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

MASTER SYLLABUS

ELEC 261 – ELECTRICITY

Updated By: Stephen Frempong

CANINO SCHOOL OF ENGINEERING TECHNOLOGY
ELECTRICAL ENGINEERING TECHNOLOGY ENGINEERING SCIENCE DEPARTMENT
FALL 2018

ELEC 261 – ELECTRICITY

A. TITLE: ELECTRICITY

B. COURSE NUMBER: ELEC 261

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

 # Credit Hours: 4
 # Lecture Hours: 3 **per week**
 # Lab Hours: 3 **per week**
Other: per week

Course Length: 15 **Weeks**

D. WRITING INTENSIVE COURSE): No

E. GER CATEGORY: NONE

F. SEMESTER(S) OFFERED: Fall

G. CATALOGUE DESCRIPTION:
Fundamentals of direct and alternating current circuits, resistance, inductance, capacitance, magnetism are presented. Also basic machine theory as it applies to both direct and alternating current types is covered. The theory of control devices such as relays, contactors and switches is studied. Also, basic number systems and digital logic functions are introduced.

H. % **PRE-REQUISITES:** Pre-Calculus Algebra (MATH 123) or permission of instructor.

CO-REQUISITE: NONE

I. STUDENT LEARNING OUTCOMES:

Institutional Student Learning Outcome (ISLO's)
(1) Communication Skills (2) Critical Thinking (3) Foundational Skills
(4) Social Responsibility (5) Industry, Professional, Discipline-Specific Knowledge and Skills.

Course Objectives	***Institutional SLO's***
a. Compute different electrical values using Ohm's law	2. Crit. Thinking **5.** Industry, Professional, Discipline-Specific Knowledge and Skills.

b. Discuss different types of AC and DC electrical circuits	2. Crit. Thinking **5.** Industry, Professional, Discipline-Specific Knowledge and Skills.
c. Use electrical measuring instruments properly	2. Crit. Thinking **5.** Industry, Professional, Discipline-Specific Knowledge and Skills.
d. Discuss electrical conduction in gas, liquids, and solids	2. Crit. Thinking **5.** Industry, Professional, Discipline-Specific Knowledge and Skills.
e. Discuss electromagnetic induction and its application in motors & generators	2. Crit. Thinking **5.** Industry, Professional, Discipline-Specific Knowledge and Skills.
f. Discuss active and reactive circuit elements and their phase relationship	2. Crit. Thinking **5.** Industry, Professional, Discipline-Specific Knowledge and Skills.
g. Understand single-phase and three-phase circuits	2. Crit. Thinking **5.** Industry, Professional, Discipline-Specific Knowledge and Skills.
h. Discuss the principle operation of transformers, motors, and generators.	2. Crit. Thinking **5.** Industry,

	Professional, Discipline-Specific Knowledge and Skills.
i. Evaluate logic circuits containing AND, OR, NOR, and NAND logic gates	2. Crit. Thinking **5.** Industry, Professional, Discipline-Specific Knowledge and Skills.

J. **APPLIED LEARNING COMPONENT:** CLASSROOM/LAB

K. **TEXTS:** Herman, Stephen. *Delmar's Standard Book of Electricity*, 5th ed. Clifton Park: Delmar Learning, 2016

L. **REFERENCES:** N/A

M. **EQUIPMENT:** Standard electronic laboratory equipment

N. **GRADING METHOD:** A - F

O. **MEASUREMENT CRITERIA/METHODS:**

- Tests
- Quizzes
- Homework assignments
- Lab projects

P. **DETAILED COURSE OUTLINE:**

I. Fundamental Units

A. Energy
B. Sources of Electricity
C. Conductors, Semiconductors, and Insulators
D. Electric Current
E. Potential Difference, Voltage
F. Resistance
G. Measurement of Current, Voltage, and Resistance

II. Direct Current

A. Ohm's Law

B. Series Circuits
C. Parallel Circuits
D. Series-Parallel Circuits

III. Direct Current (DC) Circuits

A. Wire Measurement
B. Kirchhoff's Law
C. Work, Power, Energy

IV. Magnetism

A. Permanent Magnets
B. Electromagnets
C. Magnetic Circuits

V. Inductance

A Definition
B. Units of Measurement
C. Time Constant
D. Self Inductance
E. Lenz's Law
F. Mutual Inductance
G. RL circuits

VI. Capacitance

A. Definition &
B, Units of Measurement &
C. Time Constant
D. RC Circuits

VII. Single Phase Circuits

A. Phase Relations
B. Active and Reactive Powers
C. Power Factor
D. RLC Circuits
E. Resonance Circuits

VIII. Three Phase Circuits

A. Wye Connection, Line/Phase Voltages and Currents
B. Delta Connection, Line/Phase Voltages and Currents
C. Powers and Power Factor
D. Power Sources and Loads

IX. Voltage/Current Generation

A. Theory
B. Sine Wave and DC Outputs
C. Peak, Effective, Average Values
D. AC and DC Generators

X. Transformers

A. Theory of Operation
B. Load Operation
C. Phasing of the Windings
D. Power Calculations

XI. Motors

A. Theory of Operation
B. Simple DC Motors
C. Shunt and Series Motors
D. Ac Motor Theory
E. Three Phase Induction Motors
F. Single Phase Induction Motors

XII. Introduction to Digital Logic

A. Binary Number System
B. Basic Logic Gates and Their Truth Tables

Q. LABORATORY OUTLINE:

LIST OF EXPERIMENTS

EXP. NO.	TITLE
1	INTRODUCTION TO ELECTRICITY
2	DC SERIES CIRCUITS
3	DC PARALLEL and SERIES-PARALLEL CIRCUITS
4	LINEAR AND NON_LINEAR RESISTORS CHARACTERISTICS

LP1	LAB PRACTICAL NO. 1
5	INTRODUCTION TO THE OSCILLOSCOPE
6	CAPACITIVE DISCHARGE FLASHER and RAMP GENERATOR
7	TRANSFORMER APPLICATIONS
8	RC CIRCUIT CHARACTERISTICS
9	SERIES RESONANCE
LP2	LAB PRACTICAL NO. 2
10	INTRODUCTION TO DIGITAL LOGIC
11	SINGLE PHASE INDUCTION MOTOR