secondary Laker Learning Competency. Limit to 3-5.