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

COURSE OUTLINE

ELEC 102 – ELECTRIC CIRCUITS (II)

Prepared By: Stephen E. Frempong

SCHOOL OF ENGINEERING TECHNOLOGY
ENGINEERING SCIENCE & ELECTRICAL ENGINEERING
TECHNOLOGY DEPARTMENT
SPRING 2015
A. **TITLE**: ELECTRIC CIRCUITS (II)

B. **COURSE NUMBER**: ELEC 102

C. **CREDIT HOURS**: 3

D. **WRITING INTENSIVE COURSE**: NO

E. **COURSE LENGTH**: 15

F. **SEMESTER(S) OFFERED**: SPRING/FALL

G. **HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY**: 3- Hours Lecture

H. **CATALOGUE DESCRIPTION**: A continuation of Electric Circuits (I), stressing the understanding of AC analysis that involve resistive, capacitive, and inductive circuits. Also, impedance, resonance, filters and transformers are covered. Students will analyze circuits of various configurations and enhance computational skills. Three hours lecture per week.

I. **PRE-REQUISITES/CO-COURSES**: Electric Circuits (I) ELEC 101/109, and Math 123, or permission of instructor.

J. **GOALS (STUDENT LEARNING OUTCOMES)**

   **Institutional Student Learning Objectives (SLO)**
   (1) Communication (2) Critical Thinking (3) Professional Competence

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<th>Course Objectives / ABET (SLO)</th>
<th>Institutional SLO</th>
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<td>An ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies.</td>
<td>2. Critical Thinking</td>
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<tr>
<td>An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives.</td>
<td>2. Critical Thinking</td>
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<tr>
<td>An ability to identify, analyze, and solve broadly-defined engineering technology problems</td>
<td>3. Professional Competence</td>
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K. **TEXTS**: Introductory Circuit Analysis 13/e
   By – Boylestad ISBN: 0131730444
   Publisher: Prentice Hall
   OR, as determine by instructor.
L. REFERENCES: Electric Circuits Fundamentals
By – Floyd ISBN: 0130163945
Publisher: Prentice Hall

M. EQUIPMENT: No equipment needed for lecture part of the course with the exception of scientific calculator. If computer is needed, student computer lab is available.

N. GRADING METHOD: Grade is based on Quizzes, Tests, Midterm Exam, and Final Exam.

O. MEASUREMENT CRITERIA/METHODS: Tests, Homework, and Quizzes.

P. DETAILED TOPICAL OUTLINE:

1. The Basic Elements and Phasors
   • Derivative
   • Response of R, L, and C Elements to a Sinusoidal Voltage or Current
   • Frequency Response of the Basic Elements
   • Average Power and Power Factor
   • Complex Numbers
   • Rectangular Form
   • Polar Form
   • Conversion between Forms

2. Series and Parallel in ac Circuits
   • Impedance and Phasor Diagram
   • Series Configuration
   • Voltage Divider Rule
   • Frequency Response for Series ac Circuits
   • Admittance and Susceptance
   • Parallel ac Networks
   • Current Divider Rule/Frequency Response

3. Series-Parallel ac Networks

4. Resonance
   • Series Resonant Circuit
   • The Quality Factor (Q)
   • Zt versus Frequency
   • Selectivity
   • \( V_L, V_r, \) and \( V_C \)
   • Parallel Resonant Circuit
   • Selectivity Curve for Parallel Resonant Circuits

5. Decibels, Filters
   • Properties of Logarithms
   • Decibel
• Filters
• R-C Low-Pass Filter
• R-C High-Pass Filter
• Pass-Band Filters
• Stop-Band Filters
• Double-Tuned Filter
• Low-Pass Filter
• High-Pass Filter
• Crossover Networks

6. Transformers
• Mutual Inductance
• The Iron-Core Transformer
• Reflected Impedance and Power
• Impedance Matching, Isolation, and Displacement
• Equivalent Circuit (Iron-Core Transformer)
• Frequency Considerations
• Series Connection of Mutually Coupled Coils
• Air-Core Transformer
• Types of Transformers
• Tapped and Multiple-Load Transformers
• Network with Magnetically Coupled Coils