

VALLEY ROP COURSE OUTLINE

COURSE TITLE: Auto Mechanics 2

VALLEY ROP #: TR-5655-Auto2
CDE #: 2494

CBEDS TITLE: Automotive Mechanics, Combination
CBEDS #: 5655

CTE SECTOR: Transportation
CTE PATHWAY: Vehicle Maintenance, Service & Repair

JOB TITLE: Automotive Master Mechanics 49-3023.01

COURSE DESCRIPTION:

This course introduces students to automotive service and repair, shop safety, and shop operation, as well as tool safety, use and identification. The course will also cover automotive engines and basic systems: electrical, ignition, tune-ups and trouble shooting, engine rebuilding, and battery basics. With completion of the course the student will be prepared for an entry-level position in today's automotive service industry.

DATE APPROVED: October 30, 2002
REVISION DATE(S): January 30, 2006 / March 2009 / Oct 2009

HOURS: 180
CREDITS: 10

PREREQUISITES: Auto Mechanics 1

GRADE LEVEL: 11-12

ARTICULATION(S): None

TEXTBOOKS: *Automotive Encyclopedia 2000 edition* by William Tolboldt, Larry Johnson, W. Scott Gauthier.

COURSE COMPETENCIES:

Upon completion of this course, the student will:

- Learn about careers and how to find a job through resume and job interview classroom practice. Students will learn the basic elements of a resume and will produce a professional resume for them to keep. In addition, students will go through a job interview with the instructor or a business advisor.
- Acquire skills and knowledge in records and information management by storing and protecting records, organizing records, and retrieving them quickly when needed, tracking the movement of records to account for their location at all times, and disposing of records no longer needed.
- Acquire and improve keyboarding speed and accuracy using specialized software and a personal computer.
- Learn basic concepts and procedures of Microsoft Word-word processing software. Be able to create, edit, save, retrieve, and print documents by producing assignments.
- Learn and practice business communication formats by producing interoffice memorandums, letters, reports, and outlines.

INSTRUCTIONAL METHODS:

- Portfolio
- Student projects
- Guest Speakers
- Oral Presentations
- Demonstrations
- Hands-On

EVALUATION METHODS:

Assessment opportunities, which allow continuous evaluation of students' progress, will be embedded throughout the course and should be a learning experience. All students will be expected to achieve mastery of all topics; often, demonstrations of mastery will occur in a public forum. The following strategies, which include both formal and informal assessment techniques will include, but are not limited to:

- Competency based skill sheets
- Performance demonstrated projects
- Unit tests and applications
- Portfolio

Standards Integrated

Automotive Electrical Systems

PS-C1.5, C1.1, C1.2, C1.4, C2.2 thru C2.7, C3.4 thru C3.7, C4.1, C6.1, C6.3, C6.4, C7.1 thru C7.7
LS1.1, LS1.3, LS 1.7, LS 1.8, LS1.7, LS 2.1, LS 2.5, LS 2.6 NS1.2, NS1.6, NS1.7, NS2.2, NS2.3
AF1.2, 4.2, MG1.1, MG1.3, MG2.1, MG2.3, MR1.2, MR2.1, MR3.1, MR3.3

Automotive Fuel Systems

C1.1 thru C1.5, C2.2, C2.5C3.1, C3.6, C4.1, C4.3, C4.4, C6.1, C6.3, C6.4, C6.7, C7.1
LS1.1, LS1.3, LS1.7, LS1.8, LS2.1, LS2.5, LS2.6, NS1.2,NS1.6, NS1.7, NS2.2, NS2.3, AF1.2, AF4.2,
MG1.1, MG1.3, MG2.1, MG2.3, MR1.2, MR2.1, MR3.1, MR3.3 R1.1, R1.2, R2.3, R2.4, R2.7, R2.8,
W1.2, W1.3, W1.5, W2.1, W2.5

Automotive Drive Train

PS-C1.5, C1.1, C1.2, C1.4, C2.1, C2.3, C2.4, C2.5, C2.6, C2.7, C8.1, C8.4, LS1.1, LS1.3, LS1.7,
LS1.8, LS2.1, LS2.5, LS2.6, MG1.1, MG1.3, MG2.1, MG2.3, MR1.2, MR2.1, MR3.1, MR3.3, NS1.2,
NS1.6, NS1.7, NS2.2, NS2.3, AF1.2, AF4.2, R1.1, R1.2, R2.3, R2.4, R2.7, R2.8,
W1.2,W1.3,W1.5,W2.1, W2.5

