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

COURSE OUTLINE
ELEC 261 – ELECTRICITY

Prepared By: Dr. Rashid Aidun

CANINO SCHOOL OF ENGINEERING TECHNOLOGY
ENGINEERING SCIENCE & ELECTRICAL
ENGINEERING TECHNOLOGY DEPARTMENT

MAY 2015
A. **TITLE:** ELECTRICITY

B. **COURSE NUMBER:** ELEC 261

C. **CREDIT HOURS:** 4

D. **WRITING INTENSIVE COURSE:** No

E. **COURSE LENGTH:** 15 weeks

F. **SEMESTER(S) OFFERED:** Fall

G. **HOURS OF LECTURE, LABORATORY:** 3 hours lecture, 3 hours laboratory per week.

H. **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 and operation of transformers and the theory of control devices such as relays, contactors and switches is studied.

I. **PRE-REQUISITES/CO-COURSES:** Pre-Calculus Algebra (MATH 123) or permission of instructor.

J. **GOALS (STUDENT LEARNING OUTCOMES):**
Upon completion of the course, the students will be able to:

1. Compute circuit analysis using Ohm’s and Kirchhoff laws
2. Analyze DC electrical circuits
3. Analyze AC electrical circuits
4. Analyze Series and Parallel circuits
5. Select and safely use electrical testing instruments
6. Resolve capacitive and inductive circuits
7. Understand the functionality of transformers

**Intuitional Student Learning Objectives (SLO):**

(1) Communication (2) Critical Thinking (3) Professional Competence

**Laboratory component of this course:**

<table>
<thead>
<tr>
<th>Course Objectives</th>
<th>Institutional SLO</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Compute different electrical values using Ohm’s &amp;</td>
<td>2. Crit. Thinking</td>
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<tr>
<td>Kirchhoff’s laws</td>
<td>3. Prof. Competence</td>
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<tr>
<td>b. Discuss different types of DC</td>
<td>2. Crit. Thinking</td>
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<tr>
<td></td>
<td>3. Prof. Competence</td>
</tr>
<tr>
<td>c. Discuss different types of AC</td>
<td>2. Crit. Thinking</td>
</tr>
<tr>
<td></td>
<td>3. Prof. Competence</td>
</tr>
<tr>
<td>d. Analyze Series and Parallel circuits</td>
<td>2. Crit. Thinking</td>
</tr>
<tr>
<td></td>
<td>3. Prof. Competence</td>
</tr>
<tr>
<td>f. Use electrical measuring instruments properly &amp; team</td>
<td>1. Communication</td>
</tr>
<tr>
<td>work (laboratory components of this course)</td>
<td>3. Prof. Competence</td>
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L. **REFERENCES:** N/A

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

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

O. **MEASUREMENT CRITERIA/METHODS:**

- Exams
- Quizzes
- Homework assignments
- Lab practical & lab reports
P. DETAILED TOPICAL 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. Kirchhoff’s Law
     B. Work, Power, Energy

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

V. Capacitance
   A. Definition
   B. Units of Measurement
   C. Time Constant
   D. RC Circuits

VI. Alternative Current Circuits, AC Circuits
    A. Phase Relations
    B. Active and Reactive Powers
    C. Power Factor
    D. RLC Circuits
    E. Resonance Circuits

VII. Voltage/Current
     A. Sine Wave Voltage/Current
     B. Peak, Effective, Average Values
VIII. Transformers
   A. Theory of Operation
   B. Load Operation
   C. Phasing of the Windings
   D. Power Calculations

Q. LABORATORY OUTLINE:

<table>
<thead>
<tr>
<th>EXP. NO.</th>
<th>TITLE</th>
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<tbody>
<tr>
<td>1</td>
<td>INTRODUCTION TO ELECTRICITY</td>
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<tr>
<td>2</td>
<td>DC SERIES CIRCUITS</td>
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<tr>
<td>3</td>
<td>DC PARALLEL CIRCUITS</td>
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<tr>
<td>4</td>
<td>SERIES-PARALLEL CIRCUITS</td>
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<tr>
<td>5</td>
<td>LINEAR AND NON_LINEAR RESISTORS CHARACTERISTICS</td>
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<tr>
<td>LP1</td>
<td>LAB PRACTICAL NO. 1</td>
</tr>
<tr>
<td>6</td>
<td>INTRODUCTION TO THE OSCILLOSCOPE</td>
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<td>7</td>
<td>CAPACITIVE DISCHARGE FLASHER and RAMP GENERATOR</td>
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<tr>
<td>8</td>
<td>TRANSFORMER APPLICATIONS</td>
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<td>9</td>
<td>RC CIRCUIT CHARACTERISTICS</td>
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<td>10</td>
<td>SERIES RESONANCE</td>
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<td>LP2</td>
<td>LAB PRACTICAL NO. 2</td>
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<td>11</td>
<td>AUTOTRANSFORMERS</td>
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