AUTO 014B: ADVANCED ENGINE MANAGEMENT

Date Submitted:Thu, 06 Sep 2018 16:01:11 GMT

Originator

doanderson

Justification / Rationale

Periodic review of this course indicated lecture and lab hour reduction to fit student needs. No changes to content or lab activities at this time.

Effective Term

Fall 2019

Credit Status

Credit - Degree Applicable

Subject

AUTO - Automotive Technology

Course Number

014B

Full Course Title

Advanced Engine Management

Short Title

ADV ENGINE MGMT

Discipline

Disciplines List
Automotive Technology

Modality

Face-to-Face

Catalog Description

This course provides theory and hands-on experience in intermediate to advanced engine management systems including fuel injection, electronic ignition, emission controls, OBDII, as well as service and maintenance, diagnosis and repair of engine management malfunctions. The focus is then placed on advanced engine management components and systems including: computer inputs, outputs and control and OBDII logic with an emphasis on troubleshooting, diagnosis and repair of advanced engine management malfunctions. A uniform is required for this course.

Schedule Description

This class provides lecture/discussion and hands-on experience understanding, servicing, troubleshooting, diagnosing and repairing intermediate to advanced engine management system malfunctions. Prerequisite: AUTO 014A

Lecture Units

3

Lecture Semester Hours

54

Lab Units

1

Lab Semester Hours

54

In-class Hours

108

Out-of-class Hours
108

Total Course Units
4

Total Semester Hours
216

Prerequisite Course(s)
AUTO 014A

Required Text and Other Instructional Materials

Resource Type
Book

Author
Halderman, James

Title
Advanced Engine Performance Diagnosis

Edition
6th

Publisher
Prentice Hall

Year
2015

College Level
Yes

Flesch-Kincaid Level
13

ISBN #
978-1-4018-7787-3

Resource Type
Book

Author
Halderman, James

Title
Modern Automtive Technology NATEF Standardds Job Sheets for Performance Based Learining

Edition
5th

Publisher
Pearson

Year
2015

College Level
Yes

Flesch-Kincaid Level
13

ISBN #
978-1-63126-378-1

Class Size Maximum
21

Entrance Skills
Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.

Prerequisite Course Objectives
AUTO 014A-Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.

Entrance Skills
Research applicable vehicle and service information, such as engine management system operation, vehicle service history, service precautions, and technical service bulletins

Prerequisite Course Objectives
AUTO 014A-Research applicable vehicle and service information, such as engine management system operation, vehicle service history, service precautions, and technical service bulletins.

Entrance Skills
Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns with an oscilloscope and/or engine diagnostic equipment; determine necessary action

Prerequisite Course Objectives
AUTO 014A-Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns with an oscilloscope and/or engine diagnostic equipment; determine necessary action.

Entrance Skills
Prepare 4 or 5 gas analyzer; inspect and prepare vehicle for test, and obtain exhaust readings; interpret readings, and determine necessary action.

Prerequisite Course Objectives
AUTO 014A-Prepare 4 or 5 gas analyzer; inspect and prepare vehicle for test, and obtain exhaust readings; interpret readings, and determine necessary action.

Entrance Skills
Inspect and test ignition primary circuit wiring and solid state components; perform necessary action.

Prerequisite Course Objectives
AUTO 014A-Inspect and test ignition primary circuit wiring and solid state components; perform necessary action.

Course Content
1. Review of AUTO-014A materials
2. Diagnostic scan tools and Digital Storage Oscilloscope
3. Computer input and output sensors
4. Fuel systems input and output sensors
5. Ignition system input and output sensors
6. OBDII diagnosis

7. Exhaust gas analyzer diagnosis
8. Chrysler web-based training modules

Lab Content

1. Safety & environmental protection
2. Lab practice with diagnostic scan tools and Digital Storage Oscilloscope
3. Identify and test various computer input and output sensors
4. Identify and test various fuel systems input and output sensors
5. Identify and test various ignition system input and output sensors
6. Diagnose and repair vehicles with an OBDII concern
7. Diagnose driveablility concerns using the exhaust gas analyzer
8. Required tasks to meet NATEF 2017 MAST standards

Course Objectives

	Objectives
Objective 1	Diagnose oil leaks, emissions, and drivability problems resulting from malfunctions in the positive crankcase ventilation (PCV) system; determine necessary action.
Objective 2	Inspect, test and service emission control systems, including the EVAP system.
Objective 3	Inspect and test electrical/electronic sensors, controls, and wiring of exhaust gas recirculation (EGR) systems; perform necessary action.
Objective 4	Deduce the causes of emissions or drivability concerns resulting from malfunctions in the computerized engine control system with stored diagnostic trouble codes.
Objective 5	Diagnose emissions or drivability concerns resulting from malfunctions in the computerized engine control system with no stored diagnostic trouble codes; determine necessary action.
Objective 6	Evaluate module communication (including CAN/BUS systems) errors using a scan tool and interpret data.
Objective 7	Inspect and test computerized engine control system sensors, powertrain control module (PCM), actuators, and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO); perform necessary action.
Objective 8	Access and use service information to perform5 step diagnosis procedure.
Objective 9	Diagnose drivability and emissions problems resulting from malfunctions of interrelated systems (cruise control, security alarms, suspension controls, traction controls, A/C, automatic transmissions, non-OEM-installed accessories, or similar systems); determine necessary action.
Objective 10	Interpret evaporative emission related diagnostic trouble codes (DTCs); determine necessary action.
Objective 11	Perform mechanical engine services including adjust valves on engines with mechanical or hydraulic lifters, Remove and replace timing belt; verify correct camshaft timing, mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams, and fan control devices; perform necessary action.
Objective 12	Identify hybrid vehicle internal combustion engine service precautions.

