

RARITAN VALLEY COMMUNITY COLLEGE ACADEMIC COURSE OUTLINE

AUTC 205 – Automotive Cooling & Climate Control Systems

I. Basic Course Information

A. Course Number and Title: AUTC 205 – Automotive Cooling & Climate Control Systems

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: 4

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

H. Prerequisite (s) ☐ Corequisite (s) ☐ OR Prerequisite (s) and Corequisite (s) ☒:

Pre-requisite: AUTC 101 – Automotive Introduction, Fundamentals, and Safety

Corequisites: AUTC 210 – Suspension & Steering Systems

AUTC 202 – Engine Performance and Diagnosis I

AUTC 116 Automatic & Manual Transmission

(Students must be registered in the same section for each course)

I. Additional 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

Pre-requisite: AUTC 101 – Automotive Introduction, Fundamentals, and Safety

Corequisites: AUTC 210 – Suspension & Steering Systems

AUTC 202 – Engine Performance and Diagnosis I

AUTC 116 Automatic & Manual Transmission

(Students must be registered in the same section for each course)

This course includes a study of cooling, heating, defrosting and air conditioning systems. Maintenance, diagnosis and repair of the systems are covered using lecture and lab experiences. Electrical and/or vacuum circuits and controls are emphasized.

In the lab, students will learn a hands-on strategy to perform basic maintenance of engines and learn how to use a variety of diagnostic and appropriate 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 cooling and climate control systems in automobiles and the ability to diagnose and maintain cooling and climate control system components are integral elements for the education of well-trained technicians in the field. This course is intended to enhance the student's knowledge beyond understanding.
- B. Lab assignments for the course will introduce basic maintenance and repair of engine systems while maintaining instruction that reinforces 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. Health & Safety Concerning Coolant and Refrigerants
- B. Engine Cooling, Heat Exchangers, and Basic Components
- C. Preventive Maintenance, Recycling and Renewing of Coolant
- D. Refrigerants, Chemistry and Physics of Operation
- E. A/C System Components Operation

- F. MACS Course
- G. MACS Examination
- H. HVAC System Service, Testing & Diagnosis
- I. Retrofit (CFC-12 to HFC-134A)
- J. System Controls
- K. Advanced System Controls (Computer)
- L. Future Systems

VI. A. Course Learning Outcomes

1. Analyze the structure and function of cooling & climate control systems used in automobiles.
2. Compare and contrast the various cooling & climate control systems in automatic and manual climate control vehicles as well as past and present systems.
3. Inspect, test, and replace cooling & climate control systems components according to manufacturer's specifications.
4. Examine cooling & climate control systems components and identify appropriate tools and measuring instruments used during diagnosis and repair.
5. Identify environmental and safety concerns related to maintenance procedures for cooling and climate control systems.
6. Perform lab experiments and tasks to competent skill level as listed on the NATEF curriculum standards.
7. Identify appropriate techniques to troubleshoot, repair, maintain, and solve problems with automotive Cooling & Climate Control Systems (GE NJ 4)
8. Apply quantitative reasoning to problems with the maintenance of automotive Cooling & Climate Control Systems (GE NJ 2)
9. Discuss issues involving automotive Cooling & Climate Control Systems (GE NJ 1)

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. 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