

ATL 150 Course Outline as of Fall 2024**CATALOG INFORMATION**

Dept and Nbr: ATL 150 Title: AUTO BRAKES

Full Title: Automotive Braking Systems

Last Reviewed: 1/22/2024

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	2.00	17.5	Lecture Scheduled	35.00
Minimum	3.00	Lab Scheduled	3.00	6	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	5.00		Contact Total	87.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 70.00

Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable

Grading: Grade or P/NP

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly:

Catalog Description:

Students will learn automotive braking systems including diagnosis, inspection, repair, and adjustment of modern automotive brakes and anti-lock braking systems, traction control, and dynamic stability control systems, theory of operation, the study of basic laws of hydraulics, and brake service equipment. Course prepares students to pass the Automotive Service Excellence (ASE) A5 Brakes certification test.

Prerequisites/Corequisites:

Course Completion of ATL 101 and ATL 161

Recommended Preparation:

Eligibility for ENGL 1A or equivalent and MATH 25 or equivalent

Limits on Enrollment:**Schedule of Classes Information:**

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Service Excellence (ASE) A5 Brakes certification test. (Grade or P/NP)

Prerequisites/Corequisites: Course Completion of ATL 101 and ATL 161

Recommended: Eligibility for ENGL 1A or equivalent and MATH 25 or equivalent

Limits on Enrollment:

Transfer Credit:

Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	Area	Effective:	Inactive:
CSU GE:	Transfer Area	Effective:	Inactive:

IGETC:	Transfer Area	Effective:	Inactive:
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CSU Transfer:	Effective:	Inactive:
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UC Transfer:	Effective:	Inactive:
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CID:

Certificate/Major Applicable:

Both Certificate and Major Applicable

COURSE CONTENT

Student Learning Outcomes:

At the conclusion of this course, the student should be able to:

1. Demonstrate shop safety regarding working procedures and hazardous materials and waste handling.
2. Research and identify correct procedures and specifications for maintenance and repair of braking systems.
3. Perform diagnosis, service, and maintenance procedures in a timely manner to industry standards.

Objectives:

At the conclusion of this course, the student should be able to:

1. Identify and interpret brake system concern, and determine necessary action
2. Diagnose pressure concerns in the brake system using hydraulic principles (Pascal's law)
3. Measure brake pedal height, and determine necessary action
4. Check master cylinder for internal and external leaks and proper operation, remove, bench bleed, and reinstall master cylinder
5. Diagnose poor stopping, pulling, or dragging concerns caused by malfunctions in the hydraulic system, and determine necessary action
6. Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and supports, and determine necessary action
7. Select, handle, store, and fill brake fluids to proper level
8. Flush and bleed brake hydraulic system
9. Diagnose poor stopping, noise, pulling, grabbing, dragging or pedal pulsation concerns, and determine necessary action
10. Remove, clean, inspect, measure, and refinish brake drums, and rotors
11. Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters,

- other related brake hardware, and backing support plates; lubricate and reassemble
12. Pre-adjust brake shoes and parking brake before installing brake drums or drum/hub assemblies and wheel bearings
 13. Check parking brake operation including cables and components for wear, rusting, binding, and corrosion; clean, lubricate, or replace as needed
 14. Remove caliper assembly from mountings; clean and inspect for leaks and damage to caliper housing, related hardware and determine necessary action
 15. Clean and inspect caliper mounting and slides for wear and damage, and determine necessary action
 16. Remove, clean, and inspect pads, reassemble, lubricate, and reinstall caliper, pads, and inspect for leaks on front and rear disc brake systems
 17. Diagnose wheel bearing noises, diagnose wheel shimmy, and vibration concerns, and determine necessary action
 18. Remove, clean, inspect, repack, and install wheel bearings and races, replace seals; install hub and adjust wheel bearings
 19. Inspect and replace wheel studs, install wheel, torque lug nuts, and make final checks and adjustments
 20. Check operation of brake stop light system, and determine necessary action
 21. Identify and inspect antilock brake system (ABS) components, and determine necessary action
 22. Diagnose antilock brake system (ABS) electronic control(s) and components using self-diagnosis and/or recommended test equipment, and determine necessary action
 23. Bleed the antilock brake system's (ABS) front and rear hydraulic circuits
 24. Test, diagnose and service abs speed sensors, toothed ring (tone wheel), and circuits using a Graphing Multimeter (GMM)/digital storage oscilloscope (DSO)
 25. Identify and interpret faults in traction control systems
 26. Identify and interpret faults in dynamic stability control systems

