COURSE OUTLINE: ELR631 - ELECT. FUND.

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Course Code: Title	ELR631: ELECTRICAL FUNDAMENTALS
Program Number: Name	
Department:	ELEC. APPRENTICES
Academic Year:	2025-2026
Course Description:	This course equips apprentices with a solid foundation in electrical principles, concepts, and related calculations. Upon successful completion, apprentices will be able to apply these principles in practical scenarios, measure circuit parameters accurately, and construct series, parallel, and combination circuits. Additionally, they will demonstrate an understanding of the relationships between work, power, and energy. The course combines theoretical learning with hands-on practice, ensuring apprentices gain comprehensive skills essential for their trade.
Total Credits:	9
Hours/Week:	9
Total Hours:	81
Prerequisites:	There are no pre-requisites for this course.
Corequisites:	There are no co-requisites for this course.
Course Evaluation:	Passing Grade: 50%, A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.
Other Course Evaluation & Assessment Requirements:	Students must receive a passing grade in both the lab and theory portions of the course to receive an overall passing grade.
Course Outcomes and Learning Objectives:	*(see table below)*

Course Outcome 1	Learning Objectives for Course Outcome 1
Apply formulations in relation to electrical fundamentals	• Fractions • Transpositions • Scientific notations • Engineering notations • Substitutions • Algebra
Course Outcome 2	**Learning Objectives for Course Outcome 2**
Describe atomic theory as it relates to the conduction of electricity	• Identify elements on the periodic table • Define electricity • Define a conductor and insulator • Define the elements that produce conductors, insulators and semi-conductors • Describe electron flow and conventional flow o Identify distinctions between the theories

Course Outcome 3	Learning Objectives for Course Outcome 3
Describe common sources of electricity such as,	• Chemical (Battery) • Magnetic (Generators) • Solar • Heat (Thermal pile) • Pressure
Course Outcome 4	**Learning Objectives for Course Outcome 4**
Explain the features and characteristics of resistors and colour coding	• State standard resistor colour code • Identify resistor values using the colour code • Identify the properties of resistors o Construction o Tolerance o Power rating
Course Outcome 5	**Learning Objectives for Course Outcome 5**
Describe the requirements for a basic electrical circuit	• Define voltage, current, resistance and power • Describe the components required to complete a basic circuit o Source o Conductors o Load • Describe the relationship between voltage, current, resistance and power in a basic electrical circuit o Ohm`s law basic electrical symbols such as, • resistor • source • meters • single-pole switch o Power formulae
Course Outcome 6	**Learning Objectives for Course Outcome 6**
Apply laws of electrical theory to DC circuits	• Apply Ohm`s Law to analyze series DC circuits. • Apply Kirchhoff`s Law to analyze series DC circuits • Apply Ohm`s Law to analyze parallel DC circuits • Apply Kirchhoff`s Law to analyze parallel DC circuits • Apply Ohm`s Law to analyze combination DC circuits • Apply Kirchhoff`s Law to analyze combination DC circuits • Calculate values of power for all types of DC circuits • Analyze and calculate current, voltage, and power characteristics in 2-wire and 3-wire distribution systems for balanced, unbalanced, and faulted conditions • Define and calculate efficiency of electrical distribution systems (line loss)
Course Outcome 7	**Learning Objectives for Course Outcome 7**
Demonstrate how to measure circuit parameters using multi-meters (to support outcome 6)	• Measure voltage, resistance, current and power

Course Outcome 8	Learning Objectives for Course Outcome 8
Demonstrate how to build series, parallel and combination circuits to support Ohm`s and Kirchhoff`s laws	• Measure circuit parameters using metering equipment
Course Outcome 9	**Learning Objectives for Course Outcome 9**
Demonstrate the relationship between work, power and energy	• Define work, power, and energy • Perform relationship calculations between work, power and energy • Convert between mechanical and electrical units of work, power, and energy

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Labs and Assignments	15%
Theory Testing	85%

Date: December 15, 2025

Addendum: Please refer to the course outline addendum on the Learning Management System for further information.