Raritan Valley Community College
Course Outline

AUTC 201 – Engine Systems & Emissions Control I

I. Basic Course Information

A. Course Number and Title: AUTC 201 – Engine Systems & Emission Control 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. This course will include a study of various automotive engine systems with respect to theory and operation of the internal combustible engine, the OTTO cycle, lubricating system, and coolant system. Training is provided in diagnosing, repairing, and theory of the following subsystems: cylinder block, cylinder heads, and intake and exhaust systems with emphasis on emission control systems.
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 the structure and function of engine, fuel, and emissions systems in automobiles and their maintenance are integral elements for the education of well-trained technicians in the field. Efficiency, performance and compliance with EPA regulations (State and Federal) are mandatory in this field as well as customer satisfaction. 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 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. Introduction to Engine Systems
   i. Engine Construction
   ii. Engine Classification

B. Principles of Combustion

C. Chemistry of Combustion

D. Engine gaskets and Leak Diagnosis

E. Engine Maintenance

F. Intake and Exhaust Systems

G. Basic Cooling System
H. Basic Fuel Injection Systems
I. Ignition Systems
J. Basic Computer Controls
K. Engine Construction
L. Camshaft Timing
M. Total Review of Combined Components
N. Operational Cycles
   i. Four-stroke cycle
   ii. Two-stroke cycle
O. Lubrication Systems
P. Engine Disassembly
Q. Cylinder Head Removal
R. Cleaning Engine Parts
S. Crankshaft
T. Vibration damper
U. Flywheel
V. Camshaft and Valve Train Inspection
   i. Pushrods
   ii. Rocker Arms
   iii. Timing Components
   iv. Timing belt
   v. Camshaft/crankshaft timing

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 engine systems (GE NJ 4)
2. apply quantitative reasoning to problems with the maintenance of automotive engine systems (GE NJ 2)
3. discuss issues involving automotive engine systems (GE NJ 1)

B. Course Learning Outcomes

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

1. Analyze the structure and function of engines used in automobiles.
2. Compare and contrast the various engine component systems relating to OHV and pushrod engine layout.
3. Inspect, test, and replace engine components according to manufacturer’s specifications.
4. Examine internal combustion components and identify appropriate tools and measuring instruments used during diagnosis and repair.
5. 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