Course Acronym:	NATE
Course Number:	1
Descriptive Title:	Maintenance and Light Repair (MLR) 1
Division:	Industry and Technology
Department:	Automotive Technology
Course Disciplines:	Automotive 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.*
Prerequisite:	
Co-requisite:	
Recommended Preparation:	
Enrollment Limitation:	
Hours Lecture (per week):	18
Hours Laboratory (per week):	81
Outside Study Hours:	2
Total Course Hours:	99
Course Units:	0
Grading Method:	Pass/No Pass only
Credit Status:	Non Credit
Transfer CSU:	No
Effective Date:	
Transfer UC:	No
Effective Date:	
General Education: ECC	
Term:	
Other:	

CSU GE:	
Term:	
Other:	
IGETC:	
Term:	
Other:	
Student Learning Outcomes:	**SLO #1 Safety** Recognize and identify shop safety, environmental hazards and sustainable environmental practices in an automotive shop. **SLO #2 Basic Skills** Develop the skills needed to perform maintenance and light repairs on engine, automatic transmissions, manual drive trains, axles and brakes systems. **SLO #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.
Course Objectives:	1. Comply with shop and vehicle safety practices established by laboratory policies. 2. Perform basic maintenance related to engines, automatic transmissions, manual drive trains, axles and brakes as defined by ASE G1 testing requirements. 3. Describe the education opportunities and resources available through California Community Colleges. 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. 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. 6. Perform multipoint vehicle inspection, identifying and documenting various maintenance components and systems as described by the course content. 7. Identify damaged, defective, or inoperable components while performing the comprehensive "3 C's" (Complaint, Cause, Correction) as described by the course content. 8. Follow preventive maintenance schedule as defined by the manufacturer, based on the type of driving done as described by the course content. 9. Accurately document repairs and maintenance procedures using the "3 C's" on a service repair order as described by the course content. 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.
Major Topics:	**I. Overview, Safety, Education and Industry (1.5 hours, lecture)** 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

II. Research, Measurement and Documentation (1.5 hours, lecture)

A. Complaint, cause, correction
B. Technical Service Bulletins (TSB)
C. Labor rates and time
D. Measurement; tools, systems and math

III. Engine Systems (1.5 hours, lecture)

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

IV. Cooling System (1 hour, lecture)

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

V. Exhaust, Air Induction and Fuel Induction (1 hour, lecture)

A. Inspecting, servicing or replacing air filter and housing
B. Fuel tank, filler neck, fuel cap, lines, fittings and hoses
C. Crankcase ventilation system
D. Inspecting exhaust system
E. External fuel filter

VI. Engine and Emissions Control (1.5 hours, lecture)

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

VII. Automatic Transmission/Transaxle (2 hours, lecture)

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 though various basic diagnostics

VIII. Manual Drive Train and Axles (2 hours, lecture)

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

IX. Axle Inspection (1 hour, lecture)

A. Fluid leakage
B. Inspect, drain and refill
C. Inspecting and replacing rear axle shaft wheel studs
D. Vent and axle mountings

X. Four Wheel (4WD)/All Wheel Drive (AWD) (2 hours, lecture)

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

XI. Brakes (1 hour, lecture)

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

XII. Brake Fluid (1 hour, lecture)

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

XIII. Power Assist Units (1 hour, lecture)

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 **XiV. Defined by Lecture Topics (81 hours, lab)** 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
Primary Method of Evaluation:	3) Skills demonstration
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.
Critical Thinking Assignment 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.
Critical Thinking Assignment 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.
Other Evaluation Methods:	Class Performance Laboratory Reports Multiple Choice Objective Exam Performance Exams Quizzes Written Homework Completion Homework Problems Journal kept throughout course

	Matching Items Term or Other Papers True/False
Instructional Methods:	Demonstration Discussion Field trips Group activities Guest speakers Lab Lecture Multimedia presentations Role play/simulation
If other:	
Work Outside of Class:	Answer questions 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) Problem solving activity Required reading Skill practice Study Written work (such as essay/composition/report/analysis/research)
If Other:	
Up-To-Date Representative Textbooks:	Automotive Technology: Principles, Diagnosis, and Service, 6th Edition, James Halderman, Pearson Education, 2020
Alternative Textbooks:	
Required Supplementary Readings:	
Other Required Materials:	Safety Glasses meeting American National Standards Institute (ANSI) 87 Appropriate shop apparel consider suitable by instructor
Requisite:	
Category:	
Requisite course(s): List both prerequisites and corequisites in this box.	
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	
Requisite Skill:	
Requisite Skill and Matching Skill(s): Bold	

the requisite skill(s). If applicable	
Requisite course:	
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	
Requisite Skill:	
Requisite Skill and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s). If applicable	
Enrollment Limitations and Category:	
Enrollment Limitations Impact:	
Course Created by:	Edward Matykiewicz
Date:	04/02/2019
Original Board Approval Date:	
Last Reviewed and/or Revised by:	Ed Matykiewicz
Date:	03/08/2022
Last Board Approval Date:	11/21/2022