

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

Automotive Technology 143 – Steering and Suspension Diagnosis and Repair

1 hour lecture, 1 unit

Catalog Description

This course includes a detailed study of modern suspension systems and service procedures. This course includes inspection, adjustment, and repair procedures for suspension systems, including methods of diagnosing and repairing various mechanical and hydraulic components using specified tools and procedures. Alignments, adjustments, active suspension, and the relationship between suspension and vehicle dynamics, are demonstrated during lectures. This course is complemented by AUTO143L Steering and Suspension Diagnosis and Repair Laboratory, AUTO143T Steering and Suspension Diagnosis and Repair Assessment Test Out, and by Work Experience where students will perform specific ASE competencies related to suspension and steering diagnosis and repair.

Prerequisite

None

Course Content

- 1) Lecture:
 - a. Introduction and safety
 - b. Equipment operation
 - c. Basic hydraulic theory
 - d. Basic laws of physics as related to automotive suspension systems
 - e. Suspension system theory of operation
 - f. Theory of operation of electronic and mechanical suspension systems
 - g. Interrelationship of suspension theory and design as it relates to other system performances
 - h. Tire and wheel design effect on suspension performance
 - i. Active suspension systems
 - j. Hydraulic system fluid procedures using pressure gauges and parameter values
 - k. Suspension component description and operation

Course Objectives

Students will be able to:

- 1) Describe standardized safety and hazardous waste handling practices.
- 2) Successfully navigate manufacturer specific repair information for steering and suspension system repairs.
- 3) Describe the Tire Pressure Monitoring System (TPMS).
- 4) Identify the power steering analyzer tool to diagnose faults.
- 5) Identify and inspect steering and suspension components.
- 6) Identify ball joint deflection tests.
- 7) Describe system operation of Electronic Power Assist Steering (EPAS).
- 8) Perform various alignments and correction procedures based on simulations.
- 9) Test various air suspension concerns and demonstrate knowledge of air system.
- 10) Diagnose Continuously Controlled Dampening (CCD) suspension concerns.
- 11) Perform ride height inspections.

Method of Evaluation

A grading system will be established by the instructor and implemented uniformly. Grades will be based on demonstrated proficiency in subject matter determined by multiple measurements for evaluation, one of which must be essay exams, skills demonstration using distance education technologies, performance projects where a student is required to submit assigned artifact examples of specific ASE competencies.

- 1) Quizzes, written exams, and hands-on performance exam that measure students' ability to safely identify necessary action or repair using distance education methodologies.
- 2) Practical exercises that measure students' progress toward mastering tasks related to diagnosis, replacement, repair, testing, of suspension systems and components.
- 3) Required skills-based summative assessment that measures students' ability to successfully complete the necessary ASE tasks related to diagnosis, replacement, repair, and testing of suspension controls, by completing required specific tasks in the student's portfolio.
- 4) Students must complete all of the required web based training modules.

Special Materials Required of Student

- 1) Mechanic's hand tool set
- 2) Approved safety glasses and dress code
- 3) Must have access to high speed internet
- 4) A student must have a computer or tablet with a large screen.

Minimum Instructional Facilities

- 1) Auto tech lab (20 bays)
- 2) Various training vehicles
- 3) Smart classroom
- 4) Distance education technologies

Method of Instruction

- 1) Lecture and demonstration are both synchronous and asynchronous. Students are required to attend all lectures and participate with the instructor and other students during live lectures. Students will have access to recorded lectures.
- 2) Individual assistance by file sharing, computer sharing, live demonstration of projects based methods for diagnosing and repairing actual vehicles.
- 3) Discussion boards will be used to assign weekly reflections and posting of student assignments.
- 4) Classroom management system exercises will be broadcast as group assignments.

Out-of-Class Assignments

- 1) **Reading:** assigned course materials, manuals, content on websites, and more.
- 2) **Writing:** assignments where students describe the required tasks related to diagnosis, replacement, repair, and testing of suspension systems and components, and more
- 3) **Other:** web-based training modules, portfolio performance projects related to suspension systems and components, and more.

Texts and References

- 1) Required (representative examples):
 - a. Student workbooks – will be provided electronically.
 - b. Required: VanGelder, Kirk. Fundamentals of Automotive Technology. Jones and Bartlett Learning, 2023.
 - c. Web Based Training Modules will be provided electronically.
 - d. Workshop Manuals will be provided electronically.
- 2) Supplemental: None

Student Learning Outcomes

Upon successful completion of this course, students will be able to:

- 1) Accurately describe various steering and suspension system conditions.
- 2) Identify steering and suspension problems by navigating the workshop manual based on symptoms or codes.
- 3) Communicate effectively and professionally in a diverse setting that includes prospective colleagues, clients, and supervisors.
- 4) Comply with environmental health and safety regulations at the state and federal levels.