

ELTR 1055 - Advanced Electrical Concepts II (version 201412L)

Course Title Course Development Learning Support

Advanced Electrical Standard No
Concepts II

Course Description

This is the capstone course for the Electrical Systems Construction and Maintenance program. Topics include distribution equipment, transformers, commercial electrical services, motor calculations, motor controls, and voice, data and video.

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 Distribution Equipment

Order	Description	Learning Domain	Level of Learning
1	Describe the purpose of switchgear.	Cognitive	Comprehension
2	Describe the four general classifications of circuit breakers and list the major circuit breaker ratings.	Cognitive	Comprehension
3	Describe switchgear construction, metering layouts, wiring requirements, and maintenance.	Cognitive	Comprehension
4	List National Electrical Code (NEC) requirements pertaining to switchgear.	Cognitive	Knowledge
5	Describe the visual and mechanical inspections and electrical tests associated with low-voltage and medium-voltage cables, metal-enclosed busways, and metering and instrumentation.	Cognitive	Comprehension
6	Describe a ground fault relay system and explain how to test it	Cognitive	Comprehension

2 Transformers

Order	Description	Learning Domain	Level of Learning
1	Describe transformer operation.	Cognitive	Comprehension
2	Explain the principle of mutual induction.	Cognitive	Comprehension
3	Describe the operating characteristics of various types of transformers.	Cognitive	Comprehension
4	Connect a multi-tap transformer for the required secondary voltage.	Psychomotor	Guided Response
5	Explain National Electrical Code (NEC) requirements governing the installation of transformers.	Cognitive	Comprehension
6	Compute transformer sizes for various applications.	Cognitive	Application
7	Connect a control transformer for a given application.	Psychomotor	Guided Response
8	Describe how current transformers are used in conjunction with watt-hour meters.	Cognitive	Comprehension

3 Commercial Electrical Services

Order	Description	Learning Domain	Level of Learning
1	Describe various types of electric services for commercial and industrial installations.	Cognitive	Comprehension
2	Read electrical diagrams describing service installations.	Cognitive	Application
3	Select service-entrance equipment for various applications.	Cognitive	Application
4	Explain the role of the National Electrical Code in service installations.	Cognitive	Comprehension
5	Install main disconnect switches, panelboards, and overcurrent protection devices.	Psychomotor	Guided Response
6	Identify the National Electrical Code requirements and purposes of service grounding.	Cognitive	Knowledge
7	Describe single-phase service connections.	Cognitive	Comprehension
8	Describe both wye- and delta-connected three-phase services.	Cognitive	Comprehension

4 Motor Calculations

Order	Description	Learning Domain	Level of Learning
1	Size branch circuits and feeders for electric motors.	Cognitive	Application
2	Size and select overcurrent protective devices for motors.	Cognitive	Application
3	Size and select overload relays for electric motors.	Cognitive	Application
4	Size and select devices to improve the power factor at motor locations.	Cognitive	Application
5	Size motor short circuit protectors.	Cognitive	Application
6	Size multi-motor branch circuits.	Cognitive	Application
7	Size motor disconnects.	Cognitive	Application

5 Voice, Data, and Video

Order	Description	Learning Domain	Level of Learning
1	Define the different categories for voice-data-video (VDV) cabling systems.	Cognitive	Knowledge
2	Install raceways, boxes, and enclosures for VDV systems.	Psychomotor	Guided Response
3	Interpret and apply NEC® requirements for installing and grounding VDV systems.	Cognitive	Application
4	Explain the requirements for firestopping.	Cognitive	Comprehension

6 Motor Controls

Order	Description	Learning Domain	Level of Learning
1	Identify contactors and relays both physically and schematically and describe their operating principles.	Cognitive	Knowledge
2	Identify pilot devices both physically and schematically and describe their operating principles.	Cognitive	Knowledge
3	Interpret motor control wiring, connection, and ladder diagrams.	Cognitive	Application
4	Select and size contactors and relays for use in specific electrical motor control systems.	Psychomotor	Guided Response
5	Select and size pilot devices for use in specific electrical motor control systems.	Psychomotor	Guided Response
6	Connect motor controllers for specific applications according to National Electrical Code (NEC) requirements.	Psychomotor	Guided Response