I. Basic Course Information

A. Course Number and Title: AUTC 104 – Automotive Electrical Systems I

B. New or Modified Course: Modified

C. Date of Proposal: Fall 2017

D. Effective Term: Fall 2018

E. Sponsoring Departments: Science and Engineering Department

F. Semester Credit Hours: 4

G. Weekly Contact Hours: 6
   Lecture: 3
   Laboratory: 3
   Out of class student work per week: 7.5

H. Co-requisite: A grade of C or better in AUTC 101 – Automotive Introduction, Fundamentals, and Safety

I. Laboratory Fees: Yes

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
   Divisional Dean: Sarah Imbriglio, sarah.imbriglio@raritanval.edu

II. Catalog Description

Co-requisite: A grade of C or better in AUTC 101 – Automotive Introduction, Fundamentals, and Safety. Principles of electricity, circuitry and service are included in this course. It will cover batteries, starting and charging systems, lighting and accessory systems as well as laws relating to power and consumption of electricity including Kirchhoff’s Law, Ohm’s Law, and Watt’s Law. Skills in trouble-shooting the automotive electrical system will be developed with the use of modern testing and service equipment.
In the lab, students will learn a hands-on strategy to perform basic maintenance of engines and learn how to use a variety of hand tools and precision measurement tools. 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 beyond understanding.

B. Lab assignments for the course will introduce students to the basic engine power plant of the vehicle and basic maintenance and repair of engine systems, 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. 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. For all other colleges and universities go to their individual sites.

V. Outline of Course Content

A. Fundamentals of Electricity
B. Static and Dynamic Electricity
C. Ohm’s Law
D. Kirchhoff’s Law
E. Watt’s Law
F. Other Electrical Laws
G. Series and Parallel Circuits
H. Batteries and Charging Systems
I. Semi-conductors
J. Integrated Circuits
K. Digital Fundamentals
L. Microprocessors
M. Servicing Accessory and Aftermarket Systems
N. Computerized Engine Controls
O. Keyless Entry Systems
P. Wiper/washer, Horn, Power Accessory Systems
Q. Proper Trim and Panel Removal
R. Maintaining and Servicing:
   1. Alternators and Generators
   2. Interior and Exterior Lighting
   3. Replacing Fuses, Circuit Breakers, Fusible Links, Relays, Switches and Resistors

VI. General Educational and Course Learning Outcomes

A. General Educational Learning Outcomes

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

1. identify techniques to troubleshoot, repair, maintain, and solve problems with automotive electrical systems (GE NJ 4)
2. apply quantitative reasoning to problems with the maintenance of automotive electrical systems (GE NJ 2)
3. discuss issues involving automotive electrical systems (GE NJ 1)
4. apply principles of electricity and electrical current to electrical systems in automobiles (GE NJ 3)

B. Course Learning Outcomes

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

1. Explain the structure and function of electrical systems used in automobiles.
2. Compare and contrast electrical system components used in vehicles.
3. Inspect, test, and replace electrical system components according to manufacturer’s specifications.
4. Examine electrical system components and identify appropriate tools and diagnostic equipment used during diagnosis and repair.
5. Compare computerized and solid state controls in use in automobiles.
6. Apply proper safety precautions for individuals, components and vehicles.
7. Analyze and service electrical circuits and systems within an automobile.
8. Perform lab experiments and tasks to competent skill level as listed on the NATEF curriculum standards.
C. 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


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