Glendale Unified School District

Senior High School

June 21, 2016 (Revised)

Department: Career Technical Education (CTE)

Course Title: Introduction to Automotive Service and Repair 103 A/B

Course Number: 5383V / 5384V

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 under the car automotive systems and how to safely maintain them. They will have the opportunity to work with a variety of systems, and will include some 'hands on' learning using school vehicles. They will learn how to perform basic repairs and maintenance using automotive tools and equipment. 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 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.

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

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

3. 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 preforming 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 Service and Repair – 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. Automotive Careers and Opportunities 2.5 weeks

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 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 2.5 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 2.5 weeks

   a. During this session students will learn to use the basic mathematic functions such as addition, 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 others precision measuring devices.

5. Vehicle Maintenance and Service Information 3.5 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. Tire, Wheel, and wheel/bearing fundamental 5 weeks

   a. During this session students will identify the parts of the tire and wheel assembly. They will be able to describe tire inflation and rotation procedures, explain type and sizes of tires, and diagnose common tire, wheel, and wheel bearing problems. This includes recognizing road damage, tire wear patterns and other common tire issues. Students will be able to measure tire tread and wheel run out and will perform tire-balancing procedures. They will be able to identify tires age and manufacturers coding, and understand Tire Pressure Monitoring System (TPMS systems) including valve steams and valve cores. Students will learn to follow safe practices while servicing tires and wheels.

7. Final Review and Test 1 week

B. Introduction to Automotive Service and Repair – Semester II

1. Suspension and Steering System Fundamentals 4 week

   a. During this session students will be able to identify the various types of automotive suspension systems, including their major components.

They will learn to describe the basic function of a variety of systems such as independent and non-independent suspension, coil spring, leaf spring, air spring, torsion bar, and traction control systems. They will understand traction control systems and their components. They will diagnose common problems relating to a suspension system, basic maintenance such as replacing shock absorbers. Students will learn safe work procedures while repairing suspension systems.

2. Exhaust Systems and Emission Control Technology 4 weeks

   a. During this session students will be able to describe and identify major components of automotive exhaust and emission control systems. They will understand and be able to explain the sources of air pollution and the need for automotive emission control. They will be able to describe the operation of the emission control systems, and explain how a computer or engine control module can be used to operate emission control system. They will learn to distinguish the difference between OBDI and OBDII computer systems and be able to summarize how OBDII systems uses multiple oxygen sensors to check air-fuel mixture and catalytic converter efficiency. They will be able to perform exhaust system inspections, and learn to follow safety procedures while working with exhaust system.

3. Brake System Fundamental 6 weeks

   a. During this session students will learn to identify major parts of the automotive brake system and their basic functions. They will understand the fundamental principles for both system types, hydraulic and mechanical. They will be able to explain the operation of both vacuum and hydraulic power brake systems as well as ABS systems, and compare the operation of drum and disc brake systems, including the differences in synthetic and non-synthetic brake fluids. Students will perform complete visual inspections and maintenance of brake system, including the measurement of components to specifications, and the diagnoses of common brake system problems.

4. Drive Train and Axel Technology 4 weeks

   a. During this session students will explain the operation of an automotive drive train, including Clutch, Automatic and Manual transmissions drive shaft, axles and differentials. They will be able to identify the basic parts of each element, including front wheel and rear wheel drive vehicles. They will learn the different types of transmission fluids and

gear oil used in modern automotive vehicles and understand maintenance schedules and procedures.

5. Final Review and Test 1 week