Glendale Unified School District

Senior High School

June 21, 2016 (Revised)

Department:	Career Technical Education (CTE)
Course Title:	Introduction to Automotive Light Service 107 A/B
Course Number:	5387V/5388V
Grade Level	9-12
Semester Credit:	10
Prerequisites:	Introduction to Automotive 101, 103, 106
Textbook:	Modern Automotive Technology 8th Edition by James Duffy
Course Description:	This is an introductory course and is designed to provide students with working knowledge of light duty service. Students will learn under-hood and undercar systems service, battery and basic electrical service, pre-delivery inspection procedures, and preventive maintenance operations. Emphasis will be placed on the safe operation of light duty service tools and equipment, and general repair procedures of wheels and tires, suspension and steering components, engine transmission components, engine and vehicle electrical components, and brake system components. This course offers further practice and experience in the subject taught in three other introduction courses, 101, 103, 106. Students are encouraged to complete all of the courses to earn their certification. The units for this class could be transferable to Rio Hondo College.

I. Standards

A. Career Technical Standards, Transportation – Pathway Standards: Systems ` Diagnostics Service and Repair

1. C1.0: Demonstrate the practice of personal and occupational safety and protecting the environment by using materials and processes in accordance with the manufacturer and industry standards.

a. C1.4: Use appropriate personal protective equipment and safety practices.

2. C2.0: Practice the safe and appropriate use of tools, equipment and work processes.

3. C3.0: Use scientific principles in relation to chemical, mechanical, and physical functions for various engine and vehicle systems.

    a. C3.1: Describe the operating principles of internal and/or external combustion engines.

4. C4.0: Perform and document maintenance procedures in accordance with the recommendations of the manufacturer.

    a. C4.3: Use reference books, technical service bulletins, and other documents and materials related to the service industry available in print and through electronic retrieval systems to accurately diagnose and repair systems, equipment, and vehicles.

B. Common Core Reading standards for literacy and Science and technical subjects (RST) grades 9-12

    1. RST 1: Cite specific textual evidence to support analysis of science and technical texts.

    2. RST 2: Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

    3. RST3: Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

    4. RST 4: Determine the meaning of symbols, key terms, and other domain specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-12 texts and topics.

    5. RST 6: Analyze the author's purpose and provide an explanation, describing a procedure, or discussing an experiment in a text.

    6. RST 7: Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.q., in a flowchart, diagram, model, graph, or table).

C. Common Code Writing standards for literacy in History/Social Studies, Science and technical subjects (WHST) grades 9-12

1. WHST 2: Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

2. WHST 2d: Use precise language and domain specific vocabulary to inform about or explain the topic.

II. Sample Assessments

A. Quizzes and Tests

B. Performance Tasks

III. Topics of Study – Suggested Time Distribution

A. Introduction to Automotive Light Service – Semester I

1. Shop Safety 2 weeks

a. Upon successful completion of this session, the student in the Automotive Technology Program will understand the fundamentals of Automotive Shop Safety and be able to complete and pass the Auto Technology Department Safety Test. This is required to allow the students to perform hands on lab work. They will learn the use of Material Safety Data Sheets (MSDS) and understand hazardous material handling and OSHA standards.

2. Battery Testing and Service 4 weeks

a. During this session students will be performing maintenance and testing of automotive batteries using hydrometers, multi meters, battery load testers, chargers and other maintenance equipment. They will learn how to determine the condition of the battery and the proper disposal/recycle practice. Students will practice safety procedures used while servicing the battery. This includes the use of safety glasses, gloves and other equipment required for safe operation. This is a class designed to enhance the fundamentals taught in 103.

3. Starting Systems 4 weeks

   a. During this session students will learn the steps for diagnosing, testing, and repairing starting system problems by using a variety of methods. Students will recognize the symptoms of faulty starting system components. They will check and verify the operation of each component, such as solenoids, armatures, field coils, brushes and pinion gears. They will remove, disassemble, repair, and replace faulty components in a variety of starters, including the test and adjusting of safety neutral switches. They will use special equipment and learn the safe operation of tools, meters, and other equipment needed for diagnostics and repair. This class is designed to enhance the fundamentals taught in 103.

