

SAN DIEGO COMMUNITY COLLEGE DISTRICT  
CONTINUING EDUCATION  
COURSE OUTLINE

**SECTION I**

**SUBJECT AREA AND COURSE NUMBER**

AUTO 507A

**COURSE TITLE**

**ALTERNATE TITLE**

ENGINE/ELECTRICAL/PERFORMANCE

ENGINE/ELECTRICAL/MAINTENANCE

**TYPE OF COURSE**

NON FEE

VOCATIONAL

**CATALOG COURSE DESCRIPTION**

The course includes instruction in safety procedures and the proper use of hand tools and equipment; and maintaining, diagnosing and repairing malfunctions in the gasoline engine and its electrical and fuel systems to NATEF standards A1 and A6. This course is articulated with the Miramar College automotive program – college credit may be awarded. (FT)

**LECTURE/LABORATORY HOURS**

310

**ADVISORY**

Valid California Drivers License required to operate vehicles and for employment.

**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

Student Learning Outcomes

1. To provide instruction in the operational theory of and repair procedures for automotive engines, electrical systems, and preventive maintenance procedures.
2. To develop problem solving techniques in order to diagnose engine and electrical complaints.
3. To enhance the students' reading, writing, math and communication skills so they may interact successfully with employers and customers.
4. To provide work experience in a simulated work environment representative of those encountered in the automotive repair industry today. This experience will include instruction in common business practices, ethics, and integrity.
5. To complete the BAR Level 1 and Level 2 required emissions training.

COURSE OBJECTIVES

Students will demonstrate through practical applications, written and oral communication skills, their ability to:

1. Apply general safety practices in addition to the specific procedures related to the automotive industry.
2. Select and properly use the correct hand and power tools, in addition to diagnostic equipment required to repair today's automobiles.
3. Demonstrate competence in diagnosing, maintaining and repairing malfunctions in the gasoline engine and it's electrical, ignition, and fuel systems to NATEF standards.
4. Demonstrate professional ethics, personal integrity, good business practices and customer relation skills, meeting the standards of the California Department of Consumers Affairs.
5. Demonstrate the required engine, electrical, and emissions knowledge required to pass the State Smog Inspector licensing exam

**SECTION II**

COURSE CONTENT AND SCOPE

BUSINESS PROCEDURE AND  
CUSTOMER RELATIONS

(NATEF A1)

COURSE CONTENT AND SCOPE (CONTINUED)

The following topics and concepts are presented throughout all modules of this course

1. Business Conduct and Ethics
2. Repair Orders and Job Scheduling
3. Oral and Written Communications
4. Keyboarding Skills and Computer Literacy Used in this Field

Math review for this course will cover the following areas: addition, subtraction, multiplication and division of whole numbers; fractions and decimals; simple algebraic expressions; the metric system; linear measurements; graphs; ratios; angles; percentages; reading dial gauges; volume measures; liquid measurement; weight and mass.

MODULE I	(NATEF A1 - A8)	10 Hrs.
SAFETY		

1. Auto Program Orientation
2. Facilities Orientation
  - 2.1. Safety equipment
  - 2.2. Types
  - 2.3. Locations
3. Common Types of Injuries
  - 3.1. Burns
  - 3.2. Asbestos hazards
  - 3.3. Chemical hazards
  - 3.4. Traffic hazards
4. Tool Safety
  - 4.1. Hand tools
  - 4.2. Electrical tools
  - 4.3. Hydraulic tools
  - 4.4. Pneumatic tools
5. Fire Safety
6. Batteries
  - 6.1. Charging
  - 6.2. Use of jumper cables
7. Hybrid (Electric) Car Safety Requirements
  - 7.1. Service & Maintenance
  - 7.2. High Voltage Disconnects
8. Material Safety Data Sheets (MSDS)

MODULE II	(NATEF A1)	125 Hrs.
ENGINE REPAIR		

1. Engine Theory & Design
  - 1.1. Traditional
  - 1.2. Alternative
2. Engine Block Components, Function, Diagnosis & Repair

COURSE CONTENT AND SCOPE (CONTINUED)

