

SAN DIEGO COMMUNITY COLLEGE DISTRICT
CONTINUING EDUCATION
COURSE OUTLINE

SECTION I

SUBJECT AREA AND COURSE NUMBER

AUTO 501

COURSE TITLE

AUTO TECHNOLOGY & SAFETY INTRO

TYPE COURSE

NON-FEE

VOCATIONAL

CATALOG COURSE DESCRIPTION

This course is intended to be an overview of the automobile industry and preventative maintenance services. Students will acquire a basic understanding of how the major automotive systems work and interrelate. Associate Degree Credit is available upon petition to the Miramar College Automotive Technology program. (FT)

LECTURE HOURS

3 hours per week
(for 36 weeks)

LABORATORY HOURS

2 hours per week
(for 36 weeks)

ADVISORY

NONE

RECOMMENDED SKILL LEVEL

NONE

INSTITUTIONAL STUDENT LEARNING OUTCOMES

1. Social Responsibility
SDCE students demonstrate interpersonal skills by learning and working cooperatively in a diverse environment.
2. Effective Communication
SDCE students demonstrate effective communication skills.

INSTITUTIONAL STUDENT LEARNING OUTCOMES (CONTINUED)

3. Critical Thinking
SDCE students critically process information, make decisions, and solve problems independently or cooperatively.
4. Personal and Professional Development
SDCE students pursue short term and life-long learning goals, mastering necessary skills and using resource management and self-advocacy skills to cope with changing situations in their lives.

COURSE GOALS

1. Introduce and review career choices available to students in the automotive industry.
2. Provide the students with a broad overview of the following automotive systems and their functions: engines, fuel, electrical, power train, chassis and brake.
3. Provide the students with hands-on experience in the area of preventive maintenance procedures and minor repairs on the various models of automobiles.
4. Demonstrate to the students the common business practices associated with the automotive industry and instill in them the values of ethics and integrity as future employees or employers.

COURSE OBJECTIVES

Each student successfully completing this course will be able to:

1. Identify and know how to use simple hand tools, power hand tools, and lifting tools.
2. Name and describe the function of the three basic electrical measurements.
3. Identify typical job opportunities within the major career areas.
4. Identify the major measuring instruments and devices used by technicians.
5. Identify at least five substances common to auto shops that are considered to be chemical hazards.
6. Describe how most shops produce estimates for a customer.
7. Name the major parts of the suspension, steering, and brake systems.
8. Describe what is meant by engine displacement and compression ratio and how each is calculated.
9. Explain the basic concepts of electricity and the special terms used to describe it.
10. Explain what is meant by computer engine control.
11. Describe how torque multiplication takes place and determine gear ratios.
12. Name the three interacting hydraulic pressures in an automatic transmission and how they are created.
13. State the major purpose of a transfer case.
14. Define the following alignment terms: caster, camber, toe-in, and steering axis inclination.
15. Perform the following tasks:
 - 15.1. Measure various parts with a micrometer.
 - 15.2. Use a dial indicator properly.
 - 15.3. Use a multi-meter to measure electrical circuits.
 - 15.4. Correctly use a soldering gun or iron.

COURSE OBJECTIVES (CONTINUED)

- 15.5. Use shop manuals to find various types of automotive specifications and repairs.
- 15.6. Check, drain, and refill various fluids on the vehicle.
- 15.7. Remove and replace (R&R) coolant hoses.
- 15.8. R & R fuel filter.
- 15.9. R & R air filter.
- 15.10. Service the battery.
- 15.11. Test a battery properly.
- 15.12. Charge a battery properly.
- 15.13. Inspect tires for wear.
- 15.14. Change and rotate tires.
- 15.15. Repair a flat tire.
- 15.16. Lubricate suspension and other vehicle components.
- 15.17. Inspect suspension components for wear.
- 15.18. Inspect disc and drum brake systems for wear.
- 15.19. Service wheel bearings.
- 15.20. Clean and wax exterior of car properly.
- 15.21. R & R various light bulbs on the vehicle.
- 15.22. Aim head lamps.

