

VALLEY ROP COURSE OUTLINE

COURSE TITLE: Auto Mechanics 1

VALLEY ROP #: TR-6555-Auto1
CDE #: 1480

CBEDS TITLES: Automotives Mechanics
CBEDS #: 5655

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

JOB TITLE: Automotive Master Mechanic 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 also covers automotive engines and basic systems: basic servicing and maintenance of automotive systems.

DATE APPROVED: December 1999
REVISED DATE: January 2006 / March 2009/Oct 2009

HOURS: 180
CREDITS: 10

PREREQUISITES: None

GRADE LEVEL: 11-12

ARTICULATION(S): None

TEXTBOOK: ModernAutomotive Technology, James Duffy, Goodheart-Wilcox, 2000

COURSE COMPETENCIES:

Upon completion of this course, the student will:

- Understand and perform safety in the work place
- Understand how personal skill development affects employability
- Be knowledgeable of careers in the automotive industry
- Communicate effectively
- Exhibit critical thinking, decision making, and problem solving skills
- Use references efficiently
- Understand and adapt to changing technology
- Understand the importance of ethics in the industry
- Demonstrate proper and safe use of tools
- Demonstrate use of precision measuring devices
- Understand engine operation and classification
- Demonstrate engine disassembly and reassembly
- Demonstrate engine oil and filter service
- Demonstrate, inspect and appraise electrical systems
- Be knowledgeable of fuel systems
- Explain and demonstrate drive train systems
- Demonstrate brake systems
- Explain and demonstrate service of suspension and steering systems

INSTRUCTIONAL METHODS:

- Lecture
- Demonstration
- Guest Speaker
- Applications

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:

- Portfolio
- Competency-based Skill Sheets
- Performance Tests
- Student Project
- Written Unit Tests

COURSE OUTLINE:

Unit of Instruction	Estimated Hours
General Workplace Skills and Safety	10
Changing Technology	10
• Influencing factors on auto mechanics	
• Computer use in auto technology	
• Importance of flexibility in work environment	
• Importance of life-long learning	
Tools and Equipment	15
• Hand tools	
• Power tools	
• Hydraulic press and hoist operations	
• Steam cleaner	
• Pneumatic tools	
• Tire machine	
• Computer tire balancer	
Precision Measuring Devices	15
• Basic measurements	
• Micrometers	
• Vernier calipers and the Vernier system	
• Dial bore gage	
• Dial indicators—metric and English	
• Feeler gages/wire gages	
References and Technical Data	15
• Service manuals	
• Flat-rate manuals	
• Parts-time reference manual	
• Work orders	
• Computerized diagnostics	
• Computer reference systems	
Automotive Engines	15
• Fundamentals of engine operation	
• Classification of engines	
• Engine construction	
• Disassembly and reassembly	
• Measurement	
• Performance	
Vehicle Maintenance and Fluid Service	15
• Engine oil and filter service	
• Suspension lubrication equipment	
• Automatic transmission service	
• Manual transmission service	
• Differential lubrication service	
• Engine cooling system service	
• Brake fluid	
• Belts and hoses	
• Exhaust systems	

Automotive Electrical Systems	15
• Basic electronic theory	
• Batteries	
• Charging systems	
• Starting systems	
• Electronics test equipment	
• Standard ignition systems	
• Electronic ignition system	
• Computerized engine management	
Automotive Fuel Systems	15
• Auto fuels and combustion	
• Fuel tanks systems	
• Fuel lines and filters	
• Fuel pump systems	
• Carburetors	
• Fuel injections systems	
• Turbo charged systems	
• Supercharged systems	
Automotive Drive Trains	15
• Clutches	
• Manual transmission	
• Drive shafts	
• Automatic transmissions	
• Rear drive axles	
• Front wheel drive systems	
• Four-wheel drive applications	
Brake Systems	15
• Drum brakes	
• Disc brakes	
• Brake bleeding	
• Anti-lock braking system	
• Brake lathe	
Suspension and Steering	15
• Tires, construction, design, and service	
• Wheels	
• Wheel bearings	
• Suspension systems	
• Steering systems	
• Suspension system	
Career Preparation Standards	10
<u>Total Hours</u>	<u>180 Total Hours</u>

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

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.