

SAN DIEGO COMMUNITY COLLEGE DISTRICT  
CONTINUING EDUCATION  
COURSE OUTLINE

**SECTION I**

SUBJECT AREA AND COURSE NUMBER

AUTO 507

COURSE TITLE

AUTOMOTIVE TECHNICIAN

ALTERNATE TITLE

BRAKES, SUSPENSION & DRIVELINE

TYPE OF COURSE

NON FEE

VOCATIONAL

CATALOG COURSE DESCRIPTION

The course includes instruction in safety procedures; proper use of hand tools and equipment; and diagnosing and repairing malfunctions in vehicle drivetrain, front suspension and brake systems to NATEF standards A4 and A5. This is an articulated course 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 brakes, suspension, driveline and related components.
2. To develop problem solving techniques in order to diagnose brake, suspension, driveline 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.

### 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 by diagnosing and repairing malfunctions in vehicle drivetrain, front suspension and brake 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 knowledge and competences to pass the basic automotive tire service certification exam administered by the Tire Industry Association.

## **SECTION II**

### COURSE CONTENT AND SCOPE

BUSINESS PROCEDURES AND  
CUSTOMER RELATIONS

(NATEF A1 - A8)

COURSE CONTENT AND SCOPE (CONTINUED)

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

1. Business Conduct and Ethics
  - 1.1. Consumer affairs
2. Repair Orders and Job Scheduling
3. Phone Skills
4. Oral and Written Communications
5. Keyboarding Skills and Computer Literacy for Use 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

Safety concepts and practices are presented throughout all modules of this course

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 A4) 125 Hrs.  
SUSPENSION AND STEERING

1. Suspension Function Diagnosis and Repair

COURSE CONTENT AND SCOPE (CONTINUED)

- 1.1. Front suspension systems
- 1.2. Rear suspension systems
  
2. Front and Rear Wheel Alignment Function, Diagnosis and Adjustment
  - 2.1. Advanced Driver Assistance Systems Function, Diagnosis and Adjustment
3. Tire and Wheel Function, Diagnosis, Service and Repair
  - 3.1. Tire Pressure Monitor System Function, Diagnosis and Replacement
4. Steering Systems Function, Diagnosis, and Repair
  - 4.1. Steering columns and manual steering gears
  - 4.2. Power assisted steering systems
  - 4.3. Steering linkages
5. Steering and Suspension System Lubrication Service

MODULE III (NATEF A5) 120 Hrs.  
BRAKES

1. Brake Fundamentals
  - 1.1. Hydraulic System Functions, Diagnosis and Repair
    - 1.1.1. Master cylinders
    - 1.1.2. Fluids, lines, hoses
    - 1.1.3. Valves and switches
    - 1.1.4. Bleeding, flushing and leak testing
2. Drum Brake Functions, Diagnosis and Repair
3. Disc Brake Function, Diagnosis and Repair
4. Power Assist Units, Functions, Diagnosis, and Repair
5. Anti-Lock Brake System Function, Diagnosis and Repair
  - 5.1. Use of diagnosis test equipment
6. Computer Controlled Braking Systems
  - 6.1. Functions, Diagnosis and Repair
7. Regenerative Braking Principles
  - 7.1. Theory and Component Function
  - 7.2. Diagnosis of Base Brake System

MODULE IV (NATEF A2) 25 Hrs.  
AUTOMATIC TRANSMISSION/TRANSAXLE

1. General Transmission/Transaxle Function, Diagnosis and Minor Repair
2. Hybrid Drive Systems Overview
3. Transmission/Transaxle Maintenance and Adjustments
  - 3.1. Related "in vehicle" repairs and adjustments
  - 3.2. Transmission service
4. Drive (half) Shafts and Universal Joint Function, Diagnosis, and Repair

COURSE CONTENT AND SCOPE (CONTINUED)

MODULE V (NATEF A3) 30 Hrs.  
MANUAL DRIVETRAIN/REAR AXLES

### COURSE CONTENT AND SCOPE (CONTINUED)

1. Clutch Function, Adjustment, Diagnosis and Repair
2. Transmission Function, Diagnosis, and Repair
3. Driveshaft and Universal Joint Functions, Diagnosis and Repair
4. Rear Axle and Differential Function, Diagnosis and Repair
  - 4.1. Ring gear and pinion
  - 4.2. Differential case assembly
  - 4.3. Limited slip differential.

### APPROPRIATE READINGS

*ATTS: Understanding and Diagnosing Hybrid Vehicles*, Jerry Trujia, current edition  
*Manual Transmission and Transaxles*, Jack Erjavec, current edition  
*Brake Handbook*, Bartch Verlag and Ottobrunn/Munche, current edition  
*Principles of Wheel Alignment Service*, Bacon, current edition

### 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 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, the following:

1. Written report.
2. Classroom presentation.
3. Research project.
4. Industry involvement.
5. Tire Service Certification exam

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

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:

*Brake Adjusters Handbook*, Bureau of Auto Repair, current edition  
*Modern Automotive Technology*, James Duffy, current edition

PREPARED BY Edward G. Nugent DATE AUGUST 14, 1995

REVISED BY Melvin Robinson DATE AUGUST 10 2002

REVISED BY	<u>Edward G Nugent</u>	DATE	<u>JULY 20, 2006</u>
REVISED BY	<u>Edward G Nugent</u>	DATE	<u>FEBRUARY 20, 2007</u>
REVISED BY	<u>Edward G Nugent</u>	DATE	<u>FEBRUARY 18, 2010</u>
REVISED BY	<u>Instructional Services/SLO's Added</u>	DATE	<u>JUNE 1, 2011</u>
REVISED BY	<u>Robert Jackson</u>	DATE	<u>September 4, 2019</u>

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