Brake Systems

PS-C1.5, C1.1, C1.2, C1.4, C2.1, C2.3, C2.4, C2.5, C2.6, C2.7, C4.2, C4.4, C5.3, C6.1
C8.1, C8.4, LS1.1, LS1.3, LS1.7, LS1.8, LS2.1, LS2.5, LS2.6, MG1.1, MG1.3, MG2.1, MG2.3, MR1.2,
MR2.1, MR3.1, MR3.3, NS1.2, NS1.6, NS1.7, NS2.2, NS2.3, AF1.2, AF4.2, R1.1, R1.2, R2.3, R2.4,
R2.7, R2.8, W1.2,W1.3,W1.5,W2.1, W2.5

Suspension and Steering

PS-C1.1,1.2,1.4,C1.5, CC5.3,C3.6,C3.7,C8.3,C8.5,C8.6
LS1.1,LA1.3,LS1.7,LS1.8,LS2.5,LS2.6,NS1.2,NS1.6,NS1.7,NS2.2,NS2.3,AF1.2,AF4.2,MG1.1,MG1.3
MG2.1,MG2.3,MR1.2,MR2.1,MR3.3 R1.1,R1.2,R2.1,R2.4,R2.7,R2.8,W1.2,W1.3,W1.5,W2.1,W2.5

Career Preparation Standards

PS-C1.1, C1.2, C1.4, C1.5, LS1.1, LS1.3, LS1.7, LS1.8, LS2.1, LS2.5, LS2.6,
R1.1, R1.2, R2.1, R2.3, R2.7, R2.8, W1.2, W1.3, W1.5, W2.1, W2.5

COURSE OUTLINE:

Unit of Instruction	Estimated Hours	Standards
Safety	10	
Electrical Systems		
<ul style="list-style-type: none">• Electrical theory, from basic to advanced application• Explore different automotive electrical systems from very early to late model systems.• Competencies:• Read electrical diagrams.• Take basic voltage drops.• Diagnose fault in different electrical circuits.• Identify computer sensors and their purpose.• Identify workings of charging systems.		
Ignition Systems	32	
<ul style="list-style-type: none">• Explore and discuss different ignition systems, why we need them and the advantages and disadvantages of each system.• Competencies:• Identify each ignition system from early to late model vehicles.• Identify each ignition part and their purpose.• Diagnose problems in the system by using ignition scopes, analyzers, scan tools, and graphing meters.• Do proper tune up and proper maintenance on the ignition systems.		
Tune Up and Trouble Shooting	32	
<ul style="list-style-type: none">• Trouble shoot either electrical or mechanical.• Competencies:• Identify electrical malfunction vs. mechanical.• Problem solve; using various techniques.• Identify different reasons for failure.• Use advanced tools to diagnose problems.		
Engine Rebuilding, Engine Assembly &Cylinder Head Rebuilding,	32	
<ul style="list-style-type: none">• Discuss reasons for engine rebuilding, from costs to different methods. Determine diagnosis and repair properly• Competencies:• Identify all engine parts and know their jobs.• Diagnose engine problems and determine a proper solution.• Disassemble an engine and determine needed parts.• Bore and hone a cylinder.• Use a valve grinding machine and do a proper valve job.• Break in a motor.		

Battery Basics**32**

- Discuss different types of batteries, what their proper uses are, problems with the batteries, and testing of batteries.
- **Competencies:**
- Jump start a vehicle.
- Hook up a battery charger
- Know safety rules on handling batteries.
- Test a battery with a hydrometer and a battery load tester.
- Remove and install a battery.
- Learn how a battery is built and how different batteries work.

Employability/Career skills**10****Total Hours****180 Total Hours**

CAREER PREPARATION STANDARDS:

- A. **PERSONAL SKILLS** - Students will understand how personal skill development affects their employability. This skill includes positive attitudes, self-confidence, honesty, responsibility, initiative, self-discipline, personal hygiene, time management, and the capacity for lifelong learning.
1. Demonstrate an understanding of classroom policies and procedures.
 2. Discuss importance of the following personal skills in the business environment:
 - a. positive attitude
 - b. self-confidence
 - c. honesty
 - d. perseverance
 - e. self-management/work ethic
 - f. pride in product/work
 - g. dependability
 3. Identify acceptable work attire.
 4. Establish goals for self-improvement and further education/training.
 5. Prioritize tasks and meet deadlines.
 6. Understand the importance of initiative and leadership.
 7. Understand the importance of lifelong learning in a world of constantly changing technology.
- B. **INTERPERSONAL SKILLS** - Students will understand key concepts on group dynamics, conflict resolution, and negotiation. This skill includes the ability to work cooperatively, accept supervision, assume leadership roles, and show respect for others. This standard includes an understanding of sexual harassment laws and an appreciation of cultural diversity in the workplace.
1. Identify and discuss behaviors of an effective team.
 2. Explain the central importance of mutual respect in the workplace relations.
 3. Discuss and demonstrate strategies for conflict resolution and negotiation, and explain their importance within the business environment.
 4. Understand laws that apply to sexual harassment in the workplace, and identify tactics for handling harassment situations.
 5. Work cooperatively, share responsibilities, accept supervision and assume leadership roles.
 6. Demonstrate cooperative working relationships and proper etiquette across gender and cultural groups.
- C. **THINKING AND PROBLEM-SOLVING SKILLS** - Students will exhibit critical and creative thinking skills, logical reasoning, and problem-solving. These skills include applying basic skills in order to calculate, estimate, measure; identify, locate, and organize information/data; interpret and follow directions from manuals, labels, and other sources; analyze and evaluate information and solutions.
1. Recognize the importance of good academic skills and implement a plan for self-improvement as needed.
 2. Read, write, and give directions.
 3. Exhibit critical and creative thinking skills and logical reasoning skills, and employ these skills for problem solving.
 - a. Work as a team member in solving problems.
 - b. Diagnose the problem, its urgency, and its causes.
 - c. Identify alternatives and their consequences.
 - d. Explore possible solutions.
 - e. Compare/contrast the advantages and disadvantages of alternatives.
 - f. Determine appropriate action(s).
 - g. Implement action(s).

