

ELTR 1000 - Fundamental Electrical Concepts (version 201412L)

Course Title Course Development Learning Support

Fundamental Electrical Concepts Standard No

Course Description

This course introduces the student to the electrical trade. Emphasis is placed on orientation to the trade, safety, basic electrical theory, electrical codes, and basic electrical wiring practices.

Pre-requisites

Pre-requisites: None

Regstr. Co-requisites

Regstr. Co-requisites: None

True Co-requisites

True Co-requisites: None

Course Length

	Lecture Contact Time	Regular Lab Type	Reg. Lab Contact Time	Other Lab Type	Oth. Lab Contact Time	Total Contact Hrs
Contact Hours Per Week	3 hrs	N/A	0 hrs	Practicum	3 hrs	6 hrs
Contact Min/Hrs Per Semester	2250 min		0 min		2250 min	90 hrs
	Lecture Credit Hours		Lab Credit Hours	Total Credit hours		WLU
Semester Credit Hours	3		1	4		146.25

Competencies & Outcomes

Order Description

1 Orientation to the Trade

Order	Description	Learning Domain	Level of Learning
1	Describe the apprenticeship/training process for electricians.	Cognitive	Comprehension
2	Describe various career paths/opportunities one might follow in the electrical trade.	Cognitive	Comprehension
3	Define the various sectors of the electrical industry.	Cognitive	Knowledge
4	State the tasks typically performed by an electrician.	Cognitive	Knowledge
5	Explain the responsibilities and aptitudes of an electrician.	Cognitive	Comprehension

2 Electrical Safety

Order	Description	Learning Domain	Level of Learning
1	Recognize safe working practices in the construction environment.	Cognitive	Application
2	Explain the purpose of OSHA and how it promotes safety on the job.	Cognitive	Comprehension

3	Identify electrical hazards and how to avoid or minimize them in the workplace.	Cognitive	Knowledge
4	Explain electrical safety issues concerning lockout/tagout procedures, confined space entry, respiratory protection, and fall protection systems.	Cognitive	Comprehension
5	Develop a task plan and a hazard assessment for a given task and select the appropriate PPE and work methods to safely perform the task.	Cognitive	Application
6	Perform a visual inspection on various types of ladders.	Psychomotor	Guided Response
7	Set up a ladder properly to perform a task.	Psychomotor	Guided Response
8	Properly don a harness.	Psychomotor	Guided Response
9	Perform a hazard assessment of a job such as replacing the lights in your classroom. • Discuss the work to be performed and the hazards involved. • Locate the phone closest to the work site and ensure that the local emergency telephone numbers are either posted at the phone or known by you and your partner(s). • Plan an escape route from the location in the event of an accident.	Psychomotor	Guided Response

3 Introduction to Electrical Circuits

Order	Description	Learning Domain	Level of Learning
1	Define voltage and identify the ways in which it can be produced.	Cognitive	Knowledge
2	Explain the difference between conductors and insulators.	Cognitive	Comprehension
3	Define the units of measurement that are used to measure the properties of electricity.	Cognitive	Knowledge
4	Identify the meters used to measure voltage, current, and resistance.	Cognitive	Knowledge
5	Explain the basic characteristics of series and parallel circuits.	Cognitive	Comprehension

4 Electrical Theory

Order	Description	Learning Domain	Level of Learning
1	Explain the basic characteristics of combination circuits.	Cognitive	Comprehension
2	Calculate, using Kirchhoff's voltage law, the voltage drop in series, parallel, and series-parallel circuits.	Cognitive	Application
3	Calculate, using Kirchhoff's current law, the total current in parallel and series-parallel circuits.	Cognitive	Application
4	Using Ohm's law, find the unknown parameters in series, parallel, and series-parallel circuits.	Cognitive	Application

5 Introduction to the National Electrical Code®

Order	Description	Learning Domain	Level of Learning
1	Explain the purpose and history of the NEC®.	Cognitive	Comprehension

2	Describe the layout of the NEC®.	Cognitive	Comprehension
3	Demonstrate how to navigate the NEC®.	Cognitive	Application
4	Describe the purpose of the National Electrical Manufacturers Association and the NFPA.	Cognitive	Comprehension
5	Explain the role of nationally recognized testing laboratories.	Cognitive	Comprehension
6	Use NEC Article 90 to determine the scope of the NEC®, state what is covered by the NEC® and what is not.	Psychomotor	Guided Response
7	Find the definition of the term feeder in the NEC®.	Psychomotor	Guided Response
8	Look up the NEC® specifications that you would need to follow if you were installing an outlet near a swimming pool.	Psychomotor	Guided Response
9	Find the minimum wire bending space required for two No. 1/0 AWG conductors installed in a junction box or cabinet and entering opposite the terminal.	Psychomotor	Guided Response

6 Device Boxes

Order	Description	Learning Domain	Level of Learning
1	Describe the different types of nonmetallic and metallic boxes.	Cognitive	Comprehension
2	Calculate the NEC® fill requirements for boxes under 100 cubic inches.	Cognitive	Application
3	Identify the appropriate box type and size for a given application.	Cognitive	Knowledge
4	Select and demonstrate the appropriate method for mounting a given box.	Psychomotor	Guided Response
5	Select the minimum size pull or junction box for the following applications: • Conduit entering and exiting for a straight pull. • Conduit entering and exiting at an angle.	Psychomotor	Guided Response

7 Hand Bending

Order	Description	Learning Domain	Level of Learning
1	Identify the methods for hand bending and installing conduit.	Cognitive	Knowledge
2	Determine conduit bends.	Cognitive	Application
3	Make 90° bends, back-to-back bends, offsets, kicks, and saddle bends using a hand bender.	Psychomotor	Guided Response
4	Cut, ream, and thread conduit.	Psychomotor	Guided Response

8 Raceways and Fittings

Order	Description	Learning Domain	Level of Learning
1	Identify and select various types and sizes of raceways and fittings for a given application.	Cognitive	Knowledge
2	Identify various methods used to fabricate (join) and install raceway systems.	Cognitive	Knowledge

3	Identify uses permitted for selected raceways.	Cognitive	Knowledge
4	Demonstrate how to install a flexible raceway system.	Psychomotor	Guided Response
5	Terminate a selected raceway system.	Psychomotor	Guided Response
6	Identify the appropriate conduit body for a given application.	Cognitive	Knowledge

9 Conductors and Cables

Order	Description	Learning Domain	Level of Learning
1	From the cable markings, describe the insulation and jacket material, conductor size and type, number of conductors, temperature rating, voltage rating, and permitted uses.	Cognitive	Comprehension
2	Determine the allowable ampacity of a conductor for a given application.	Cognitive	Application
3	Identify the NEC® requirements for color coding of conductors.	Cognitive	Knowledge
4	Install conductors in a raceway system.	Psychomotor	Guided Response