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

MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
ENGS 263 – Electric Circuits

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Canino School of Engineering Technology

Department: Electrical & Engineering Science

Semester/Year: Fall 2018

A. **TITLE**: Electric Circuits

B. **COURSE NUMBER:** ENGS 263

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

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

Course Length: 15 **Weeks**

D. **WRITING INTENSIVE COURSE**: Yes ☐ No ☒

E. **GER CATEGORY: None:** ☒ **Yes:** GER
***If course satisfies more than one*:** GER

F. **SEMESTER(S) OFFERED: Fall** ☐ **Spring** ☒ **Fall & Spring** ☐

G. **COURSE DESCRIPTION:**

Electric circuit theory is introduced with empha¬sis on
mathematical definitions of circuit elements. Network analysis techniques are presented within the framework of direct and alternating current theory. Transient forced and complete responses of circuits involving resistance, inductance, and capacitance are analyzed via differential and integral calculus. Circuit Design using Operational Amplifiers

H. **PRE-REQUISITES: None** ☐ **Yes** ☒ **If yes, list below:**

Calculus II (MATH 162), University Physics II (PHYS 132), or permission of instructor

CO-REQUISITES: None ☒ **Yes** ☐ **If yes, list below:**

I. STUDENT LEARNING OUTCOMES: (*see key below*)

By the end of this course, the student will be able to:

Course Student Learning Outcome [SLO]	***Program Student Learning Outcome [PSLO]***	***GER*** *[If Applicable]*	***ISLO & SUBSETS***	
Understand the basic electric theory w/emphasis on mathematical definitions of circuit elements	Provide students with the requisite mathematical skills to successfully pursue their engineering education		3-Found Skills ISLO ISLO	Subsets Subsets Subsets Subsets
Use different techniques to analyze electrical circuits	Prepare students to utilize modern computational tools for engineering programming, analysis, and design		2-Crit Think 3-Found Skills ISLO	PS Subsets Subsets Subsets
Design electrical circuits using Operational Amplifier	Prepare students to utilize modern computational tools for engineering programming, analysis, and design		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
Understand transient responses of circuits using differential equations	Prepare students to utilize modern computational tools for engineering programming, analysis, and design		3-Found Skills ISLO ISLO	Subsets Subsets Subsets Subsets
			ISLO ISLO ISLO	Subsets Subsets Subsets Subsets

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**

*Include program objectives if applicable. Please consult with Program Coordinator

J. APPLIED LEARNING COMPONENT: Yes ☐ No ☒

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

- ☐ Classroom/Lab
- ☐ Internship
- ☐ Clinical Placement
- ☐ Practicum
- ☐ Service Learning
- ☐ Community Service
- ☐ Civic Engagement
- ☐ Creative Works/Senior Project
- ☐ Research
- ☐ Entrepreneurship (program, class, project)

K. TEXTS:

Introductory Circuits for Electrical & Computer Engineering – Nilsson and Riedel, ISBN: 0-13-019855-2, Pearson Education

L. REFERENCES:

Many online references. They will be posted as needed

M. EQUIPMENT: None ☒ Needed:

N. GRADING METHOD: A - F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

Participation:	**5%**
Quiz/Homework:	**25%**
Tests:	**45%**
Final exam:	**25%**

P. DETAILED COURSE OUTLINE:

I. Basic Concepts

- **A. System of Units**
- **B. Basic Quantities**
- **C. Independent Sources**
  - **1. Voltage Sources**
  - **2. Current Sources**

II. Resistive Circuits

- **A. Ohms Law**
- **B. Kirchhoff's Laws**
  - **1. Voltage Law**
  - **2. Current Law**

- **C. Single-Loop Circuits**
- **D. Single-Node Circuits**
- **E. Series-Parallel Circuits**
- **F. Dependent Sources**

III. Analysis Methods

- **A. Nodal Analysis**
- **B. Mesh/Loop Analysis**

IV. Circuit Analysis Theorems

- **A. Linearity**
- **B. Source Transformation**
- **C. Thevenin's Theorem**
- **D. Norton's Theorem**
- **E. Superposition**

V. Operational Amplifier

- **A. Ideal OpAmp**
- **B. Inverting Amplifier circuits**
- **C. Non-Inverting Amplifier Circuits**
- **D. Summing Amplifier Circuits**
- **E. Difference Amplifier Circuits**
- **F. Comparator Circuits**

VI. First-order Circuits

- **A. RL natural response**
- **B. RC natural response**
- **C. RL step (forced) response**
- **D. RC step (forced) response**

VII. Second-order Circuits

A. Series RLC natural response
B. Parallel RLC natural response
C. Series RLC step response
D. Parallel RLC step response

VIII. Sinusoidal Steady-State Analysis

A. Sinusoidal Source
B. Sinusoidal Response
C. The Phasor
D. Circuit Theorems in the Frequency Domain
E. Circuit Simplifications
F. Instantaneous, True, and Reactive Power
G. Complex Power and Power Calculations

Q. LABORATORY OUTLINE: None ☒ Yes ☐