SECTION II

COURSE CONTENT AND SCOPE

- 1. The Automotive Industry
 - 1.1. Careers
 - 1.2. Tools of the trade
 - 1.3. Test instruments and equipment
 - 1.4. Measuring
 - 1.5. Working safely
 - 1.6. Shop manuals
 - 1.7. The car and its systems
- 2. Engines
 - 2.1. Types of engines
 - 2.2. The crankshaft
 - 2.3. The cylinder head
 - 2.4. The valve train
 - 2.5. Intake and exhaust system
 - 2.6. Engine lubrication and cooling
- 3. Engine Electrical Systems
 - 3.1. Electricity and the battery
 - 3.2. The charging system
 - 3.3. The starting system
- 4. Fuel, Ignition, and Emission Systems
 - 4.1. Fuel system: general
 - 4.2. Fuel system: carburetion

COURSE CONTENT AND SCOPE

- 4.3. Fuel system: injection
- 4.4. On-board computers
- 4.5. Ignition systems
- 4.6. Emission control system
5. Power Train
 - 5.1. Clutches and propeller shafts
 - 5.2. Drive axles
 - 5.3. Manual transmission
 - 5.4. Automatic transmission
 - 5.5. Transfer cases and four wheel drive
6. Chassis System
 - 6.1. Suspensions
 - 6.2. Steering systems and wheel alignment
 - 6.3. Tires and wheels
7. Brakes
 - 7.1. Brake system
 - 7.2. Master cylinders and power boosters
 - 7.3. Drum brakes
8. Heating and Air Conditioning Systems

APPROPRIATE READINGS

Engine Service, W. Gary Lewis, 1989
Engine Mechanics Diagnosis and Repair, Tim Gilles, 1990
Automotive Engines, William Crouse, 1988
Auto Engines & Electrical Systems, Motor, 1990
Auto Mechanics Fundamentals, Martin W. Stockel, 1992

WRITING ASSIGNMENTS

Typical writing assignments will include:

1. Completing assigned reports.
2. Providing written answers to assigned questions.
3. Performing arithmetic calculations as assigned.
4. Maintaining a notebook of class assignments and activities.
5. Completing a 500 word written assignment dealing with a subject related to this course.

APPROPRIATE OUTSIDE ASSIGNMENTS

Students are expected to spend a minimum of two hours outside of class in practice and preparation for each hour of theory in class. Appropriate assignments include:

1. Researching appropriate readings.
2. Preparing research reports.

APPROPRIATE OUTSIDE ASSIGNMENTS (CONTINUED)

3. Preparing writing assignments.
4. Studying as needed to perform successfully in class.

APPROPRIATE ASSIGNMENTS THAT DEMONSTRATE CRITICAL THINKING

Students will perform analysis and evaluation of readings and/or classroom materials and utilize this analysis in classroom discussions, writing assignments and in performing laboratory activities. Students must select and use appropriate methods and materials needed to complete laboratory assignments.

EVALUATION

A student's grade will be based on multiple measures of performance. The assessment will measure development of independent critical thinking skills and will include evaluation of the students' ability to:

1. Perform on written, oral, or practical examinations.
2. Perform on outside assignments including writing assignments.
3. Contribute to class discussions.
4. Maintain attendance per current policy.

METHODS OF INSTRUCTION

The appropriate method of instruction will be determined by each instructor and may include:

1. Lecture with, or without, various audio-visual aids.
2. Group problem solving, discussion, debate, and/or critique.
3. Demonstrations.
4. Computer-assisted or other self-paced instruction.
5. Field trips or field assignments.
6. Laboratory assignments utilizing specifically planned instructional activities or "live" work.

TEXTS AND SUPPLIES

Texts:

Today's Technician, Jay Webster, 1995

Today's Technician, Shop Manual, Jay Webster, 1995

PREPARED BY: Edward G. Nugent DATE: May 16,1995

REVISED BY: Instructional Services, SLOs added DATE: March 8, 2017

Instructors must meet all requirements stated in Policy 3100 (Student Rights, Responsibilities and Administrative Due Process), and the Attendance Policy set forth in the Continuing Education Catalog.

REFERENCES:

San Diego Community College District Policy 3100
California Community Colleges, Title 5, Section 55002
Continuing Education Catalog