

RANKEN

TECHNICAL COLLEGE

COURSE INFORMATION

Course Number: INT 2011

Course Name: Industrial Electrical/PLC Theory

CREDIT-BY-ASSESSMENT (CBA) COMPETENCY LIST COMPONENTS, QUANTITIES, AND UNITS

- State the basic electrical quantities and their units.
- Use scientific notation to express quantities.
- Use engineering notation and metric prefixes to express quantities.
- Convert from one metric-prefixed unit to another.

VOLTAGE, CURRENT, AND RESISTANCE IN ELECTRIC CIRCUITS

- Define Voltage and discuss its characteristics.
- Define Current and discuss its characteristics.
- Define Resistance and discuss its characteristics.
- Describe a basic electrical circuit.

OHMS LAW AND POWER

- Explain Ohm's Law.
- Use Ohm's law to determine voltage, current, or resistance.
- Calculate power in a circuit.
- Define Opens and Shorts.

SERIES CIRCUITS

- Identify a series circuit.
- Determine the current in a series circuit.
- Determine total series resistance.
- Apply Ohm's law in series circuits.
- Determine the total effect of voltage sources in series.

PARALLEL CIRCUITS

- Identify a parallel circuit.
- Determine the voltage across each parallel branch.
- Apply Kirchoff's current law.
- Determine the total parallel resistance.
- Apply Ohm's law in a parallel circuit.

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SERIES-PARALLEL CIRCUITS

- Identify series-parallel Relationships.
- Analyze series-parallel circuits.
- Design and build series-parallel circuits.
- Measure and record values in series-parallel circuits.

MAGNETISM AND ELECTROMAGNETISM

- Explain the principles of the magnetic field.
- Explain the principles of electromagnetism.
- Discuss the principle of electromagnetic induction.

ALTERNATING CURRENT

- Discuss the principles of Peak, Instantaneous, and RMS voltages.
- Perform AC Conversions.

NATIONAL ELECTRICAL CODE

- Describe the layout and purpose of the National Electrical Code.
- Identify requirements for electrical installations.
- Explain conductor characteristics.
- Identify various types of wiring methods and explain their uses.
- Identify various types of raceway methods and explain their uses.
- Identify receptacle and switch locations for branch circuits.
- Explain Edison 3-wire service.
- Identify purpose of grounding and bonding.
- Design circuits based on the National Electrical Code.
- Construct circuits based on the National Electrical Code.
- Apply the National Electrical Code during electrical installations.

NATIONAL ELECTRICAL CODE CALCULATIONS

- Explain the requirements for over current protection.
- Calculate ampacity of a conductor.
- Calculate conductor voltage drop.
- Calculate raceway conductor fill.
- Calculate box fill.
- Calculate and perform Conduit bending for 1/2 "E.M.T.
- Install Residential Service.

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TRANSFORMERS AND POWER DISTRIBUTION

- Discuss single-phase transformers and Edison 3-Wire system.
- Calculate single-phase transformers and Edison 3-Wire systems.
- Discuss single-phase transformer and Edison 3-Wire connections.
- Discuss three-phase transformers.
- Calculate three-phase transformers.
- Discuss three-phase Delta, Wye, and Open Delta Transformer Configurations.
- Calculate single motor circuits.
- Calculate multiple motor circuits.
- Identify receptacle and switch locations for branch circuits.
- Explain Edison 3-wire service.
- Identify purpose of grounding and bonding.

MOTOR CONTROL & PLCs

- Discuss relay logic and numbering systems.
- Discuss ladder logic.
- Apply ladder logic to motor controls.
- Discuss motor control circuits.
- Explain the operation of PLC.
- Discuss sensors.
- Discuss maintenance items involved with the PLC.
- Install several Input/Output devices for PLC operation.
- Understand the logic needed to perform the proper operation of the PLC.
- Troubleshoot circuits using the PLC.
- Configure PLC.
- Communicate with PLC.
- Address and Wire PLC.
- Select Instructions and Verify.
- Interpret Timers, Counters, and Math Instructions.