

**RARITAN VALLEY COMMUNITY COLLEGE  
ACADEMIC COURSE OUTLINE**

**ELEC 101 - Electrical Fundamentals**

**I. Basic Course Information**

- A. Course Number and Title: ELEC 101 - Electrical Fundamentals
- B. New or Modified Course: Modified Course
- C. Date of Proposal: Semester: Spring      Year: 2015
- D. Effective Term: Fall 2015
- E. Sponsoring Department: Science and Engineering
- F. Semester Credit Hours: 3
- G. Weekly Contact Hours: 3              Lecture: 3  
                                                                                 Laboratory: 0
- H. Prerequisites/Corequisites: MATH 106 Technical Math
- I. Laboratory Fees: none
- J. Name and Telephone Number or E-Mail Address of Department Chair at time of approval: Sarah Imbriglio, 908-526-1200 Ext. 8241; sarah.imbriglio@raritanval.edu

**II. Catalog Description**

Prerequisites: MATH 106 Technical Math

Description: This course provides Direct Current and Alternating Current Analysis, and basic understanding of Electrical Fundamentals. Topics include: Voltage, current, resistance, Ohm's Laws, network analysis methods, network theorems, capacitors, inductors, transients, sine wave characteristics.

**III. Statement of Course Need**

- A. This course is designed to introduce the students to topics related to direct and alternating current circuits. Understanding of these concepts and analysis techniques is necessary for subsequent coursework in the Electric Utilities Technology Program

- B. The course has no lab component.
- C. This course meets a program requirement for Electric Utility Technology AAS degree.

#### **IV. Place of Course in College Curriculum**

- A. Free Elective
- B. This course meets a program requirement for Electrical Utility Technology AAS degree.
- C. To see course transferability: a) for New Jersey schools, go to the NJ Transfer website, [www.njtransfer.org](http://www.njtransfer.org); b) for all other colleges and universities, go to the individual websites.

#### **V. Outline of Course Content**

- A. The Nature of Electricity; Electrical Standards and Conventions
- B. Ohm's Law and Power
- C. Direct Current Series Circuits
- D. Direct Current Parallel Circuits: Batteries
- E. Kirchoff's Laws, Thevenin's Theorem, Series/Parallel Circuits
- F. Series/Parallel Circuits, Line Drop Calculations, Three Wire Systems
- G. Magnetism and Electromagnetism
- H. Principles of Alternating Current
- I. Inductance, Inductive Reactance, and Capacitive Circuits
- J. Capacitance, Capacitive Reactance, and Capacitive Circuits
- K. Inductive and Capacitive Circuits Continued
- L. Single Phase Circuits
- M. Single Phase Transformers
- N. Three Phase Systems
- O. Three Phase Transformer Connections

#### **VI. General Education and Course Learning Outcomes**

##### **A. General Education Learning Outcomes:**

At the completion of the course, students will be able to:

1. Demonstrate a basic understanding of the nature of electricity. (GE-NJ 3)
2. Communicate, apply and use their knowledge in real life situations. (GE-NJ 1,3)

## **B. Course Learning Outcomes:**

At the completion of the course, the student will be able to:

1. Distinguish between direct and alternating current circuits.
2. Explain the differences between direct and alternating current circuits.
3. Explain Kirchoff's Laws and how they apply to current circuits.
4. Distinguish between Magnetism and Electromagnetism.
5. Apply Ohm's Law to basic electric circuits.
6. Demonstrate an understanding of power in AC and DC circuits.

## **C. Assessment Instruments**

- A. HW assignments
- B. Tests and Exams
- C. Research projects
- D. Discussions
- E. Presentations

## **VII. Grade Determinants**

- A. HW assignments
- B. Tests and Exams
- C. Research projects
- D. Discussions
- E. Presentations

Primary formats, modes, and methods for teaching and learning that may be used in the course:

- A. lecture/discussion
- B. small-group work
- C. documentaries/video
- D. student presentations
- E. independent study

## **VIII. Texts and Materials**

- A. Schaum's Outline in Basic Electricity, by Milton Gussow. McGraw Hill Publishing
- B. Film and video
- C. Other web and computer based sources

(Please Note: The course outline is intended only as a guide to course content and resources. Do not purchase textbooks based on this outline. The RVCC Bookstore is the sole resource for the most up-to-date information about textbooks.)

**IX. Resources**

- A. Libraries
- B. Computer with online access for research

**X. Honors Options [if relevant]:** no honors option