4. Testing and Repair of Charging Systems 4 weeks

   a. During this session students will learn how to diagnose, test, and repair charging system problems by using a variety of methods. Diagnostics will use scan tools, lab scopes, and meters, which the students will understand and maintain. Students will recognize the symptoms of faulty charging systems. They will check and verify the operation of internal components. They will remove, disassemble, repair, and replace faulty components. They will use special equipment and learn the safe operation of tools, meters, and other equipment needed for diagnostics and repair. This class is designed to enhance the fundamentals taught in 103.

5. Testing and Repair of Ignition Systems 4 weeks

   a. During this session students will learn the steps to diagnose, test, and repair modern ignition systems, including vacuum systems. They will summarize drivability problems, oscilloscope functions, and tune-up procedures. They will perform diagnostics on primary and secondary ignition systems from visual inspection to electronic scanning following schematics and technical bulletins. Students will learn how to identify common problems, and resolve ignition faults using school vehicles. They will operate hand held scopes, engine analyzers, and electronic ignition testers in their evaluation of ignition system problems. They will follow manufacturer's specifications for timing adjustments, including the use of computers and scan tools. This class is designed to enhance the fundamentals taught in 103.

6. Final Review and Test 1 week

B. Introduction to Automotive Light Service – Semester II

1. Lights, Instrumentation, Wipers, Horns operation and service 4 weeks

a. During this session students will perform basic testing of the lighting, instrumentation, wipers, horn circuits, and other essential safety functions. They will identify system problems by evaluating indicator lights on the dashboard. Through the use of electronic schematics and flow charts, they will diagnose and repair malfunctioning circuits using school vehicles. They will learn headlight adjustment techniques, fuse replacement, and identify wire color-coding for circuit maintenance and repair. They will work with service manuals, technical bulletins, and information from other automotive sources. This class is designed to enhance the fundamentals taught in 103.

2. Suspension Maintenance and Repair 3 weeks

a. During this session the students will diagnose, inspect, remove and replace common suspension parts that commonly wear and fail in service. They will assemble and disassemble strut assemblies types, Shock Absorbers, Constant Velocity Joints (CV Joint), Axle shafts, steering components. They will inspect ball joints and suspension bushings to manufacturer's specifications. They will learn the different alignment angles, characteristics and problems affecting wheel alignments. They will evaluate leaf springs and torsion bar suspension. Students will service power steering systems, including power rack and pinion and manual rack and pinion systems. This class is designed to enhance the fundamentals taught in 103.

3. Cooling Systems Testing, Maintenance and Repair 4 weeks

   a. During this session the students will perform cooling system diagnostics and maintenance, including fans, radiators, heater cores, water pumps, thermostats, and fan belt adjustments. They will pinpoint overcooling and overheating problems using cooling system pressure testers, combustion leak testers, and gas analyzer testers. They will complete basic repairs, understand major repair procedures. Students will test coolant using a Hydrometer, and understand the correct procedure for handling storage and disposal of chemicals. This class is designed to enhance the fundamentals taught in 101.

4. On-board Diagnostics and the Use of Scan Tools 4 weeks

   a. During this session the students will use advanced methods to trouble shoot difficult-to-locate problems. It will also introduce the operating principles of vehicle analyzers with emphasis on using the oscilloscope. They will interpret problem codes, and use data stream values to find problems that do not trip problem codes. Students will learn how to use scan tools to activate and deactivate computer components for testing. This class is designed to enhance the fundamentals taught in 106.

5. Brake System Maintenance and Repair 3 weeks

   a. During this session the students will inspect and service the braking system, including master cylinders, disc brake assemblies, drum brake assemblies and hand brakes. They will disassemble the entire brake assembly, measure and resurface drum and rotors using lathe machines, reassemble, and reinstall onto school vehicles. They will learn the correct procedure for bleeding and adjusting the brake systems using manufacturer's recommendations. They will learn how to diagnose Anti-lock

Brakes Systems (ABS), and the functions of warning lights. Students will service master cylinders, wheel cylinders, and calipers, and will inspect and repack wheel bearings. This class is designed to enhance the fundamentals taught in 103.

6. Final Review and Test 1 week