Laboratory Contact Hours: 48-54; Homework Hours: 0; Total Student Learning Hours: 48-54

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

AUTOMOTIVE TECHNOLOGY 153L – ADVANCED BRAKE SYSTEM DIAGNOSIS AND REPAIR LABORATORY

3 hours laboratory, 1 unit

Catalog Description
This laboratory course describes and demonstrates proper inspection and diagnostic techniques for various electronic brake symptoms and conditions. Electronic braking system components and operation are covered in this course. This course is the lab for students taking courses AUTO 153 Advanced Brake System Diagnosis and Repair Lecture, AUTO 153T Advanced Brake System Assessment Test Out, and/or for students taking Work Experience who need additional instruction and practice completing required ASE competencies and tasks.

Prerequisite
None

Course Content
1) Laboratory:
   a. Introduction and safety
   b. Equipment operation
   c. Electro-hydraulic brake theory and operation
   d. Review basic laws of physics as related to automotive braking systems
   e. Anti-lock brake system theory of operation
   f. Active brake system theory of operation
   g. Theory of operation of electronic and mechanical anti-lock braking systems
   h. Suspension theory and design as it relates to brake performance using electronic controls
   i. Tire and wheel sensor input design effect on braking performance
   j. Various interactive computer sensor inputs and outputs
   k. Brake hydraulic system fluid procedures using software and hardware
   l. Electronic brake component description and operation

Course Objectives
Students will be able to:
1) Demonstrate standardized safety and hazardous waste handling practices.
2) Successfully navigate manufacturer specific repair information for advanced brake system repairs.
3) Demonstrate knowledge of the Electronic Stability Control System (ESC).
4) Demonstrate knowledge of the Traction Control System.
5) Demonstrate knowledge of the Anti-Lock Braking System (ABS).
6) Create PID maps related to ESC, ABS and Traction Control Systems.
7) Identify ABS, ESC and Traction Control System components.
8) Diagnose ABS pump motor concerns.
9) Diagnose ABS warning light concerns.
10) Diagnose red brake warning lamp concerns.
11) Diagnose ABS/AdvanceTrac warning light.
12) Diagnose Electronic Parking Brake concerns.
13) Diagnose ABS/Electronic Stability Control concerns.

Method of Evaluation
A grading system will be established by the instructor. Grades will be based on demonstrated proficiency in subject matter determined by multiple measurements for evaluation, one of which must be essay exams, diagnosis and repair skills using distance education technologies, performance projects where a student is required to submit assigned artifact examples of specific ASE competencies using a portfolio.
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 electronic brake control systems and components.
3) Students must complete all of the required web based training modules.

Special Materials Required of Student
1) Approved safety glasses and dress code
2) Must have access to high-speed internet
3) A computer or tablet with large screen, camera, and microphone

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 (CMI) will be broadcast as group assignments.

Out-of-Class Assignments
1) Reading assignments
2) Writing assignments
3) Web based training modules
4) Quizzes
5) Tests
6) Competencies Record Book Portfolio

Texts and References
1) Required (representative examples):
   a. Student workbooks – will be provided electronically.
   b. Required:-CDX Master Automotive Technician Series, 2020, **ISBN:** 9781284170917
   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 repair various electronic brake system conditions.
2) Identify advanced electronic brake system 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.