

Nashville State Community College
Business, Applied Arts & Technologies Division
Automotive Department/ GM ASEP Program

Course Syllabus

GM Automotive Brakes

AMT-1120

3 Credits, 2 Class Hours, 2 Laboratory Hours

Instructor: Claude Whitaker

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Office: W-58 Phone: 353-3449

Hours M - T- W 7:00-3:00 R- 7:00-2:00 F- 8:00-12:00

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Textbook and Other Materials:

Automotive Technology 4th edition, James D. Halderman

GM Service Technical College, GM Fundamental Curriculum Series Automotive Brakes, James D. Halderman, IAGMASEP 2003 Training Material

Supplemental material All Computer Based Training CD's, Service Know How videos, and Web Based Training IDLs are required to be completed for GM hands-on certification to be granted .

Course Description

This is a comprehensive course in types of braking systems and their service requirements for General Motors vehicles. Topics include machine turning of brake drum and rotors, system operation, diagnosis, adjustment, testing, replacement, and repair procedures. *Prerequisite: AMT 1190.*

Course Outcomes:

At the completion of this course, the student will be able to:

1. Locate and name automotive components on an actual automobile.
2. Answer questions on braking hydraulics (including force calculations). Testing in this area will be responses to verbal questions.
3. Identify automotive system component replacement procedures during a formal written examination.

4. "Machine" a rotor and a drum, install brake shoes, disassemble/reassemble a wheel cylinder and caliper.
5. Disassemble/reassemble and bleed a hydraulic system.
6. Adjust hand and "drum-type" brakes.
7. Properly test, diagnose, service, and repair antilock brake systems.

Course Assessments:

The student will be required to pass a series of on-the-car hands-on tasks set by the GM Service Technical College and the NATEF task lists (Task V. Brakes)

Evidence that the tasks have been met, the student will identify and interpret brake system concern; determine necessary action. Research applicable vehicle and service information, such as brake system operation, vehicle service history, service precautions and technical service bulletins. Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, calibration decals. Diagnose pressure concerns in the brake system using hydraulic principles (Pascal's Law). Remove, bench bleed, and reinstall master cylinder. Diagnose poor stopping, pulling, or dragging concerns caused by malfunctions in the hydraulic system, determine necessary action. Fabricate and/or install brake lines (double flare and ISO types); replace hoses fittings, and supports as needed. Bleed (manual, pressure, vacuum or surge) brake systems. Remove, clean (using proper safety procedures), inspect, and measure brake drums; determine necessary action. Refinish brake drum. Remove caliper assembly from mounting; clean and inspect for leaks and damage to caliper housing. Clean and inspect caliper mounting and slides for wear damage, remove, clean and inspect caliper assemble; inspect parts for wear, rust, scoring and damage. Replace seal, boot and damaged or worn parts. Clean, inspect and measure rotor with a dial indicator and a micrometer; follow manufacturer's recommendations in determining need to machine or replace. Remove and reinstall rotor. Refinish rotor according to manufacturer's recommendations. Install wheel, torque lug nuts, and make final checks and adjustments. Check parking brake operation, operation of parking brake indicator light and operation of brake stop light systems. Identify and inspect antilock brake system (ABS) components. Diagnose poor stopping, wheel lock-up, abnormal pedal feel or pulsation and noise concerns caused by the antilock brake system. Bleed the antilock brake system front and rear hydraulics circuits. Test, diagnose and service ABS speed sensors, toothed ring (tone wheel) and circuits using a digital multimeter (including output signal, resistance, shorts to voltage/ground and frequency data. Diagnose antilock brake system braking concerns caused by vehicle modifications (tire size, curb height, final drive ratio, etc.) Identify traction control system components. All these tasks will be observe by me on a one-on-one basic, when in the shop.

Grading Policy:

Grading of class:		Letter grade conversions:
Assignment /Lab Sheets	10%	A (90-100)
Unit & Mid-Term Tests (4)	20%	B (80-89)
Hands-on Components	40%	C (70-79)
Final Test	30%	D (60-69)

Lab Sheets are based on hands-on performance tasks per the GM Service Technical College and the NATEF task list.

NOTE: If the AVERAGE TOWARD FINAL GRADE is 90 or above (+ - assignments and lab sheets) you do not have to take the FINAL TEST.

If you have to take the FINAL TEST, the AVERAGE TOWARD FINAL GRADE and FINAL TEST are averaged for the FINAL LETTER GRADE.

Laboratory Guidelines

- **Horseplay will not be tolerated**
- **When working under an automobile, you must use a creeper**
- **Use all hand or special tools properly**
- **Do not sit in an automobile unless you are making a check or test that requires you to**
- **Do not run the radio or change radio setting**
- **Do not move the seat unless necessary**
- **You must use fender covers when working under the hood**
- **Do not use any part of an automobile for a work bench**
- **Every automobile must have a work order on it**
- **Every automobile jacked up must have jack stands under it**
- **You must wear safety glasses when doing the following**

Turning a drum/rotor	Balancing a wheel
Grinding	Drilling holes
Re-facing a valve	Using a blow gun

Topics to Be Covered:

Week 1 – System Operation, Component Identification

1. correctly describe how brake system operates
2. properly identify and name all components used in the brake system

Week 2 – Hydraulics

3. correctly describe the effects of hydraulics on braking.
4. properly use formulas to figure force at wheel cylinders, calipers and master cylinder

Week 3- 4 – Drum Brakes, Disc Brakes

5. identify and describe operation of leading/trailing brake system
6. identify and describe operation of duo-servo brake system
7. properly check and change drum brakes
8. correctly describe operation of disc brakes
9. properly check and change disc brakes

