

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

Automotive Technology 144T – Noise, Vibration, and Harshness Assessment Test Out

1.5 hours laboratory, .5 unit

Catalog Description

This assessment course includes summative and criterion tests using actual noise and vibration concerns, diagnosis, and repair procedures. This course allows a student to demonstrate knowledge of proper diagnostic techniques for various Noise, Vibration, and Harshness (NVH) concerns in the department laboratory or by using distance education technologies, live demonstrations, and recordings of work. The assessments will include various tests using vehicles with symptoms and conditions. This course allows a student residing at a distance from training centers to complete ASE certification requirements. This course compliments AUTO 144L Noise, Vibration, and Harshness Laboratory, 144 Noise, Vibration, and Harshness Lecture, and Work Experience classes.

Prerequisite

None

Recommended Preparation

“C” grade or higher or “Pass” in AUTO 161T Electronics Diagnosis and Repair Assessment Test Out.

Entrance Skills

Without the following skills, competencies, and knowledge, students entering this course will be highly unlikely to succeed:

- 1) Demonstrate computer input and output tests and activation using a scan tool
- 2) Obtain and describe normal and abnormal waveforms using a lab-scope
- 3) Test thermistor, potentiometer, variable reluctance, pressure, Hall-effect and related sensors
- 4) Graph and interpret system data using PIDS on a scan tool
- 5) Diagnose and repair computer communication networking faults
- 6) Describe types and functions of computer memory including RAM, ROM, and PROM
- 7) Demonstrate proper diagnosis and repair of electronic system concerns

Course Content

- 1) Assessment Laboratory:
 - a. Introduction and safety
 - b. Equipment operation
 - c. Basic sound theory
 - d. Basic laws of physics as related to automotive rotational systems
 - e. Noise frequency system theory of operation
 - f. Theory and operation of the electronic measurements of sound
 - g. Interrelationship of NVH theory and design as it relates to other vehicle systems noise transfer
 - h. Vehicle systems design effects on NVH performance
 - i. Vehicle Communication Measurements Module (VCMM)
 - j. Frequency calculations based on ratios

Course Objectives

Students will be able to:

- 1) Demonstrate standardized safety and hazardous waste handling practices.
- 2) Successfully navigate manufacturer specific repair information for specific NVH repairs.

- 3) Demonstrate how to perform a driveshaft balance using the VMS Vibration Analyzer.
- 4) Perform vibration diagnostics using the VMS Vibration Analyzer.
- 5) Diagnose various vibration concerns on FWD and RWD vehicles.
- 6) Determine pulley ratios and calculate firing frequencies.
- 7) Measure tires using a tire frequency chart to calculate tire and driveline vibrations.
- 8) Demonstrate proper use and diagnosis of concerns using the ChassisEAR tool.
- 9) Diagnose engine speed vibrations.

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 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) A Student portfolio is required to showcase student comprehension.
- 3) Performance projects used to evaluate student ability to perform repair procedures using web conferencing and simulations.

Special Materials Required of Student

- 1) Approved safety glasses
- 2) Must have access to high-speed internet.
- 3) A signed Ford dealership sponsoring agreement form
- 4) A computer or tablet with a large screen size
- 5) Safe clothing - uniform as required by dealership

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 project based methods for diagnosing and repairing 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 NVH systems, components, and controls, and more.
- 3) **Other:** web-based training modules (pass online pretests prior to laboratory "Test Out"), portfolio performance projects related to NVH systems, components, and controls, 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 repair various Noise, Vibration, and Harshness system conditions.
- 2) Identify Noise, Vibration, and Harshness 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.