

SAN DIEGO COMMUNITY COLLEGE DISTRICT
CONTINUING EDUCATION
COURSE OUTLINE

SECTION I

SUBJECT AREA AND COURSE NUMBER

AUTO 601

COURSE TITLE

AUTOMOTIVE FUNDAMENTALS

TYPE COURSE

NON-FEE

VOCATIONAL

CATALOG COURSE DESCRIPTION

This course provides students with an overview of the automotive industry and a basic understanding of how each system within an automobile works. Students learn how to operate basic hand, power, and lifting tools as well as the major measuring instruments and devices used by automotive technicians. This course is intended as a first course for automotive students or as a basic core course for the entire automotive program. (FT)

LECTURE HOURS

54

LABORATORY HOURS

ADVISORIES

Valid California Driver's License.

RECOMMENDED SKILL LEVEL

Eighth grade reading level, ability to communicate effectively in the English language and knowledge of general math.

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

To provide instruction in the operational theory of today's automobiles and their systems, and to enhance the students' reading, writing, math and communication skills so they may interact successfully with employers and customers.

COURSE OBJECTIVES

Upon successful completion of the course the student will be able to:

1. Identify and operate basic hand, power, and lifting tools as well as the major measuring instruments and devices used by automotive technicians
2. Explain the basic concepts of electricity
3. Name at least five substances typically found in an automotive shop that are considered to be chemical hazards
4. Calculate and prepare a vehicle inspection/repair estimate for a customer using typical industry practices
5. Identify the major parts of a vehicle's suspension, steering, and brake system
6. Calculate and describe engine displacement and compression ratios
7. Assess what "computer engine control" means
8. Determine how torque multiplication takes place and estimate gear ratios
9. Illustrate the three interacting hydraulic pressures in an automatic transmission and discuss how they are created
10. Express clearly the major purpose of a transfer case
11. Describe caster, camber, toe-in, and steering axis inclination
12. Compare and contrast how the three basic electrical measurements function.

SECTION II

COURSE CONTENT AND SCOPE

The following topics are included in the framework of the course but are not intended as limits on content. The order of presentation and relative emphasis will vary with each instructor.

1. The automotive industry
 - 1.1. Career options
 - 1.2. Tools of the trade

COURSE CONTENT AND SCOPE (CONTINUED)

- 1.3. Test instruments and equipment
- 1.4. Measuring requirements
- 1.5. Working safely
- 1.6. Shop manuals
- 1.7. The automobile and its systems.
2. Engines
 - 2.1. Engine types
 - 2.2. Crankshaft
 - 2.3. Cylinder head
 - 2.4. 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
 - 4.3. Fuel system: injection
 - 4.4. On-board computers
 - 4.5. Ignition systems
 - 4.6. Emission control system
 - 4.7. Alternative fuels: electric/hybrid, electric.
5. Power train
 - 5.1. Clutches and propeller shaftwork
 - 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
 - 7.4. Heating and air conditioning.
8. Tests
 - 8.1. Terminology
 - 8.2. Concepts and systems

APPROPRIATE READINGS

Reading assignments are required and may include but, are not limited to, the following:

1. Course textbooks such as Auto Repair for Dummies, Auto Mechanics Fundamentals, and Automotive Engines
2. Articles from magazines such as Import Service, Domestic Service, Popular Mechanics, Popular Science, Motor Trend, and Road and Track
3. Newspaper articles and Internet sites related to the automotive industry or automotive technology
4. Toyota, Honda, and Chrysler manuals and bulletins regarding overall automotive information and systems.

WRITING ASSIGNMENTS

Writing assignments are required and may include, but are not limited to, the following:

1. Completing assigned reports
2. Providing written answers to critical inquiries based on assigned readings from course texts, manufacturer manuals and bulletins, Internet sites, and magazine articles
3. Maintaining a class notebook
4. Completing a 500-word essay related to the automotive industry or to the operation of automotive systems.

OUTSIDE ASSIGNMENTS

Outside assignments may include, but are not limited to, the following:

1. Conducting research and preparing reports
2. Preparing written assignments
3. Attending and reporting on automotive trade shows, car shows, and races such as NASCAR-California Speedway events, National Hot Rod Association events, and San Diego Regional Clean Fuel Vehicle Coalition events.

APPROPRIATE ASSIGNMENTS THAT DEMONSTRATE CRITICAL THINKING

Critical thinking assignments are required and may include, but are not limited to, the following:

1. Performing arithmetic calculations
2. Analyzing and evaluating reading assignments and classroom materials
3. Comparing and contrasting how basic electrical measurements function
4. Calculating and preparing a vehicle inspection/repair estimate for a customer using typical industry practices.

EVALUATION

A student's grade will be based on multiple measures of performance unless the course requires no grade. Multiple measures may include, but are not limited to, the following:

1. Demonstrate the skills to operate basic automotive tools and measuring devices
2. Perform on written, oral, or practical examinations
3. Contribute to class discussions
4. Perform on out-of-class assignments
5. Practice appropriate safety procedures and policies.

Upon successful completion of this course a Certificate of Course Completion will be issued. Upon successful completion of all courses included in the program, a Certificate of Program Completion will be issued.

METHOD OF INSTRUCTION

Methods of instruction may include, but are not limited to, the following:

Lecture, Laboratory, Computer Assisted Instruction, Audio-Visual, Job Shadowing and Field Trips.

This course, or sections of this course, may be offered through distance education.

TEXTS AND SUPPLIES

Textbooks may include, but are not limited to:

Schwaller. Motor Automotive Technology, current edition, Delmar
Auto Repair for Dummies, current edition, IDG Books

Fundamentals of Automotive Technology: *Principles and Practice Second Edition*, Kirk VanGelder, or current edition, CDX

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REVISED BY Instructional Services/SLO's Added

DATE July 17, 2014

REVISED BY: Bryan Perrin

DATE: April 15, 2020

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:

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