Student Learning Outcomes

	Upon satisfactory completion of this course, students will be able to:
Outcome 1	Demonstrate shop safety practices.
Outcome 2	Diagnose and repair intermediate to advanced level engine management system malfunctions.
Outcome 3	Student will work in a team to formulate a proper diagnosis or repair plan.
Outcome 4	Demonstrate proficiency in referencing service information, following advanced diagnostic flow-charts and documenting repairs.

Methods of Instruction

Method	Please provide a description or examples of how each instructional method will be used in this course.
Demonstration, Repetition/Practice	Students will complete assigned assignments demonstrating their ability to perform the task
Technology-based instruction	Instructor lecture
Participation	Chapter reading and homework
Observation	Instructor observation during assigned tasks
Lecture	Instructor lead instruction

Laboratory	Instructor lead lab activities
Discussion	Weekly discussions

Methods of Evaluation

Method	Please provide a description or examples of how each evaluation method will be used in this course.	Type of Assignment
College level or pre-collegiate essays	Book report, verbal presentation or other research based assignment	Out of Class Only
Oral and practical examination	Book report, verbal presentation or other research based assignment	In and Out of Class
Student participation/contribution	Weekly chapter homework	In and Out of Class
Mid-term and final evaluations	Quizzes and/or exams	In and Out of Class
Tests/Quizzes/Examinations	Quizzes and/or exams	In and Out of Class
Group activity participation/observation	Book report, verbal presentation, lab activities	In and Out of Class
Presentations/student demonstration observations	Book report, verbal presentation or other research based assignment	In and Out of Class
Laboratory projects	Lab assignments and tasks	In and Out of Class
Term or research papers	Book report, verbal presentation or other research based assignment	In and Out of Class
Written homework	Chapter homework	Out of Class Only

Assignments

Other In-class Assignments

1. Review homework from required text: multiple-choice questions, fill in the blank and essay questions to be graded each week.
2. Complete SP2 safety tests.
3. Notes on lecture.
4. Participation in discussion related to topic of lecture.
5. Students must keep a notebook of all course materials including homework, class notes, handouts, class project and team activities. The notebook must be organized by chapter, in-class notes, handouts and extra-credit assignments. The notebook will be evaluated after the half-way point and graded at the end of the course.
6. Review and discuss vehicle diagnosis, troubleshooting and repair of personal, shop and other vehicles to be evaluated by the instructor during lab time.
7. Must develop teamwork skills through classroom interaction and discussion.

Other Out-of-class Assignments

1. Readings from required text: 1-3 chapters per week from both classroom and shop manuals.
2. Homework from required text: multiple-choice questions, fill in the blank and essay questions to be graded each week.
3. Completion of SP2 safety tests.
4. Assigned readings and written summaries from selected instructor handouts.
5. Written summaries and analysis of assigned websites.
6. Must complete a course project consisting an essay describing, analyzing and summarizing a selected topic, including out of class research and fieldwork.
7. Students must keep a notebook of all course materials including homework, class notes, handouts, class project and team activities. The notebook must be organized by chapter, in-class notes, handouts and extra-credit assignments. The note book will be evaluated after the half-way point and graded at the end of the course.
8. Vehicle diagnosis, troubleshooting and repair of personal, shop and other vehicles to be evaluated by the instructor during lab time.
9. Hands-on lab worksheets matching each course objective. These will be graded by the instructor throughout the semester during lab time.
10. Must develop teamwork skills through lab activities and assigned special projects.
11. Chrysler web-based training.

Grade Methods

Letter Grade Only

MIS Course Data

CIP Code
47.0604 - Automobile/Automotive Mechanics Technology/Technician.

TOP Code
094800 - Automotive Technology

SAM Code
B - Advanced Occupational

Basic Skills Status
Not Basic Skills

Prior College Level
Not applicable

Cooperative Work Experience
Not a Coop Course

Course Classification Status
Credit Course

Approved Special Class
Not special class

Noncredit Category
Not Applicable, Credit Course

Funding Agency Category
Not Applicable

Program Status
Program Applicable

Transfer Status
Not transferable

Allow Audit
Yes

Repeatability
No

Materials Fee
No

Additional Fees?
No

Files Uploaded

Attach relevant documents (example: Advisory Committee or Department Minutes)
AUTO-014B_2019.pdf

Approvals

Curriculum Committee Approval Date
11/6/2018

Academic Senate Approval Date
11/29/2018

Board of Trustees Approval Date
12/14/2018

Chancellor's Office Approval Date
1/07/2019

Course Control Number
CCC000599871

Programs referencing this course
Automotive Air Conditioning Certificate of Achievement (http://catalog.collegeofthedesert.eduundefined?key=104)
Automotive Engine Management Certificate of Achievement (http://catalog.collegeofthedesert.eduundefined?key=107)
Brakes Certificate of Achievement (http://catalog.collegeofthedesert.eduundefined?key=109)
Steering, Suspension, Alignment Certificate of Achievement (http://catalog.collegeofthedesert.eduundefined?key=112)
Advanced Transportation Technologies AS Degree (http://catalog.collegeofthedesert.eduundefined?key=44)
Advanced Transportation Technologies AS Degree (http://catalog.collegeofthedesert.eduundefined?key=45)
Automotive Technology AS Degree (http://catalog.collegeofthedesert.eduundefined?key=57)