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

MASTER SYLLABUS

ELEC 343 – Advanced Circuit Analysis

Created by: Stephen Frempong

Upgraded by: Stephen Frempong

SCHOOL OF ENGINEERING TECHNOLOGY
ELECTRICAL ENGINEERING TECHNOLOGY & ENGINEERING
SCIENCE DEPARTMENT
Spring 2019

ELEC 343 – Advanced Circuit Analysis

A. TITLE : Advanced Circuit Analysis

B. COURSE NUMBER: ELEC 343

C. CREDIT HOURS: (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)
Credit Hours: 3
Lecture Hours: 3 one hour lecturers per week

Lab Hours: per week
Other: per week

Course Length: 15 Weeks

D. WRITING INTENSIVE COURSE: NO

E. GER CATEGORY: NONE

F. SEMESTER OFFERED: SPRING

G. COURSE DESCRIPTION: An advanced course designed to give students upper level circuit analysis experience. Topics include: Resistive Circuits, Nodal and Loop Analysis, Two-Port Networks, Application of Laplace Transform, Variable-Frequency Network Performance, Polyphase Circuits, and AC Steady-State Analysis.

H. PRE-REQUISITES: ELEC102/129 [Electric Circuits II/lab] and MATH 261[Differential Equations], or permission of instructor.

CO-REQUISITES: NONE

I. STUDENT LEARNING OUTCOMES

- Institutional Student Learning Outcomes (ISLO)
- Accreditation Board for Engineering and Technology (ABET) – Student Outcomes

Course Objectives	Institutional SLO	ABET- Student Outcomes
a. Analyze first and second-order circuits and perform basic circuit design	2. Critical Thinking 5. Industry, Professional, Discipline-Specific Knowledge and Skills	1. An ability to apply knowledge, techniques, skills and modern tools of mathematics, science,

		engineering, and technology to solve broadly defined engineering problems appropriate to the discipline.
b. Apply different techniques to circuits containing a single or more sources	2. Critical Thinking 5. Industry, Professional, Discipline-Specific Knowledge and Skills	1. An ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly defined engineering problems appropriate to the discipline.
c. Apply differential and integral calculus to capacitive and inductive circuits	2. Critical Thinking 5. Industry, Professional, Discipline-Specific Knowledge and Skills	1. An ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly defined engineering problems appropriate to the discipline.
d. Solve problems in magnetically coupled networks, and Analyze variable frequency network performance	2. Critical Thinking 5. Industry, Professional, Discipline-Specific Knowledge and Skills	1. An ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly defined engineering problems appropriate to the discipline.
e. Perform Laplace Transform calculations, and apply the experience from Laplace Transform to circuit analysis	2. Critical Thinking 5. Industry, Professional, Discipline-Specific Knowledge and Skills	1. An ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly defined engineering problems appropriate to the discipline.

J. APPLIED LEARNING COMPONENT: YES

Classroom/Lab

K. TEXTS:

David J. Irwin and Mark R. Nelms, Basic Engineering Circuit Analysis, 10th Edition, 111 River Street, Hoboken, NJ 07030: John Wiley & Sons, Inc. 20016.

L. REFERENCES: None

M. EQUIPMENT: None

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

- Examination
- Class Participation.

P. DETAILED TOPICAL OUTLINE:

1. Review of resistive circuits

    a. Single-Loop Circuits
    b. Single-Node-Pair Circuits
    c. Circuits with Dependent Sources
    d. Design Examples

2. Nodal and Loop Analysis

    a. Nodal Analysis
    b. Loop Analysis
    c. Application Examples
    d. Design Examples

3. First-and Second-Order Transient Circuits

    a. Introduction
    b. First-Order Circuits
    c. Second-Order Circuits
    d. Application Examples
    e. Design Examples

4. Magnetically Coupled Networks

    a. Mutual Inductance
    b. Energy Analysis
    c. The Ideal Transformer

    d. Application Examples

e. Design Examples

5. The Laplace Transform

    a. Two Important Singularity Functions
    b. Transform Pairs
    c. Properties of the Transform
    d. Performing the Inverse Transform
    e. Convolution Integral
    f. Initial-Value and Final-Value Theorems

6. Application of Laplace Transform to Circuit Analysis

    a. Laplace Circuit Solutions
    b. Circuit Element Models
    c. Analysis Techniques
    d. Transfer Function
    e. Application Example
    f. Design Examples

7. Variable-Frequency Network Performance

    a. Variable-Frequency Response Analysis
    b. Sinusoidal Frequency Analysis
    c. Resonant Circuits
    d. Scaling
    e. Application Examples
    f. Design Examples

Q. LABORATORY OUTLINE: None