

Craft Skills

Basic Electrical Concepts



Course Number

EMS-100

Course Purpose

This course provides information on the basic concepts of direct current (DC) electricity and magnetism, including electrostatics, basic circuit concepts, and measurement of electrical quantities and associated numerical concepts, Ohm's Law, practical circuits, electromagnetism, and electrical measurements. There are hands-on exercises for device operation and simple circuit construction and analysis.

Upon completion of this course, you should be able to:

- Identify the types of electrical energy
- Discuss the composition of the atom and its relation to electrical charge
- Explain the characteristics of current, voltage, and resistance
- Explain Kirchhoff's Current Law and Kirchhoff's Voltage Law
- Calculate equivalent resistance of series and parallel resistive circuits
- Calculate DC circuit parameters using Ohm's Law, Kirchhoff's Current Law, and Kirchhoff's Voltage Law
- Describe the characteristics of capacitors and capacitance
- Describe the characteristics of inductors and inductance
- Describe the construction and operation of a simple AC generator
- Define inductive reactance
- Calculate the inductive reactance of a simple AC circuit
- Define capacitive reactance
- Calculate the capacitive reactance of a simple AC circuit
- Define impedance
- Describe the relationship between apparent, true, and reactive power
- Define power factor as it relates to true power and apparent power

COURSE AGENDA

DAY 1

- Distinguishing Conductors and Insulators
- Observing Electrical Safety Precautions
- Defining Electromotive Force/Voltage
- Explaining Current Flow
- Describing the Properties of Resistance

DAY 2

- Constructing Series Circuits
- Constructing Parallel Circuits
- Defining Basic Electrical Laws
- Constructing Resistive Circuits

DAY 3

- Generating Sine Waves
- Defining Frequency, Period and Wavelength
- Calculating Sine Wave Voltage and Current Values
- Observing AC Phase Relationships

DAY 4

- Calculating Resistance in AC Circuits
- Using Inductance in AC Circuits
- Using Capacitance in AC Circuits

DAY 5

- Calculating Power in AC Circuits
- Review
- Written Exam

WHO SHOULD ATTEND

- I&C technicians
- Electricians
- Electrical Technicians

PREREQUISITES

To successfully complete this course, the following prerequisites are required:

- None

STUDENT MATERIALS

To enhance and facilitate the students' learning experiences, the following materials are provided as part of the course package:

- Student Manual
 - Includes the key concepts, definitions, examples, and activities presented in this course
- Lab Book
 - Provides learning activities and hands-on practice

HANDS-ON PRACTICE

Throughout this course, you will have the opportunity to practice the skills you have learned through a variety of hands-on exercises. These exercises focus on the skills introduced in each lesson.

You will also have the opportunity to combine and practice groups of key skills by completing multiple integrated practices during the course.

NEXT LEARNING LEVEL

Once you have mastered the skills covered in this course, you may want to attend specific training, such as:

- Motor Theory

COURSE LENGTH





This is a five-day course.

TO REGISTER

To register for this or any other Rockwell Automation training course, contact your local authorized Allen-Bradley® Distributor or your local Sales/Support office for a complete listing of courses, descriptions, prices, and schedules.

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