Topics and Scope:

Lecture-Related Topics and Scope:

- I. Automotive Safety and Shop Practices
- II. Proper Care and Manipulation of Basic Hand and Specialty tools
- III. Braking System Components and Performance Standards
- IV. Braking System Principles
- V. Brake Linings and Pads
- VI. Brake Fluid and Lines
- VII. Hydraulic Principles and Master Cylinders
- VIII. Hydraulic Valves and Switches
- IX. Brake Bleeding Methods and Procedures
- X. Wheel Bearings and Service
- XI. Drum Brakes
- XII. Drum Brake Diagnosis and Service
- XIII. Front and Rear Disc Brakes
- XIV. Front and Rear Disc Brake Diagnosis and Service
- XV. Parking Brake Operation, Diagnosis, and Service
- XVI. Machining Brake Drums and Rotors
- XVII. Power Brake Unit Operation, Diagnosis, and Service
- XVIII. Brake System Electrical Fundamentals
- XIX. ABS, Traction Control, and Dynamic Stability Control Components and Operation
- XX. Antilock Brake, and Traction Control Systems
- XXI. ABS, Traction Control, and Dynamic Stability Control Diagnosis and Service

- XXII. Hazardous Waste Handling
- XXIII. Hybrid, Electric, and Alternative Fuel Safety
- XXIV. Hybrid, Electric, and Alternative Fuel Applicable Systems Awareness

Lab-Related Topics and Scope:

- I. Demonstrate Proper Shop Safety and Working Practices, Including tools and Equipment, and Hazardous Waste Handling
- II. Explain and Identify Major Brake Components and Area Requiring Inspection
- III. Perform Brake Disc Maintenance/Machining to Manufacturer's Standards
- IV. Perform Brake Drum Maintenance/Machining to Manufactures Standards
- V. Identify All Components of an ABS System
- VI. Identify All Components of an ABS, Traction Control, and Dynamic Stability Control System
- VII. Diagnose ABS, Traction Control, and Dynamic Stability Control Faults and Make Appropriate Repairs
- VIII. Perform Brake Fluid Service
- IX. Perform Wheel Bearing Service on Serviceable Bearings
- X. Perform wheel bearing service on non-serviceable bearings
- XI. Perform parking brake service and adjustment
- XII. Diagnose vacuum booster faults and make appropriate repairs

Assignment:

Lecture-Related Assignments:

- 1. Weekly reading (25-75 pages)
- 2. Homework consisting of chapter review questions
- 3. Weekly quizzes and final exam

Lab-Related Assignments:

- 1. Lab demonstrations related to: the ability to follow industry approved diagnostic and repair procedures, brake assembly, lathe operation and alignment
- 2. Lab write-ups such as:
 - A. Reading and analyzing lab reports
 - B. Making customer recommendations
 - C. Writing diagnostic sheets in a neat, complete, and readable manner
- 3. Lab work such as:
 - A. Disassemble components and subsystems
 - B. Inspect components and subsystems
 - C. Reassemble components and subsystems

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Homework; lab write-ups

Writing 10 - 20%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Lab work	Problem solving 5 - 15%
Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.	
Lab demonstrations	Skill Demonstrations 30 - 40%
Exams: All forms of formal testing, other than skill performance exams.	
Weekly quizzes and final exam	Exams 35 - 45%
Other: Includes any assessment tools that do not logically fit into the above categories.	
None	Other Category 0 - 0%

Representative Textbooks and Materials:

Automotive Braking Systems. Goodnight, Nicholas and VanGelder, Kirk. CDX. 2019 (classic)
Instructor prepared materials