3. Lubrication Components, Function, Diagnosis, & Repair
4. Engine Cooling System Function, Testing, Diagnosis & Repair
  - 4.1. Traditional Front & Rear Wheel Drive Systems
  - 4.2. Hybrid Cooling Systems
5. Cylinder Head and Valve Train Components, Function, Diagnosis & Repair
6. Mechanical Condition Testing, Diagnosis & Repair
7. Ignition System Function
8. Fuel and Exhaust Systems Function
9. BAR Level 1 emissions training
10. BAR Level 2 emissions training

MODULE III (NATEF A6)

125 Hrs.

ELECTRICAL/ELECTRONIC SYSTEMS

1. Review Safety procedures, Low and High Voltage (Hybrid/Electric) Concerns
2. Basic Electrical Theory
3. Semi Conductors and Integrated Circuits
4. General Electrical System Diagnosis,
5. Use of Diagnostic and Testing & Equipment
6. Reading & Using Schematics
7. Wire & Circuit Repair
8. Battery Function, Testing, Service & Diagnosis
9. Starting System Function, Testing, Diagnosis & Repair
10. Charging System Function, Testing, Diagnosis & Repair
11. Chassis and Accessory Systems Function, Diagnosis & Repair
12. Computerized Engine Controls Function, Diagnosis, & Repair

MODULE IV (NATEF A8)

50Hrs.

ENGINE TUNE AND SCHEDULED MAINTENANCE

1. Review 4 Stroke Operation
2. General Engine Mechanical & Performance Diagnosis
  - 2.1. Diagnostic Trouble Code Retrieval
3. Ignition Systems Function, Service, Diagnosis, Adjustments & Repair
4. Fuel Systems Functions, Service, Diagnosis & Repair
5. Emissions system components, function, and testing

APPROPRIATE READINGS

*Engine Builder's Handbook*, Tom Monroe, current edition

*Today's Technician: Automotive Engine Repair and Rebuilding*, Christopher Hadfielder, current edition

*Getting Started in Electronics*, MIMS, current edition

Schematic Based Fault Diagnosis, ATG Training

Hybrid Safety, ATG Training

State Lamp Adjusters Manual, BAR

### WRITING ASSIGNMENTS

Typical writing assignments may include but are not limited to:

1. Completing assigned reports.
2. Providing written answers to assigned questions.
3. Performing arithmetic calculations as assigned.
4. Completing repair orders.
5. Completing job application and resume.

### OUTSIDE ASSIGNMENTS

Students are expected to spend a minimum of two hours per day outside of class in practice and preparation for each day in class. Appropriate assignments may include, but are not be limited to:

1. Appropriate readings.
2. Preparing research reports.
3. Preparing appropriate writing assignments.
4. Studying as needed to perform successfully in class.

### APPROPRIATE ASSIGNMENTS THAT DEMONSTRATE CRITICAL THINKING

Students will perform analysis and evaluation of reading 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 student's ability to:

1. Perform the manipulative skills of the craft, as required, to NATEF standards.
2. Apply theory to laboratory assignments.
3. Perform on written, oral, or practical examinations.
4. Contribute to class discussions.
5. Maintain attendance per current policy.

Satisfactory completion of the course may require completion of a culminating activity, which may include, but is not limited to, one of the following:

1. Written exam.
2. Classroom presentation.
3. Research project.
4. Industry involvement.

EVALUATION (CONTINUED)

The culminating activity will require the student to use the new skills that he/she acquired during the course.

The student will receive an evaluation at the end of each module or when requested by student. A grade point average of 2.0 or letter grade of C or better must be achieved for satisfactory completion.

Upon successful completion of each individual course within the Automotive Technician program 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

Classroom lectures, demonstrations, laboratory, audio-visual presentations, computer assisted instruction, group and individual instruction. Field trips, job shadowing and intern/externships may be utilized.

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

TEXT AND SUPPLIES

Texts:

*Modern Automotive Technology*, James Duffy, current edition

Smog Inspection Manual, BAR

Smog Check Reference Guide, BAR

PREPARED BY Edward G. Nugent DATE AUGUST 14, 1995

REVISED BY Melvin Robinson DATE AUGUST 10 2002

REVISED BY Edward G Nugent DATE JULY 20, 2006

REVISED BY Edward G Nugent DATE FEBRUARY 20, 2007

REVISED BY Edward G Nugent DATE FEBRUARY 18, 2010

REVISED BY Instructional Services/SLO's Added DATE JUNE 1, 2011

REVISED BY Sam Phu DATE MAY 17, 2016

REVISED BY Bryan Perrin DATE September 4, 2019

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