- h. Evaluate results of action(s) taken.
- D. **COMMUNICATION SKILLS** - Students will understand principles of effective communication. This standard includes effective oral and written communication, listening skills, following and giving directions, requesting and giving information, asking questions.
- 1. Use communication concepts in application of skills, techniques, and operations.
 - a. Prepare written material.
 - b. Analyze written material.
 - 2. Understand and implement written instructions, from technical manuals, written communications, and reference books.
 - 3. Present a positive image through verbal and nonverbal communication, and understand the power of body language in communication.
 - 4. Demonstrate active listening through oral and written feedback.
 - 5. Give and receive feedback.
 - 6. Demonstrate assertive communications (both oral and written).
 - 7. Demonstrate proper etiquette in workplace communications, including an awareness of requisites for international communications (languages, customs, time zones, currency and exchange rates).
 - 8. Demonstrate writing/editing skills as follows:
 - a. Write, proofread, and edit work.
 - b. Use correct grammar, punctuation, capitalization, vocabulary, and spelling.
 - c. Select and use appropriate forms of technology for communication.
 - 9. Exhibit a proficiency in the use of reference books.
 - 10. Research, compose, and orally present information for a variety of business situations utilizing appropriate technology.
- E. **OCCUPATIONAL SAFETY** - Students will understand occupational safety issues, including the avoidance of physical hazards in the work environment. This includes the safe operation of equipment, proper handling of hazardous materials, appropriate attire and safety accessories, avoidance of physical injuries, interpretation of warning and hazard signs and terminology, and following and understanding safety-related directions.
- 1. Discuss and implement good safety practices, including the following (if applicable to course):
 - a. personal
 - b. lab
 - c. fire
 - d. electrical
 - e. equipment
 - f. tools
 - g. interpretation of Material Safety Data Sheets (MSDSs)
 - h. Environmental Protection Agency (EPA)
 - i. Occupational Safety and Health Administration (OSHA)
 - j. American Red Cross Standards (ARC)
 - k. Networking Safety Standards
 - 2. Apply sound ergonomic principles in organizing one's work space.
- F. **EMPLOYMENT LITERACY** - Students will understand career paths and strategies for obtaining employment within their chosen field. This includes traditional job preparation skills, such as resumes, application forms, cover letters, sources of employment information, and interviewing skills, but also includes an overview of the industry and an understanding of labor market trends.
- 1. Explore career opportunities and projected trends; investigate required education, training and experience; and develop an individual education plan.
 - 2. Identify steps for setting goals and writing personal goals and objectives.

3. Examine aptitudes related to career options; relate personal characteristics and interests to educational and occupational opportunities.
4. Develop a career portfolio, including the following documents:
 - a. job application
 - b. resume(s)
 - c. appropriate cover and follow-up correspondence
5. Identify and demonstrate effective interviewing techniques.
- G. **TECHNOLOGY LITERACY** - Students will understand and adapt to changing technology by identifying, learning, and applying new skills to improve job performance. Students should understand the role of technology in their chosen field and should be able to use all appropriate technology. Students should also feel confident in their ability to learn new technology by generalizing from what they know, adapting skills to new situations, and identifying and using sources of information and of further learning.
 1. Demonstrate the ability to use personal computers for loading and retrieving data, information gathering, measurements, and writing.
 2. Identify the characteristics and explain the importance of adapting to changes, being flexible, and evaluating goals when working in the industry.
 3. Understand the importance of lifelong learning in adapting to changing technology.
- H. **IMPORTANCE OF ETHICS** – Students will understand proper ethics in the workplace.
 1. Discuss social and ethical responsibilities in the industry.
 2. Demonstrate ethical choices in workplace situations.