Week 5 – Component Operation Function

10. correctly describe operation of the following brake system components: master cylinder, wheel cylinder, caliper, proportioning valve, metering valve, vacuum booster

Week 6 – Component Replacing

11. properly check, replace or repair the following brake system components: master cylinder, wheel cylinder, caliper, proportioning valve, metering valve, vacuum booster

Week 7 – Brake Lathe Operation/Complete Brake Job

12. correctly operate a brake lathe
13. properly turn drums and rotors
14. correctly do a complete brake job

Attendance Policy

A student is expected to attend all scheduled classes and laboratories. Each instructor will formulate an attendance policy and provide it on the course syllabus. Absences are counted from the first scheduled meeting of the class, and it is the responsibility of each student to know the attendance policy of each instructor in whose class he/she is enrolled. If a student is absent from a class, he/she should give an advanced explanation to the instructor. Absences in a course may affect a student's final grade. The student is responsible for all assigned work in the course regardless of excused or unexcused absences. Tardiness may also affect a student's final grade.

Failure to attend class will result in a final course grade of “FA” or “FN” (see explanation below) depending on the individual instructor’s course policy.

FA= failure, attendance-related (unofficial withdrawal) Last recorded date of attendance required.

FN= failure, never attended class (unofficial withdrawal)

Student Communication Channels

It is the student’s responsibility to check D2L and MyNSCC email on a regular basis. These are the official communication channels between the college and students. Students are responsible for the information communicated through those channels. D2L contains specific course information and MyNSCC contains information important for other purposes.

Early Warning System

Nashville State Community College has implemented an Early Warning System to notify students via e-mail about academic problems such as poor classroom attendance, poor performance on assignments/tests, poor communication skills, late/missing assignments, and/or lack of classroom participation. Please note that Early Warning Alerts do not affect a student’s academic standing.

ADA Compliance Statement

Nashville State complies with the Americans with Disabilities Act. If you wish to request any special accommodations for any courses in which you are enrolled, contact the Student Disabilities Office at 353.3721.

Classroom Misconduct

Nashville State Community College has a zero tolerance policy for disruptive conduct in the classroom. Students whose behavior disrupts the classroom will be subject to disciplinary sanctions. Please consult your Student Handbook for more specific details.

The instructor has primary responsibility for control over classroom behavior and maintenance of academic integrity. He/she can order temporary removal or exclusion from the classroom of any student engaged in disruptive conduct or in conduct which violates the general rules and regulations of the College.

Disruptive behavior in the classroom may be defined as, but is not limited to, behavior that obstructs or disrupts the learning environment (e.g., offensive language, harassment of students and professors, repeated outbursts from a student which disrupt the flow of instruction or prevent concentration on the subject taught, failure to cooperate in maintaining classroom decorum, etc.), the continued use of any electronic or other noise or light emitting device which disturbs others (e.g., disturbing noises from beepers, cell phones, palm pilots, lap-top computers, games, etc.).

Please be aware that children are not allowed in class or unattended on campus.

Academic Dishonesty (Honor Code)

Any form of academic dishonesty, cheating, plagiarizing, or other academic misconduct is prohibited. “Plagiarism may result from: (1) failing to cite quotations and borrowed ideas, (2) failing to enclose borrowed language in quotation marks, and (3) failing to put summaries and

paraphrases in your own words (A Writer's Reference 331). Academic dishonesty may be defined as, but is not limited to, intentionally trying to deceive by claiming credit for the work of another person, using information from a web page or source without citing the reference, fraudulently using someone else's work on an exam, paper, or assignment, recycling your own work from another course, purchasing papers or materials from another source and presenting them as your own, attempting to obtain exams/materials/assignments in advance of the date of administration by the instructor, impersonating someone else in a testing situation, providing confidential test information to someone else, submitting the same assignment in two different classes without requesting both instructor's permission, allowing someone else to copy or use your work, using someone else's work to complete your own, altering documents, transcripts or grades, and forging a faculty/staff member's signature.

In addition to other possible disciplinary sanctions that may be imposed through regular college procedures as a result of academic dishonesty the instructor has the authority to assign an "F" or a "Zero" for the exercise, paper, or examination or to assign an "F" for the course. Students may appeal through the appropriate college grade appeal procedures.

Inclement Weather Policy

In the event of an inclement weather event, check the Nashville State web site home page at www.nsc.edu for announcements on campus closures. Campus closures will also be announced on local television stations (channels 2, 4, 5, and 17).

When classes are cancelled, an online assignment will be posted in NS Online. Check your NS Online email for a message from your instructor regarding your online assignment requirements. Even though classes may be cancelled, some areas, i.e. Testing Center, may be open. However, you should check before commuting to campus.

The Vice President for Academic Affairs and the Director of Security are responsible for cancellation decisions during an inclement weather event for the Nashville State main campus and the Southeast campus. Cookeville, Waverly, and Dickson Campus Directors will make class cancellation decisions based on conditions in their respective areas. Decisions about class cancellations are based on actual conditions, not forecasts. The perspective used for making decisions is that of the college as an employer, not as a K-12 institution. Students should use their own best judgment in determining whether to report to campus during inclement weather when classes are not cancelled.

NOTE: This syllabus is meant simply as a guide and overview of the course. Some items are subject to change or may be revised at the instructor's discretion. Each instructor will further clarify their criteria for grading, classroom procedures, attendance, exams and dates, etc. on his/her course syllabus.