



El Camino College
COURSE OUTLINE OF RECORD – Approved

I. GENERAL COURSE INFORMATION

Subject and Number: Noncredit Automotive Technology 1
Descriptive Title: Maintenance and Light Repair (MLR) 1
Course Disciplines: Automotive Technology
Division: Industry and Technology

Catalog Description:

This noncredit course is designed to prepare students for entry-level employment in Vehicle Maintenance and Light Repair (MLR) as identified by the Automotive Service Excellence (ASE) Auto Maintenance and Light Repair test area G1. The principles of engines, automatic transmissions, manual drive trains, axles and brakes are essential components in automotive practices and are vital topics in preparing students for the ASE G1 testing requirements.

Note: This is the first of two courses required for ASE G1 Testing.

Conditions of Enrollment:

None

Course Length: ☒ Full Term ☐ Other (specify number of weeks):
Hours Lecture: 1.00 hours per week TBA
Hours Laboratory: 4.50 hours per week TBA
Course Units: 0
Total hours: 99

Grading Method: Pass/No Pass
Credit Status: Non-Credit

Transfer CSU: No
Transfer UC: No

A. COURSE STUDENT LEARNING OUTCOMES (The course student learning outcomes are listed below, along with a representative assessment method for each. Student learning outcomes are not subject to review, revision or approval by the College Curriculum Committee)

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

1. Safety

Recognize and identify shop safety, environmental hazards and sustainable environmental practices in an automotive shop.

2. Basic Skills

Develop the skills needed to perform maintenance and light repairs on engine, automatic transmissions, manual drive trains, axles and brakes systems.

3. Research

Perform basic maintenance according to research on proper safety precautions, established maintenance scheduling, accurate inspection processes and repair procedures resulting in efficient repairs.

B. Course Student Learning Objectives (The major learning objective for students enrolled in this course are listed below, along with a representative assessment method for each)

1. Comply with shop and vehicle safety practices established by laboratory policies.
Multiple Choice Exams
2. Perform basic maintenance related to engines, automatic transmissions, manual drive trains, axles and brakes as defined by ASE G1 testing requirements.
Laboratory reports
3. Describe the education opportunities and resources available through California Community Colleges.
Written homework
4. Evaluate the cause of a customer complaint and determine the corrective action needed that complies with industry standards and manufacturer's specifications as described by the course content.
Performance exams
5. Understand the various fluid level check points, fluid characteristics and filling procedure for each fluid for multiple automotive systems as described by the course content.
Multiple Choice Exams
6. Perform multipoint vehicle inspection, identifying and documenting various maintenance components and systems as described by the course content.
Class Performance
7. Identify damaged, defective, or inoperable components while performing the comprehensive "3 C's" (Complaint, Cause, Correction) as described by the course content.
Quizzes
8. Follow preventive maintenance schedule as defined by the manufacturer, based on the type

of driving done as described by the course content.

Written homework

9. Accurately document repairs and maintenance procedures using the "3 C's" on a service repair order as described by the course content.

Laboratory reports

10. Recognize maintenance indicators used for various systems by different manufacturers and research how to properly reset maintenance indicators based on various factors as described by the course content.

Multiple Choice Exams

III. OUTLINE OF SUBJECT MATTER (Topics are detailed enough to enable a qualified instructor to determine the major areas that should be covered as well as ensure consistency from instructor to instructor and semester to semester.)

Lecture or Lab	Approximate Hours	Topic Number	Major Topic
Lecture	1	I	Overview, Safety, Education and Industry A. Course requirements and policies B. Safety information and test C. Safety and Pollution Prevention (SP2) D. Tools, equipment and usage E. Hazardous waste handling F. Education opportunities and resources G. ASE exam process
Lecture	1.5	II	Research, Measurement and Documentation A. Complaint cause correction B. Technical Service Bulletins (TSB) C. Labor rates and time D. Measurement; tools, systems and math
Lecture	1.5	III	Engine Systems A. Four stroke process B. Compression testing and cylinder leakage C. Leaks and noises D. Inspecting and replacing gaskets, pans, covers, oil and filters E. Rest oil life monitor F. Verifying operation of engine-related warning indicators
Lecture	1	IV	Cooling system A. Parts and operation B. Various system leak inspection and testing C. Drain, flush, refill and bleed system D. Inspecting and replacing thermostat and bypass E. Fan operation mechanical and electrical F. Fan clutch, fan shroud and air dams G. Drive belts, tensioner and pulleys
Lecture	1	VI	Exhaust, Air Induction and Fuel Induction A. Inspecting, servicing or replacing air filter and housing B. Fuel tank, filler neck, fuel cap, lines, fittings and

			<ul style="list-style-type: none"> hoses C. Crankcase ventilation system D. Inspecting exhaust system E. External fuel filter
Lecture	1	VII	Engine and Emissions Control <ul style="list-style-type: none"> A. Removing and replacing spark plugs B. Inspecting canister, lines and components of the evaporative emissions control system C. Diagnostic Trouble Codes (DTC) D. Diesel exhaust fluid
Lecture	2	VIII	Automatic Transmission/Transaxle <ul style="list-style-type: none"> A. Basic operation and types B. Fluid types, level and condition C. Replacing fluid and filter(s) D. Leaks; external seals and gaskets E. Transmission cooling system, lines and fittings F. Powertrain mounts G. Verifying correct operation through various basic diagnostics
Lecture	2	IX	Manual Drive Train and Axles <ul style="list-style-type: none"> A. Operation B. Fluid inspection and service C. Hydraulic clutch system inspection and service D. Shifter assembly and linkage inspection and service E. Drive shaft, half-shaft, universal and Constant Velocity joints (CV) F. Noises and vibration G. Shafts, yokes and boots for universal and CV joints H. Drive shaft center support bearings wheel bearings, seals and hubs
Lecture	1	X	Axle Inspection <ul style="list-style-type: none"> A. Fluid leakage B. Inspect, drain and refill C. Inspecting and replacing rear axle shaft wheel studs D. Vent and axle mountings
Lecture	2	XI	Four Wheel (4WD)/All Wheel Drive (AWD) <ul style="list-style-type: none"> A. Types and operation B. Transfer case shifting mechanisms C. Transfer case fluid level, condition and service D. Front drive shaft service E. Front drive axle various joints and half shafts F. Bearings, hubs, axle seals and vents G. Tires size for vehicle application H. Verifying operation of 4WD and AWD system
Lecture	1	XII	Brakes <ul style="list-style-type: none"> A. Operation B. Poor stopping, noises and spongy pedal C. Hoses, lines, valves, fittings and supports D. Brake and anti-lock brake system warning lights E. Parking brake indicator light, switch and wiring

