Glendale Unified School District

Senior High School

June 21, 2016 (Revised)

Department: Career Technical Education (CTE)

Course Title: Introduction to Automotive Service and Repair 101 A/B

Course Number:

Grade Level 9-12

Semester Credit: 10

Prerequisites: None

Textbook: Modern Automotive Technology 8th Edition by James Duffy

Course Description: This course is designed to introduce the student to the fundamentals of a variety of automotive systems under the hood and safely maintain them. It will also include some 'hands on' opportunities using school vehicles. They will learn basic automotive tool and equipment use, and how to perform basic repairs and maintenance. It is a preliminary course for obtaining a certification as a General Service Technician. Students are encouraged to complete all of the courses to earn their certification. The credits 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 a 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 (ex., 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 Service and Repair

1. Shop Safety 2 weeks

a. Upon successful completion of this session, the students 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. Automotive Careers and Opportunities 1 week

a. Upon successful completion of this session, students will learn about the automotive industry opportunities and how to pursue them. This includes the writing of resumes, job search techniques, and industry careers. This also includes earning degrees in higher education. It will introduce the students into more than just auto mechanics, but an understanding of corporate or private management in the automotive field, including careers in sales, manufacturing, engineering and all facets of the industry.

3. Hand Tools and Power Tools 2 weeks

a. Upon successful completion of this session, students will be able to successfully demonstrate proper use of hand tools, power tools, and service equipment including floor jacks and hoists. They will be able to identify standard automotive hand tools as well as tools for specific tasks. They will work with both SAE standard and metric and be able to judge the quality of the tools, work clothes and personal apparel, including safety glasses, shoes, boots and gloves. The safe operation of power tools including drills, lathes and impact tools will also be covered, as well as the use of computers in the automotive shop.

4. Measurements and Math 2 weeks

   a. During this session students will learn to use the basic mathematic functions such as addition and subtraction for determining engine sizes, ratios, component dimensions, and other calculations. Students will learn how to read scales, decimals, and fractions. They will learn to identify SAE and metric fasteners and the tools and procedures needed to torque them. They will understand the use of micrometers, calipers, telescopic gauges, and other precision measuring devices.

5. Vehicle Maintenance and Service Information 3 Weeks

   a. During this session students will be able to successfully research applicable vehicle and service information, such as service information, system operation, and technical service bulletins and recall notices. They will be able to properly write work and service orders. They will identify decals placed under the hood or on the doorposts, used by most auto manufacturers giving maintenance and service information. They will learn to read and understand the information contained in an automotive Vehicle Identification Number (VIN number).

6. Cooling Systems 4 weeks

   a. During this session students will learn the operation and maintenance of air-cooled and radiator cooled systems, including the safe operation of high temperature liquids. They will understand the diagnostics procedures of overheating and overcooling problems and the functions of each component in a cooling system. The properties of the different types of antifreeze will be presented, as well as the environmental regulations in dealing with toxic chemicals. They will be able to explain the importance and types of antifreeze.

7. Lubricating Systems 4 weeks

   a. During this session students will learn the fundamentals of oil, lubrication systems, diagnostics, testing and changing engine fluids. Students will understand the functions of the basic parts of a lubrication system. They will be able to summarize the operation of the system, and describe the construction of system parts. They will be shown how to compare different lubrication systems and

explain the characteristics and ratings of engine oil while learning to change the engine oil.

8. Final Review and Test 1 week

B. Introduction to Automotive Service and Repair – Semester II

1. Engine Fundamentals 3 weeks

a. During this session the students will identify the major parts of a variety of automotive engines, and understand the differences between four-stroke and two-stroke engines. They will be able to explain the basic function of the major parts of an automotive engine and define common engine terms.

2. Engine Disassembly using Briggs and Stratton Materials 7 weeks

a. During this session the students will review engine operating systems, engine handling, model identification and safety. They will disassemble and assemble small engines. They will make adjustments based on specifications, perform safety checks and run the engines.

3. Ignition Systems Fundamentals 4 weeks

a. During this session the students will learn to identify and describe the function of major ignition systems components and understand the fundamental of the automotive ignition system. They will learn the functions of the primary and secondary circuits. This includes the ignition coil, spark plug, and ignition circuit variation. They will be able to distinguish between distributor, distributorless, and direct ignition systems and describe the three basic methods used to control ignition system spark timing, they will be able to follow maintenance manufacture recommendations and perform minor tune ups.

4. Fuel System fundamentals 4 weeks

a. During this session the students will understand how crude oil is converted into a variety of products, including gasoline, diesel fuel, and liquefied petroleum gas. They will be able to explain octane and octane ratings, describe typical and non-typical combustion, and define major parts of the fuel supply system. Students will define different types of fuel systems, and be able to list the advantages of direct fuel injection. They will be able to perform basic testing and repairs, and follow safety procedures.

5. Final Review and Test 1 week