

# RARITAN VALLEY COMMUNITY COLLEGE ACADEMIC COURSE OUTLINE

## AUTC 204 – Automotive Electrical Systems II

### I. Basic Course Information

- A. Course Number and Title: AUTC 204 – Automotive Electrical Systems II
- B. New or Modified Course: Modified
- C. Date of Proposal: Fall 2022
- D. **Effective Term: Fall 2023**
- E. Sponsoring Departments: *Science and Engineering Department*
- F. Semester Credit Hours: 3
- G. Weekly Contact Hours: 5      Lecture: 2  
Laboratory: 3  
Out of class student work per week: 5.5
- H. Prerequisite (s) ☐ Corequisite (s) ☐ **OR** Prerequisite (s) and Corequisite (s) ☒:  
Prerequisite: AUTC 101 – Automotive Introduction, Fundamentals, and Safety  
AUTC 104 – Automotive Electrical Systems I  
Corequisites: AUTC 208 – Engine Performance and Diagnosis II  
AUTC 220 Hybrid/Electric Vehicles  
AUTC 221 – Engine Systems & Emission Control II  
AUTC 290-Automotive Cooperative Education I  
(Students must be registered in the same section for each course)
- I. Additional Fees: No
- J. Name and Telephone Number or Email Address of Department Chair and Divisional Dean at time of approval::  
*Department Chair: Marianne Baricevic, [Marianne.baricevic@raritanval.edu](mailto:Marianne.baricevic@raritanval.edu) Divisional Dean: Sarah Imbriglio, [sarah.imbriglio@raritanval.edu](mailto:sarah.imbriglio@raritanval.edu)*

### II. Catalog Description

Prerequisite: AUTC 101 – Automotive Introduction, Fundamentals, and Safety  
AUTC 104 – Automotive Electrical Systems I

Corequisites: AUTC 208 – Engine Performance and Diagnosis II  
AUTC 220 Hybrid/Electric Vehicles  
AUTC 221 – Engine Systems & Emission Control II  
AUTC 290-Automotive Cooperative Education I  
(Students must be registered in the same section for each course)

Advanced theory of electrical circuitry, magnetism, induction, and computer control circuits and functionality are included in this course. The course will cover advanced starting and charging strategies controlled by the engine control module, advanced lighting and accessory systems as well as improving skills in laws relating to power and consumption of electricity. Skills in trouble-shooting the automotive electrical system will be further developed with the use of advanced testing equipment.

In the lab, students will learn a hands-on strategy to perform advanced diagnostic strategies and learn how to use a variety of diagnostic tools and electronic equipment. Students will be required to wear clothing appropriate for auto shop safety at all classes. Safety glasses will also be required at all classes.

### **III. Statement of Course Need**

- A. Automotive technicians are vital to our mobile and transport-dependent community. Understanding electrical systems in automobiles and the ability to diagnose and maintain electrical components are integral elements for the education of well-trained technicians in the field, as vehicles have moved from mechanical to electro-mechanical in their design and operation. This course is intended to enhance the student's knowledge past the basics of understanding.
- B. Lab assignments for the course will build on previously learned basics of the electrical systems of the vehicle while introducing advanced electrical systems theory and functionality of computer controlled systems. The lab assignments will challenge the students' critical thinking strategies while maintaining instruction that reinforces the safety practices in a demonstrative environment.
- C. Course transferability: The course transfers as one of the core fundamental courses for the Automotive Technology major and includes a laboratory component; for New Jersey schools go to the NJ Transfer website, [www.njtransfer.org](http://www.njtransfer.org). For all other colleges and universities, go to their individual websites.

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

- A. Free Elective
- B. This course meets the program requirement for the Automotive Technology Certificate and the Associate of Applied Science in Automotive Technology.
- C. Course transferability; for New Jersey schools go to the NJ Transfer website, [www.njtransfer.org](http://www.njtransfer.org). For all other colleges and universities go to their individual sites.

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

- A. Review of the Fundamentals of Electricity
- B. Static and Dynamic Electricity Applications
- C. Advanced Series and Parallel Circuits in computer systems
- D. Series-Parallel Circuits
- E. Integrated Circuit Controls
- F. Advanced Electrical Systems
- G. Computerized Engine Control Applications
- H. Advanced circuitry and functionality of computer controls
- I. Intro to Graphing multi-meter (GMM)
- J. Intro to Digital oscilloscope (DSO)
- K. Diagnosing shorts to voltage/ground
- L. Diagnosing Body Electronic Systems

## **VI. A. Course Learning Outcomes**

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

1. Explain the structure and function of components of automotive electrical systems .
2. Compare and contrast electrical system components used in vehicles.
3. Inspect, test, and replace electrical system components according to manufacturer's specifications.
4. Compare computerized and solid state controls in use in automobiles.
5. Demonstrate proper safety precautions for individuals, components and vehicles.
6. Analyze and service electrical circuits and systems within an automobile.
7. Perform lab experiments and tasks to competent skill level as listed on the NATEF curriculum standards.
8. Identify techniques to troubleshoot, repair, maintain, and solve problems with various automotive electrical systems (GE NJ 4)
9. Apply quantitative reasoning to problems with the maintenance of automotive electrical systems (GE NJ 2)
10. Discuss issues involving automotive electrical systems (GE NJ 1)
11. Apply principles of electricity and electrical current to electrical systems in automobiles (GE NJ 3)

## **B. Assessment Instruments**

1. lectures
2. demonstrations
3. laboratory work
4. instructional videos/DVDs
5. laboratory performance

6. examinations
7. NATEF task list

## **VII. Grade Determinants**

- A. lab performance
- B. examinations
- C. class participation
- D. technical writing
- E. interactive simulations

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

- A. lecture/discussion
- B. small-group work
- C. group discussion
- D. computer-assisted instruction
- E. laboratory
- F. simulation/role playing
- G. demonstration
- H. student collaboration

## **VIII. Text and Materials**

- A. Suggested Text: Automotive Technology: Principles, Diagnosis, and Service Plus MyAutomotiveLab with Pearson eText -- Access Card Package / Edition 5 by James D. Halderman (Author), Prentice Hall Publishing ISBN-10: 0134009088 / ISBN-13: 9780134009087
- B. Students will be required to wear clothing appropriate for auto shop safety at all classes. Student are required to wear a standard industry uniform. Safety glasses will also be required at all classes.
- C. The Automotive Program utilizes online curriculum and online industry service and repair information from the following sources:
  - I. AllData
  - II. Snap On Industries
  - III. Shop Key Pro.
- D. Various Automotive Magazines
- E. Students are provided the use of RVCC technology during the course

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. Reference books
- B. Text Book
- C. AllData
- D. Shop Key Pro
- E. Snap On Industries
- F. NAPA Pro-Link
- G. Published Automotive Magazines
- H. Lab/Shop Tools and Equipment
- I. Electude Interactive Courseware
- J. Safety equipment
- K. Lubricants and various automotive fluids
- L. Sample automotive system components
- M. Instructional videos/DVDs
- N. Auto mechanics shop facility at RVCC workforce building