Lecture	1	XIII	Brake Fluid <ul style="list-style-type: none"> A. Selecting, handling, storing and installing proper brake fluid B. Checking fluid level and condition C. Inspecting for fluid leakage D. Bleeding and/or flushing hydraulic system
Lecture	1	XIV	Power Assist Units <ul style="list-style-type: none"> A. Brake pedal free travel B. Booster operation C. Vacuum supply manifold or auxiliary pump D. Vacuum leaks E. Checking valve operation F. Basic operation of hydro-boost and electric-hydraulic assist system and safety hazards
Lab	81	XV	Defined by Lecture Topics <ul style="list-style-type: none"> A. Overview, safety, education and Industry B. Research, measurement and documentation C. Engine systems D. Cooling system E. Exhaust, air Induction and fuel Induction F. Engine and emissions control G. Automatic transmission transaxle H. Manual drive train and axles I. Axle inspection J. 4WD and AWD K. Brakes L. Brake fluid M. Power assist units
Total Lecture Hours			18
Total Laboratory Hours			81
Total Hours			99

IV. PRIMARY METHODS OF EVALUATION AND SAMPLE ASSIGNMENTS

A. PRIMARY METHOD OF EVALUATION

Problem solving demonstrations (computational or non-computational)
Skills demonstrations

B. TYPICAL ASSIGNMENT USING PRIMARY METHOD OF EVALUATION

Complete a 7-10 page worksheet packet that covers specific tasks for ASE G1 as defined by course outline. Submit worksheet packet to the instructor.

C. COLLEGE LEVEL CRITICAL THINKING ASSIGNMENTS

1. Research the benefits of having a degree by meeting with a campus advisor to discuss what is offered, what resources are available to students to become successful and how it ties to employment. This will be documented through a two-page report submitted to the instructor and evaluated by rubric.
2. Analyze a vehicle's maintenance and light repair needs, research shop manual diagnostic references and write a one-page repair order recommending repair procedures. Submit repair order to the instructor.

D. OTHER TYPICAL ASSESSMENT AND EVALUATION METHODS:

- Class Performance
- Objective Exam
- Completion
- Performance Exams
- Quizzes
- Homework Problems
- Journal kept throughout course
- Term or Other Papers
- Laboratory Reports
- True/False
- Matching Items
- Written Homework
- Multiple Choice

V. INSTRUCTIONAL METHODS:

- Lecture
- Lab
- Discussion
- Multimedia presentations
- Demonstration
- Group Activities
- Role play/simulation
- Guest Speakers
- Field trips

Note: In compliance with Board Policies 1600 and 3410, Title 5 California Code of Regulations, the Rehabilitation Act of 1973, and Sections 504 and 508 of the Americans with Disabilities Act, instruction delivery shall provide access, full inclusion, and effective communication for students with disabilities.

VI. WORK OUTSIDE OF CLASS:

- Study
- Answer questions
- Skill practice
- Required reading
- Problem solving activity
- Written work (such as essay/composition/report/analysis/research)
- Journal (done on a continuing basis throughout the semester)
- Observation of or participation in an activity related to course content (such as theatre event, museum, concert, debate, meeting)

Estimated Study Hours Per Week: 2 hours

VII. TEXTS AND MATERIALS

A. UP-TO-DATE REPRESENTATIVE TEXTBOOKS

Automotive Technology: Principles, Diagnosis, and Service (6th Edition), James Halderman, Pearson Education, 2019

B. ALTERNATIVE TEXTBOOKS

C. REQUIRED SUPPLEMENTARY READINGS

D. OTHER REQUIRED MATERIALS

Safety Glasses meeting American National Standards Institute (ANSI) 87
Appropriate shop apparel consider suitable by instructor

VIII. CONDITIONS OF ENROLLMENT

A. Requisite/s (Course and Non-Course Prerequisite/s and Corequisite/s). Add rows as needed.

Requisites	Category and Justification
None	

B. Requisite Skills - Match skills from prerequisite course/s or non-course prerequisites without which a student would be "highly unlikely to succeed."

Requisite Skills – Matching
Requisite Skill Needed: Course title and number and objective related to that skill:

C. Recommended Preparations (Course and Non-Course) Add rows as needed.

Recommended Preparation	Category and Justification
None	

D. Recommended Skills. Match skills from recommended courses or non-course prerequisite that would "enhance a students' ability to succeed in the courses".

Recommended Skills – Matching
Recommended Skill Needed: Course title and number and objective related to that skill:

E. Enrollment Limitations

Enrollment Limitations and Category	Enrollment Limitations Impact
None	

Course created by: EDWARD MATYKIEWICZ

BOARD APPROVAL DATE: 10/21/209

LAST BOARD APPROVAL DATE:

Last Reviewed and/or Revised by