



**COWLEY COLLEGE
& Area Vocational Technical School**

COURSE PROCEDURE FOR

**INDUSTRIAL ELECTRIC POWER
MLL3602 3 Credit Hours**

Student Level:

This course is open to high school and post-secondary level students.

Catalog Description:

MLL3602 – INDUSTRIAL ELECTRIC POWER (3)

The student will learn and apply the fundamentals of industrial electricity such as motor phasing, conductor sizing, single & three-phase power, conduit bending, and the use of ladder diagrams and test equipment to meet acceptable codes and industry standards.

Prerequisites:

None

Controlling Purpose:

This course is designed to help the student increase their knowledge regarding fundamentals of electricity.

Learner Outcomes:

Upon completion of the course, the student will be able to demonstrate a proficiency in basic electrical concepts.

Units Outcomes and Criterion Based Evaluation Key for Core Content:

The following defines the minimum core content, not including the final examination period. Instructors may add other content as time allows.

Evaluation Key:

- A = All major and minor goals have been achieved, and the achievement level is considerably above the minimum required for doing more advanced work in the same field.
- B = All major goals have been achieved, but the student has failed to achieve some of the less important goals. However, the student has progressed to the point where the goals of work at the next level can be easily achieved.
- C = All major goals have been achieved, but many of the minor goals have not been achieved. In this grade range, the minimum level of proficiency represents a person who

Rev: 6/01/2016

DISCLAIMER: THIS INFORMATION IS SUBJECT TO CHANGE. FOR THE OFFICIAL COURSE PROCEDURE CONTACT ACADEMIC AFFAIRS.

has achieved the major goals to the minimum amount of preparation necessary for taking more advanced work in the same field, but without any major handicap of inadequacy in his background.

- D = A few of the major goals have been achieved, but the student's achievement is so limited that he is not well prepared to work at a more advanced level in the same field.
- F = Failing will be computed in GPA and hours attempted.
- N = No instruction or training in this area.

UNIT 1: Electricity Principles

Outcomes: Upon completion of this course students will be able to successfully identify basic principles of electricity.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Outline and describe common forms of electricity.
						Describe the fundamental properties of matter and atomic structure.
						Describe the properties of conductors, insulators, and semiconductors.
						Identify chemical elements that have special interest to the electrical field.
						Identify applications where the electrical properties of compounds are important.
						Describe common methods of electricity generation.

UNIT 2: Basic Quantities

Outcomes: Upon completion of this course students will be able to successfully identify basic units and their source.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Describe the fundamental properties of energy.
						Outline and describe common types of voltage.
						Calculate common types of AC voltage values.
						Outline and describe common types of current, current flow, power and circuits.
						Calculate power factor formulas.
						Explain the function of resistance, conductors, and insulators in an electrical circuit.
						Describe the properties of heat and heat measurement.
						Describe the fundamental properties of light.

UNIT 3: Ohm's Law and the Power Formula

Outcomes: Upon completion of this course students will be able to correctly use basic mathematic properties.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Calculate voltage, current, and resistance using Ohm's law.
						Explain the voltage/current relationship and the current/resistance relationship according to Ohm's law.
						Explain the power formula and its role in calculating power, voltage, and current as well as power/current relationship.
						Describe common applications of the power formula.

UNIT 4: Numbering Systems and Codes

Outcomes: Upon completion of this course students will be able to accurately translate between numeric codes.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Describe the function and operation of the decimal and binary numbering systems.
						Convert a binary number to a decimal number.
						Describe the function and operation of the binary coded decimal (BCD) system.
						Convert a BCD number to a decimal number.
						Describe the function and operation of color.

UNIT 5: Taking Standard Measurements

Outcomes: Upon completion of this course students will be able to successfully identify common measurement techniques and applications.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Identify common measurement principles.
						Describe common procedure for taking voltage, current, resistance, temperature and speed measurement.
						Outline and describe common types of scopes and their operation.
						Describe common applications of scopes.
						Describe the operation and common applications of digital logic probes.

UNIT 6: Symbols and Print Reading

Outcomes: Upon completion of this course students will be able to successfully interpret and understand electrical schematics.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Describe the characteristics and function of Power Sources.
						Describe the characteristics and function of Disconnects.
						Describe the characteristics and function of OCPDs.
						Describe the characteristics and function of Contacts.
						Describe the characteristics and function of Control Switches.
						Describe the characteristics and function of Relays.
						Describe the characteristics and function of Timers.
						Describe the characteristics and function of Contactors.
						Describe the characteristics and function of Motor starters.
						Describe the characteristics and function of Solenoids.
						Describe the characteristics and function of Resistors.
						Describe the characteristics and function of Thermistors.
						Describe the characteristics and function of Capacitors.
						Describe the characteristics and function of Diodes.
						Describe the characteristics and function of Switching Devices.
						Describe the characteristics and function of Digital Logic Gates.
						Describe the characteristics and function of Transformer and Coils.
						Describe the characteristics and function of Motors.

						Describe the characteristics and function of Lights, Alarms, Meters, and Wiring.
						Describe the function of symbols in process control and instrumentation drawings.
						Define and Describe the use of symbols on plans and drawings.

UNIT 7: Circuits and Motors						
Outcomes: Upon completion of this course students will be able to successfully apply basic techniques to complex circuits.						
A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Describe a series/parallel connection and a series and parallel circuit.
						Calculate capacitance and inductance in any kind of circuit.
						Describe the function of batteries and solar cells in any kind of circuit.
						Calculate resistance, voltage, current, and power in any kind of circuit.
						Describe the relationship between torque, horsepower, and motor speed.
						Outline and describe common types of DC motors.
						Describe differences, and common types of single phase and three phase motors.

Projects Required:

As assigned.

Textbook:

Contact Bookstore for current textbook.

Materials/Equipment Required:

None

Attendance Policy:

Students should adhere to the attendance policy outlined by the instructor in the course syllabus.

Grading Policy:

The grading policy will be outlined by the instructor in the course syllabus.

Maximum class size:

Based on classroom occupancy

Course Timeframe:

The U.S. Department of Education, Higher Learning Commission and the Kansas Board of Regents, define credit hour and have specific regulations that the college must follow when developing, teaching and assessing the educational aspects of the college. A credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally-established equivalency that reasonably approximates not less than one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work for approximately fifteen weeks for one semester hour of credit or an equivalent amount of work over a different amount of time. The number of semester hours of credit allowed for each distance education or blended hybrid courses shall be assigned by the college based on the amount of time needed to achieve the same course outcomes in a purely face-to-face format.

Refer to the following policies:

[402.00 Academic Code of Conduct](#)

[263.00 Student Appeal of Course Grades](#)

[403.00 Student Code of Conduct](#)

Disability Services Program:

Cowley College, in recognition of state and federal laws, will accommodate a student with a documented disability. If a student has a disability, which may impact work in this class which requires accommodations, contact the Disability Services Coordinator.