

New Course Form

MET 130 Industrial Electrical Systems 4

Originator: Kenny Keith **Status:** Approved **Date Created:** 01/31/2013

Department: MET: Mechatronics **Submitted:** 02/05/2013 **Completed:** 02/27/2013

To ACETS:

Course Prefix: MET

Course Number: 130

Course Title: Industrial Electrical Systems

Cross-listing: No

**Cross-listing
information:**

**Semester for
Implementation:** Fall

**Year of
Implementation:** 2013

Course Type: Required Transfer Vocational

Credit Hours: 4

Transfer Course: BAS-articulation discussions are underway

Course Catalog Description: This course covers the principles and application of alternating (AC) and direct (DC) current electricity, industrial sequential control and electrical controls construction as found in a typical energy and manufacturing environment.

Rationale: This course provides basic electrical principles, skills and competencies that would be required of an entry-level maintenance electrician in a moderately complex, non-PLC, industrial environment such as electronics, automotive, food, pharmaceuticals, consumer goods, packaging, metals, mining & materials, pulp & paper, chemicals, water & wastewater, refining and energy.

**Total Lecture
Contact Hours** 3
per Week:

**Total Lab
Contact Hours** 3
per Week:

**Total Contact
Hours:** 90

Load Factor: 5.1

Requisites: Yes

Prerequisites: Satisfactory placement scores in reading, writing and mathematics and MAT 112 or MAT 121 or any MAT course for which MAT 112 or MAT 121 is a prerequisite.

Co-requisites:

Mode of Instructional Delivery: (1) Traditional classroom instruction (3) Hybrid: internet with live lab (5) Laboratory

If "other" mode of instruction, specify:

Library Resources: N/A

Assessment of Student Learning - Methods: (1) Written Examinations (5) Demonstration of Skills

IF "other" assessment, specify:

Recommend Course: 15

Enrollment:

Credit by Examination: Yes

Literacy/ Critical Inquiry Component: N/A

Ethnic/ Gender Awareness: N/A

Sustainability: No

Sustainability (explanation):

COURSE TOPICS: This course covers the principles and application of alternating (AC) and direct (DC) current electricity, industrial sequential control and electrical controls construction as found in a typical power plant and manufacturing environment.

COURSE OUTCOMES:

1. Describe basic safety rules for working with electrical equipment under 600 volts
2. Apply basic safety rules for working with electrical equipment under 600 volts
3. State Ohm's and Kirchhoff's rules
4. Apply Ohm's and Kirchhoff's rules to calculate and measure voltage and current in series, parallel and combination resistive circuits and in basic capacitive and inductive circuits
5. Identify schematic symbols for power supplies, switches (NO and NC), resistors, capacitors, inductors, motors, transformers, buzzers, solenoids, lights, fuses, circuit breakers, and rheostats
6. Describe the operation and function for power supplies, switches (NO and NC), resistors, capacitors, inductors, motors, transformers, buzzers, solenoids,

- lights, fuses, circuit breakers, and rheostats
7. Connect and test circuits composed of power supplies, switches (NO and NC), resistors, capacitors, inductors, motors, transformers, buzzers, solenoids, lights, fuses, circuit breakers, and rheostats
 8. Identify schematic symbols for 3 phase motors; manual, magnetic and reversing motor starters; overloads; fuses; and basic Hand-Off-Auto and Forward-Reverse-Jog motor control circuits
 9. Describe the operation and function for 3 phase motors; manual, magnetic and reversing motor starters; overloads; fuses; and basic Hand-Off-Auto and Forward-Reverse-Jog motor control circuits
 10. Identify schematic symbols for AND, OR, NOT, NOR and NAND logic and memory
 11. Describe the operation and function for AND, OR, NOT, NOR and NAND logic and memory
 12. Using a transformer, switches, indicators and relays demonstrate AND, OR, NOT, NOR and NAND logic and memory
 13. Interpret elementary ladder diagrams for AND, OR, NOT, NOR and NAND logic and memory
 14. Using a transformer, switches, indicators and relays demonstrate AND, OR, NOT, NOR and NAND logic and memory
 15. Interpret schematic symbols for typical input and output devices that would be used for motor, electro-pneumatic, and electro-hydraulic control operations
 16. Describe the operation and function for typical input and output devices that would be used for motor, electro-pneumatic, and electro-hydraulic control operations
 17. Combine motor, electro-pneumatic, and electro-hydraulic control components with relays, timers and counters to create logic and sequential control circuits and develop the elementary ladder diagram
 18. Describe methods of troubleshooting and testing electrical components and systems.
 19. Demonstrate methods of troubleshooting and testing electrical components and systems
 20. Describe methods used for installing electrical outlets, switches and lighting appropriate to residential or light commercial construction
 21. Demonstrate methods used for installing electrical outlets, switches and lighting appropriate to residential or light commercial construction
 22. Describe methods used for sizing and installing EMT and IMT conduit systems
 23. Demonstrate methods used for sizing and installing EMT and IMT conduit systems
 24. Describe methods used to design and install a wiring system in conduit in compliance with NEC requirements
 25. Demonstrate methods used to design and install a wiring system in conduit in compliance with NEC requirements
 26. Describe methods of bundling, labeling, and terminating wires to construct an electrical control panel; wire electric motors; interconnect panels and motors; and to wire a complete machine
 27. Demonstrate methods of bundling, labeling, and terminating wires to construct an electrical control panel; wire electric motors; interconnect panels

and motors; and to wire a complete machine

Proposer: Kenny Keith