STATE UNIVERSITY OF NEW YORK
COLLEGE OF TECHNOLOGY
CANTON, NEW YORK

MASTER SYLLABUS

ECMR 101 – Electricity for Trades

CIP Code: 46.0399

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Updated by:

Canino School of Engineering Technology
Civil and Construction Technology
Fall 2021

A. TITLE: Electricity for Trades I

B. COURSE NUMBER: ECMR 101

C. CREDIT HOURS (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity):

 # Credit Hours: 3
 # Lecture Hours _3__ per Week
 # Lab Hours _ Week
Other ___ per Week

Course Length (# of Weeks): 15 weeks

D. WRITING INTENSIVE COURSE: No

E. GER CATEGORY:
Does the course satisfy more than one GER category? If so, which one? No

F. SEMESTER(S) OFFERED: (*Fall, Spring, or Fall and Spring*) Fall

G. COURSE DESCRIPTION:
The exploration of direct and alternating current circuits, resistance, inductance, capacitance, and magnetism through practical applications. Series and parallel circuits, metering, wire sizing, batteries, and motors connect the learner to industry needs.

H. PRE-REQUISITES:
CO-REQUISITES: MATH 106, Intermediate Algebra or higher

I. STUDENT LEARNING OUTCOMES:

Course Student Learning Outcome [SLO]	***PSLO***	***GER***	***ISLO***
a. Using Ohm's Law to determine voltage, resistance, or current values	1. Install Wiring Systems…		5. Industry, Professional, Discipline-specific Knowledge and Skills
b. Explain the concepts of DC circuits	1. Install Wiring Systems…		5. Industry, Professional, Discipline-specific Knowledge and Skills

c. Explain the concept of AC circuits	1. Install Wiring Systems…		5. Industry, Professional, Discipline-specific Knowledge and Skills
d. Explain the proper use of various metering equipment for electrical circuits	1. Install Wiring Systems…		5. Industry, Professional, Discipline-specific
e. Analyze voltage and current relationships in AC circuits	1. Install Wiring Systems…		5. Industry, Professional, Discipline-specific

KEY	**Institutional Student Learning Outcomes [ISLO 1 – 5]**
ISLO #	**ISLO & Subsets**
1	**Communication Skills** Oral [O], Written [W]
2	**Critical Thinking** *Critical Analysis [CA] , Inquiry & Analysis [IA] , Problem Solving [PS]*
3	**Foundational Skills** *Information Management [IM], Quantitative Lit,/Reasoning [QTR]*
4	**Social Responsibility** *Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]*
5	**Industry, Professional, Discipline Specific Knowledge and Skills**

J. APPLIED LEARNING COMPONENT: **Yes__X____ No_____**

If Yes, select one or more of the following categories:

Classroom/Lab___X
Internship___
Clinical Practicum___
Practicum___
Service Learning___
Community Service___
Civic Engagement___
Creative Works/Senior Project___
Research___
Entrepreneurship___
(program, class, project)

K. TEXTS:

Herman, Stephen. *Delmar's Standard Book of Electricity*, 7th ed. Clifton Park: Delmar Learning, 2020

L. REFERENCES: N/A

M. EQUIPMENT: Technology enhances classroom

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

- Tests
- Quizzes
- Homework assignments

P. DETAILED COURSE OUTLINE:

I. ELECTRICAL COMPONENTS & SYMBOLS

A. Residential Electrical
1) switches
2) receptacles
3) lighting

II. ELECTRICAL THEORY & OHMS LAW

A. Nature of Electricity
1) displacement of electrons
2) current: unit of measurement
3) EMF: electrical pressure, voltage
4) resistance
a) opposition to current flow
b) unit of measurement
c) instrument- ohmmeter

III. ELECTRICAL CIRCUITS

A. Series Circuit
1) definition
2) voltage drop
3) current flow
4) total resistance
B. Parallel Circuit
1) definition
2) electrical chrematistics
a) voltage
b) current
3) resistance

a) equal resistors
b) two resistors
c) unequal resistors
C. Series-Parallel circuits
1) equivalent circuit
D. Short circuit
1) accidental path of current flow to ground

E. Ground fault
1) a form of short circuit hot phase touching earth ground
F. Open circuit
1) a break in circuit no current flow

IV. ELECTRICAL ENERGY & POWER

A. Work
1) definition
2) factors involved
3) formula
a) work = force x distance
4) units of work
B. Power
1) definition
a) rate of doing work
b) power is work (ft. lbs./ time)
C. Units of Power
1) Ft. lbs. / min.
2) horsepower
3) watts
D. Measurement of Electrical Power
1) ammeter-voltmeter
a) P = E x I
2) wattmeter
E. Electrical Energy
1) power x time
2) measure with watt hour meter

V. METERS

A. Ammeter
1) movement of indicator needle
2) ammeter applications
3) multi range settings
B. Voltmeter
1) voltage levels
2) voltmeter applications
3) multi range settings
C. Ohmmeter
1) principal of operation
2) ohmmeter applications

VI. ELECTRICAL CONDUCTORS

A. Introduction
1) types of conductors
2) resistivity
3) American wire gauge

B. Conductor resistance
1) total circuit resistance
a) voltage drop
b) current totals
C. Cross sectional area
1) measurement
2) circular mils
3) numerical method for conductor sizing
D. Resistance of Conductors
1) resistivity for copper 10.4 ohms/ mil
2) resistivity for aluminum 21 ohms/ mil
E. Voltage drop single phase

1) effects on electrical load
2) resistance drop
a) E = I X R
b) DVD = 2xKxLxI/CM
3) factors effecting voltage drop
a) load
b) inrush current
c) conductor size

VII. MAGNETISM & ELECTROMAGNETISM

A. nature & theory
B. applications
C. polarity
D. magnetic materials
E. electromagnets
1) construction
2) factors effecting strength
a) current
b) number of turns
c) reluctance

VIII. INDUCTION & GENERATION of EMF

A. induced EMF
1) cutting lines magnetism
2) relationship of current direction through magnetic field
a) Flemings rule
3) factors affecting magnitude of induced elf
B. lens law
C. self-induced EMF
D. self-induction of a coil

E. operation of a simple ac generator

Q. LABORATORY OUTLINE: None