

Course Outline for NAUT A5

BRAKES

Effective: Fall 2021

I. CATALOG DESCRIPTION:

NAUT A5 — Noncredit

Diagnosis, evaluation, inspection, adjustment, and repair of braking, antilock braking systems, traction control and related devices. Class will involve California State law regarding brake and safety inspections. Includes the material on the California Brake Adjuster's Licensing Examination. Students are strongly recommended to enroll in Automotive Lab concurrently.

Prerequisite

AUTO INTR - Automotive Service and Introduction
 with a minimum grade of C
 (May be taken concurrently)
 or

NAUT INTR - Automotive Service and Introduction
 with a minimum grade of C
 (May be taken concurrently)
 or

AUTO INTL - Automotive Service and Introduction Hands-On Lab
 with a minimum grade of C
 (May be taken concurrently)
 and

AUTO INTZ - Automotive Service and Introduction Lecture
 with a minimum grade of C
 (May be taken concurrently)

Grading Methods:

Pass/No Pass

Discipline:

- Automotive Technology

Noncredit Category

J - Workforce Preparation

	MIN
Total Noncredit Hours:	144.00

II. PREREQUISITE AND/OR ADVISORY SKILLS:

Before entering the course a student should be able to:

A. AUTOINTR

1. Utilize and apply hazardous waste handling;
2. Identify and describe uses of automotive related tools;
3. Describe the importance of preventative maintenance and inspection procedures as they relate to the automobile;
4. Apply Ohm's law, read basic schematics, test automotive electrical systems;
5. Discuss braking systems, perform a brake inspection, identify parts;
6. Differentiate between suspension and steering system types, inspect and qualify components;

B. NAUTINTR

1. Utilize and apply hazardous waste handling;
2. Identify and describe uses of automotive related tools;
3. Describe the importance of preventative maintenance and inspection procedures as they relate to the automobile;
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C. AUTOINTL

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- D. AUTOINTZ
1. Identify and describe uses of automotive related tools;
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 4. Discuss braking systems, perform a brake inspection, identify parts;
 5. Differentiate between suspension and steering system types, inspect and qualify components;

III. MEASURABLE OBJECTIVES:

Upon completion of this course, the student should be able to:

- A. Describe the theory and fundamentals of automotive brake, anti-lock brake electronic traction control, and steering stability systems;
- B. Use basic testing and diagnostic tools and equipment in the inspection, diagnosis and repair of automotive braking systems;
- C. Demonstrate the ability to access the vehicle computer and various sensors relating to brakes and suspension systems;
- D. Demonstrate safe and appropriate handling of hazardous material;
- E. Accurately investigate and catalogue consumer concerns;
- F. Maintain a clean and professional environment.

IV. CONTENT:

- A. Automotive brakes.
 1. Foundation brake systems
 - a. Hydraulic servo, dual-servo, advanced leading trailing and leading trailing
 - b. Caliper and piston front
 - c. Caliper and piston rear
 2. Anti-Lock systems and sub-systems
 - a. Wheel speed sensors
 - b. Vehicle speed sensors
 - c. Hydraulic control units
 - d. Electrical control units
 3. Traction control systems, and sub-systems.
 - a. Wheel speed sensors
 - b. Vehicle speed sensors
 - c. Hydraulic control units
 - d. Electrical control units
 4. Steering Stability systems and subsystems
 - a. Wheel speed sensors
 - b. Vehicle speed sensors
 - c. Hydraulic control units
 - d. Electrical control units
 - e. Yaw Sensors
 - f. Pitch Sensors
 - g. Decelerometers
 - h. Steering input sensors
- B. Testing and diagnostic tools and equipment
 1. Proper and safe tool use procedures
 2. Diagnostic safety precautions
 3. Analysis of test results
 4. Digital volt, ohm meter reading (DVOM)
 5. Digital storage oscilloscope hook-up and reading
- C. Computer access
 1. Access vehicle on board computer
 2. Retrieve codes and refer to diagnostic service information
 3. Evaluate sensor data
- D. Hazardous material handling
 1. Demonstrate proper handling of brake system components
 2. Perform proper fluid disposal
- E. Consumer concerns
 1. Research customer concerns, evaluate steps needed to repair concern
 2. Catalogue concern
 3. Repair Procedures
- F. Electrical Concerns
 1. Base Brakes
 2. ABS
 3. Traction Control
 4. Collision avoidance
- G. Professional environment
 1. Safety glasses (clear lens) worn in all laboratory areas
 2. No loose clothing (coveralls strongly recommended)
 3. Long Hair secured
 4. No open toe shoes (safety shoes recommended)
 5. Work areas maintained; clean, free of debris and spills

V. LAB CONTENT:

- A. Automotive brakes.
 1. Foundation brake systems
 - a. Hydraulic servo, dual-servo, advanced leading trailing and leading trailing
 - b. Caliper and piston front
 - c. Caliper and piston rear
 2. Anti-Lock systems and sub-systems
 - a. Wheel speed sensors
 - b. Vehicle speed sensors
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- 4. Steering Stability systems and subsystems
 - a. Wheel speed sensors
 - b. Vehicle speed sensors
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VI. METHODS OF INSTRUCTION:

- A. **Lab** - Student Hands-on laboratory activities and assignments
- B. **Lecture** -

VII. TYPICAL ASSIGNMENTS:

- A. Lecture based assignments
 - 1. Lecture on ABS.
- B. Lab based assignments
 - 1. Test Hall effect WSS

VIII. EVALUATION:

Methods/Frequency

- A. Exams/Tests
monthly
- B. Quizzes
weekly
- C. Lab Activities
weekly

IX. TYPICAL TEXTS:

- 1. Duffy, James. *Modern Automotive Technology*. 9 ed., Goodheart-Wilcox, 2020.
- 2. Johanson, Chris. *Auto Brakes*. 5 ed., Goodheart Wilcox, 2021.
- 3. California State Department Consumer Affairs *Brake Inspection Manual*, -, 2003.

X. OTHER MATERIALS REQUIRED OF STUDENTS:

- A. Safety Glasses