

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

AUTOMOTIVE TECHNOLOGY 163T – FORD ELECTRICAL AND ELECTRONIC SUPPLEMENTAL ASSESSMENT TEST OUT

4.5 hours laboratory, 1.5 unit

Catalog Description

This Ford course provides the foundation needed to perform electrical and electronic testing for certified warranty repairs. Topics include electrical and electronic theory and components, using the Digital Multimeter (DMM) and Ford Diagnostic scan tool, navigating the workshop manual and wiring diagrams, and diagnosis and testing of electrical and electronic circuits.

Prerequisite

Acceptance into Ford ASSET and/or Ford ACE program by faculty approval

Recommended Preparation

Currently co-enrolled or "C" grade or higher or "Pass" in AUTO 161T Electrical Diagnosis and Repair Assessment Test Out and in AUTO 162T Electronics Diagnosis and Repair Assessment Test Out or equivalent

Course Content

- 1) Safety policies and procedures
- 2) Proper digital multimeter use
- 3) Voltage, current, and resistance testing
- 4) Circuitry components, operation and testing
- 5) Wiring diagram/schematic interpretation
- 6) Workshop manual navigation
- 7) Scan tool and oscilloscope operation
- 8) Battery, charging, and starting tests
- 9) Various sensor operation and diagnosis
- 10) Network function and testing
- 11) Monitoring input data
- 12) Accessing output operation

Course Objectives

Students will be able to:

- 1) Understand DMM and measurements for Voltage, Current and Resistance as applicable.
- 2) Understand a properly operating series, parallel and series-parallel circuits
- 3) Understand how to check pin fits and perform proper wiring repairs.
- 4) Identify circuit faults using a DMM.
- 5) Perform on vehicle electrical diagnosis
- 6) Understand how to use PTS to locate circuits and components.
- 7) Understand how to interpret wiring diagrams.
- 8) Set up and use the scan tool and/or oscilloscope and interpret the data.
- 9) Read and interpret Wiring Diagrams, set up and use an oscilloscope and use a Digital Multi-Meter (DMM) to measure electronic system components.
- 10) Set up and use the scan tool with Vehicle Communication Measurement Module (VCMM) and interpret the data.

- 11) Navigate service publications and perform electrical and electronic systems diagnosis.
- 12) Read and interpret Wiring Diagrams, and use a Digital Multi-Meter (DMM) to measure electronic system components.
- 13) Recognize when and how to perform charging system tests, interpret charging system test data, reinforce using service publications.
- 14) Recognize normal and abnormal network communication patterns using the oscilloscope.

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, and skills demonstration.

- 1) Skills-based summative assessment that measures students' ability to successfully complete the required tasks related to diagnosis, replacement, repair, and testing of automotive electrical and electronic systems.
- 2) Practical exercises that measure students' progress toward mastering tasks related to diagnosis, replacement, repair, and testing of automotive electrical and electronic systems.
- 3) A student portfolio will be used to show student skill mastery of electrical and electronic competencies.
- 4) Web based training modules.
- 5) Performance projects used to evaluate student ability to navigate repair procedures.
- 6) Live student demonstrations or actual diagnosis and repairs.

Special Materials Required of Student

- 1) Approved safety glasses.
- 2) High speed internet connection and access to large screen computer, laptop, or tablet.
- 3) Students will have access to testing tools and equipment while on campus and by simulations.
- 4) Uniform dress code is required.

Minimum Instructional Facilities

- 1) Auto tech lab (20 service bays)
- 2) Various training vehicles
- 3) Smart classroom
- 4) Diagnostic tools and equipment

Method of Instruction

- 1) Demonstration
- 2) Individual assistance
- 3) Feedback of repair processes regardless of successful or unsuccessful

Out-of-Class Assignments

- 1) Reading assignments
- 2) Writing assignments
- 3) Web based training
- 4) Portfolio artifacts of skills demonstrations

Texts and References

- 1) Required (representative examples):
 - a. Student workbooks – will be provided electronically.
 - b. Web Based Training Modules will be provided electronically.
 - c. Workshop Manuals will be provided electronically.
- 2) Recommended:
 - a. CDX Master Automotive Technician Series, 2018 , ISBN: 9781284170917

Exit Skills

Students having successfully completed this course exit with the following skills, competencies and/or knowledge:

- 1) Diagnose and repair Ford starting, charging, and electrical circuits.
- 2) Demonstrate various electrical tests including resistance, voltage drop, and current.
- 3) Perform Ford scan tool function tests including PID monitoring, actuations, and maps.
- 4) Use the Ford workshop manual to correctly perform electrical diagnosis and repair procedures.
- 5) Demonstrate Ford computer input and output tests and activation using s scan tool.
- 6) Obtain and describe normal and abnormal waveforms using a lab-scope.
- 7) Test thermistor, potentiometer, variable reluctance, pressure, Hall-effect and related sensors.
- 8) Graph and interpret system data using PIDS on a scan tool.
- 9) Diagnose and repair computer communication networking faults.
- 10) Describe types and functions of computer memory including RAM, ROM, and PROM.
- 11) Demonstrate proper diagnosis and repair of electronic system concerns.

Student Learning Outcomes

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

- 1) Accurately diagnose automotive electrical and electronic system conditions.
- 2) Correctly repair automotive electrical and electronic system problems.
- 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.