9/3/2024 DATE

☑ REQUIRED COURSE
☐ ELECTIVE COURSE

TEC DIVISION

☑ NEW COURSE
☐ REVISION

Lake Land College

Course Information Form

COURSE NUMBER:	APT-047		**TITLE:** *(30 Characters Max)*	Electrical System Install I							
SEM CR HRS:	1	**Lecture:**	0.5	**Lab:**	1	ICCB Lab:	1	**ECH:**	1.5		
Course Level:	☐ Gen Ed/IAI ☐ Baccalaureate/Non-IAI ☑ Career/Technical ☐ Dev Ed/Not in Degree Audit			**Clinical Practicum:**	0	**Work-based Learning:**	0	**WBL ECH:**	0		
COURSE PCS #	12 - 15.0406		**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 learn to connect and wire electrical panels safely, control devices and electric motors. Proper grounding, wire sizing and circuit protection are also covered. (Meets SACA Automation Specialist I C-206 Electrical System Installation 1 credential.)										

List the Major Course Segments (Units)	Contact Lecture Hours	Contact Lab Hours	Clinical Practicum	Work-based Learning
Standard 206.1 Apply industrial electrical wiring safety procedures	1	1		
Standard 206.2 Interpret electrical prints for wiring installation	2	4		
Standard 206.3 Install wires and terminal blocks in electrical panels	0.5	2		
Standard 206.4 Install grounding in an electrical panel	0.5	1		
Standard 206.5 Size and install circuit protection for an industrial electrical panel	0.5	2		
Standard 206.6 Install wires between electrical panels	1	2		
Standard 206.7 Install electrical panel wiring to external control devices	0.5	2		
Standard 206.8 Install electrical panel wiring to electric motors	0.5	3		
TOTAL	6.5	17	0	0

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

COURSE MATERIALS		
TITLE:	Instructor-made handouts and circuit schematics	
AUTHOR:		
PUBLISHER:		
VOLUME/EDITION/URL:		
COPYRIGHT DATE:		

MAJOR COURSE SEGMENT	HOURS	LEARNING OUTCOMES
		The student will be able to:
Standard 206.1 Apply industrial electrical wiring safety procedures	2	Performance Indicator 1. Identify industrial electrical wiring installation hazards. Knowledge Indicator 1. Describe PPE/ safe dress for wiring industrial electrical systems. 2. Describe types of industrial electrical wiring installation hazards. 3. Describe types of electrical components and enclosure standards. 4. Describe NFPA 70 Arc Flash and explain its importance.

Standard 206.2 Interpret electrical prints for wiring installation	6	Performance Indicator 1. Add wire number labels to an electrical print. 2. Determine wire size, color, and type needed for electrical panel wiring. 3. Select a circuit protection device for an electrical control system. 4. Size a safety disconnect switch. Knowledge Indicator 1. Describe the function of an electrical print. 2. Describe the function of cross-reference symbols and notes on an electrical print. 3. Describe types of wire, colors, and sizes for electrical panel wiring.
Standard 206.3 Install wires and terminal blocks in electrical panels	2.5	Performance Indicator 1. Size and install a terminal block in an electrical panel. 2. Install control and power device wires in an electrical panel. 3. Route wires in an electrical panel. 4. Bundle wires in an electrical panel. Knowledge Indicator 1. Describe types of terminal blocks and ratings. 2. Describe types of electrical panel routing methods. 3. Describe types of wire bundling methods.
Standard 206.4 Install grounding in an electrical panel	1.5	Performance Indicator 1. Install a grounding circuit in an electrical control system. 2. Inspect and verify an installed grounding circuit. Knowledge Indicator 1. Describe the National Electrical Code (NEC) grounding requirements for Electrical Systems. 2. Describe the operation/components of an electrical control system grounding circuit. 3. Describe methods of connecting ground wires.
Standard 206.5 Size and install circuit protection for an industrial electrical panel	2.5	Performance Indicator 1. Size a circuit protection device for an electrical control system. 2. Size a safety disconnect switch. 3. Install and test a circuit breaker in an industrial electrical panel. Knowledge Indicator 1. Describe the operation of a safety disconnect switch. 2. Describe the operation/construction of industrial circuit breakers.
Standard 206.6 Install wires between electrical panels	3	Performance Indicator 1. Determine number of wires to run between electrical panels. 2. Run wires through conduit between electrical panels. 3. Route wires in an electrical panel. Knowledge Indicator 1. Describe types of terminal blocks and ratings. 2. Describe types of electrical panel routing methods.
Standard 206.7 Install electrical panel wiring to external control devices	2.5	Performance Indicator 1. Connect electrical wires to limit switches and pressure switches. 2. Connect electrical wires to solenoid-operated pneumatic and hydraulic valves. 3. Run wiring through junction boxes to external control devices. Knowledge Indicator 1. Describe the construction of electrical switch wiring terminations. 2. Describe the construction of solenoid valve wiring terminations.

Standard 206.8 Install electrical panel wiring to electric motors	3.5	Performance Indicator 1. Splice and tape motor leads using ring lug connectors. 2. Run electrical panel wiring to motor safety switches and motors. 3. Install and test an electrical motor control circuit using an electrical print. Knowledge Indicator 1. Describe how motors are connected to electrical panels.
	23.5	

Outcomes*	At the successful completion of this course, students will be able to:
Course Outcome 1	Connect and configure an IO-Link Master and Ethernet to Serial interface.
Course Outcome 2	Connect and operate an IO-Link RFID reader system that is connected to a PLC.
Course Outcome 3	Connect and operate an Ethernet to serial barcode reader system that is connected to a PLC.
Course Outcome 4	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.*