

ELTR 1035 - Advanced Electrical Concepts I (version 201412L)

Course Title Course Development Learning Support

Advanced Electrical Concepts I Standard No

Course Description

This course introduces the student to more advanced electrical applications. Topics include load calculations, conductor selection and calculations, practical lighting applications, hazardous locations, and overcurrent protection.

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		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		157.5

Competencies & Outcomes

Order Description

1 Load Calculations - Branch and Feeder Circuits

Order	Description	Learning Domain	Level of Learning
1	Calculate loads for single-phase and three-phase branch circuits.	Cognitive	Application
2	Size branch circuit overcurrent protection devices (circuit breakers and fuses) for noncontinuous duty and continuous duty circuits.	Cognitive	Application
3	Apply derating factors to size branch circuits.	Cognitive	Application
4	Calculate ampacity for single-phase and three-phase loads.	Cognitive	Application
5	Use load calculations to determine branch circuit conductor sizes.	Cognitive	Application
6	Use NEC Table 220.55 to calculate residential cooking equipment loads.	Cognitive	Application
7	Select branch circuit conductors and overcurrent protection devices for electric heat, air conditioning equipment, motors, and welders.	Cognitive	Application

2 Conductor Selection and Calculations

Order	Description	Learning Domain	Level of Learning
1	Select electrical conductors for specific applications.	Cognitive	Application
2	Calculate voltage drop in both single-phase and three-phase applications.	Cognitive	Application
3	Apply National Electrical Code (NEC) regulations governing conductors to a specific application.	Cognitive	Application
4	Calculate and apply NECR tap rules to a specific application.	Cognitive	Application
5	Size conductors for the load.	Cognitive	Application
6	Derate conductors for fill, temperature, and voltage drop.	Cognitive	Application
7	Select conductors for various temperature ranges and atmospheres.	Cognitive	Application

3 Practical Applications of Lighting

Order	Description	Learning Domain	Level of Learning
1	Explain how the lighting terms lumen, candlepower, and footcandle relate to one another.	Cognitive	Comprehension
2	Classify lighting fixtures by type and application.	Cognitive	Application
3	Identify the general lighting pattern produced by each type of fixture.	Cognitive	Knowledge
4	Identify the lighting requirements associated with lighting systems used in selected applications such as office buildings, schools, theaters, hazardous areas, etc.	Cognitive	Knowledge
5	Identify various dimming systems and their components.	Cognitive	Knowledge
6	Use manufacturers' lighting fixture catalogs to select the appropriate lighting fixtures for specific lighting applications.	Cognitive	Application
7	While touring selected structures to observe their lighting systems: • Identify the various types of lighting fixtures used. • Explain the specific purpose(s) served by the different fixtures. • Identify the lighting system class of service.	Psychomotor	Guided Response

4 Hazardous Locations

Order	Description	Learning Domain	Level of Learning
1	Define the various classifications of hazardous locations.	Cognitive	Knowledge
2	Describe the wiring methods permitted for branch circuits and feeders in specific hazardous locations.	Cognitive	Comprehension
3	Select seals and drains for specific hazardous locations.	Cognitive	Application
4	Select wiring methods for Class I, Class II, and Class III hazardous locations.	Cognitive	Application
5	Follow National Electrical CodeR (NECR) requirements for installing explosionproof fittings in specific hazardous locations.	Cognitive	Application
6	Using two rigid metal conduit nipples, a sealing fitting, three pieces of No. 12	Psychomotor	Guided

THHN conductors, and a packing fiber/sealing kit, perform the following operations:

- Secure one conduit nipple in each end of the seal.
- Make sure the required amount of threads are engaged.
- Pull the three THHN conductors through the nipples and seal so that about 6" is protruding from each nipple.
- Pack the fiber as per the instructions furnished with the sealing kit.
- Mix the sealing compound.
- Position the unit in the required location and pour in the sealing compound.

Response

5 Overcurrent Protection

Order	Description	Learning Domain	Level of Learning
1	Apply the key National Electrical Code® (NEC®) requirements regarding overcurrent protection.	Cognitive	Application
2	Check specific applications for conformance to NEC® sections that cover short circuit current, fault currents, interrupting ratings, and other sections relating to overcurrent protection.	Cognitive	Application
3	Determine let-through current values (peak and rms) when current-limiting overcurrent devices are used.	Cognitive	Application
4	Select and size overcurrent protection for specific applications.	Psychomotor	Guided Response