



South Portland, Maine 04106

Title: **Brakes 2**

Catalog Number: **AUTO-117**

Credit Hours: **2**

Credit hours: **1 hour lecture / 1 hour lab**

Semester: **Fall 2016**

Total Contact Hours: **15 / 30**

Instructor: **Joe Moore**

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Course Syllabus

Course Description

This is the second class in a 2 part study of brake systems. Tasks from the NATEF Master Automobile Service Technology list will be performed. Students will diagnose and repair hydraulic systems, power assist units, wheel bearings, parking brakes, and electronic brake systems.

Co-requisite: AUTO 116 Brakes 1

Co-requisite: AUTO 205 Electrical/Electronics 2

Course Objectives

After completing this course, the student will be familiar with all tasks listed below. He or she must perform all high priority tasks to manufacturer's specifications and document the completion of each task.

NATEF TASKS FOR THIS COURSE:

V. BRAKES MAST tasks minus the MLR tasks

For every task in Brakes, the following safety requirement must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

A. General: Brake Systems Diagnosis

1. Identify and interpret brake system concerns; determine necessary action. P-1

B. Hydraulic System Diagnosis and Repair

1. Diagnose pressure concerns in the brake system using hydraulic principles (Pascal's Law). P-1
2. Check master cylinder for internal leaks and proper operation; determine necessary action. P-1

3. Remove, bench bleed, and reinstall master cylinder. P-1
4. Diagnose poor stopping, pulling or dragging concerns caused by malfunctions in the hydraulic system; determine necessary action. P-3
5. Replace brake lines, hoses, fittings, and supports. P-2
6. Fabricate brake lines using proper material and flaring procedures (double flare and ISO types). P-2
7. Inspect, test, and/or replace components of brake warning light system. P-3

C. Drum Brake Diagnosis and Repair

1. Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action. P-1

D. Disc Brake Diagnosis and Repair

1. Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging, or pulsation concerns; determine necessary action. P-1

E. Power-Assist Units Diagnosis and Repair

1. Inspect vacuum-type power booster unit for leaks; inspect the check-valve for proper operation; determine necessary action. P-1
2. Inspect and test hydraulically-assisted power brake system for leaks and proper operation; determine necessary action. P-3
3. Measure and adjust master cylinder pushrod length. P-3

F. Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.) Diagnosis and Repair

1. Diagnose wheel bearing noises, wheel shimmy, and vibration concerns; determine necessary action. P-3
2. Remove and reinstall sealed wheel bearing assembly. P-2

G. Electronic Brake, Traction and Stability Control Systems Diagnosis and Repair

1. Identify and inspect electronic brake control system components; determine necessary action. P-1
2. Diagnose poor stopping, wheel lock-up, abnormal pedal feel, unwanted application, and noise concerns associated with the electronic brake control system; determine necessary action. P-2
3. Diagnose electronic brake control system electronic control(s) and components by retrieving diagnostic trouble codes, and/or using recommended test equipment; determine necessary action. P-2
4. Depressurize high-pressure components of an electronic brake control system. P-3
5. Bleed the electronic brake control system hydraulic circuits. P-1
6. Test, diagnose, and service electronic brake control system speed sensors (digital and analog), toothed ring (tone wheel), and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO) (includes output signal, resistance, shorts to voltage/ground, and frequency data). P-3
7. Diagnose electronic brake control system braking concerns caused by vehicle modifications (tire size, curb height, final drive ratio, etc.). P-3

Topical Outline of Instruction

1. Hydraulics
2. Brake diagnosis
3. Electronic brake systems

Course Requirements

Students will successfully complete homework, quizzes and tests

Students will successfully complete shop projects as assigned and approved by instructors and maintain documentation of completion

ASE Student Certification Test

The final week of this course will consist of an ASE Student Certification Test. It will be administered at the Testing Center, located in the Campus Center building. Students will be responsible for taking the test at their convenience during the normal operating hours of the Testing Center. A photo ID is required. For information about the Testing Center, please see www.smccme.edu/tests

Student Evaluation and Grading

10% Attendance and Participation

10% Homework

20% Quizzes

30% Tests

30% Practice of Safety and Shop Participation

Electude modules will be assigned periodically through the course. Each module will be counted as a quiz grade and if not completed by the due date will result in a zero for that quiz. Electude involves some time commitment; do not wait to the last minute.

Attendance Policy

Students will be dropped a letter grade from their final grade for 10% of total hours. Students will be dropped an additional letter grade at 13%. (For example: Received A for class but 10% absences now translates to a B for the final grade. 13% absence would translate to a C.) Students missing 15 % of the total hours for the course, tardy or absent will result in an administrative failure (AF) for the class. For this course meeting 3 hours per day twice a week, means 15% is 7.0 hours. Tardies will count as .5 hours no matter time missed unless greater than .5 hours which then will be counted as time missed. Tardies are considered not seated at the time of the start of class. Tardies will add up. Students will be removed with an AF if 3 consecutive absences.

Example A final grade

10%	5 hours	B final grade
13%	6 hours	C final grade
15%	7 hours	AF

Telephones and Computers

The use of computers, cell phones, smart phones, or other mobile communication devices is prohibited during lecture, unless the instructor indicates a special circumstance. In case of emergency, phones should be silenced, and answered outside the classroom. Special requests to use a computer for note taking will be considered by the instructor on a case by case basis. Violations of this policy will result in dismissal from the class period and an absence recorded. Repeat problems may result in a sanction from the Dean of Students.

Texts, Tools and/or Supplies

- Automotive Technology: Principles, Diagnosis, and Service, 4th Edition by James Halderman (ISBN 9780132811057)
- Electude by Argo- voucher to be purchased at school bookstore.
- Each student must supply and maintain his or her own set of tools as listed on the “SMCC Automotive Technology Required Student Tool List.”
- Personal protective equipment must be worn at all times in lab. Leather, steel-toe work boots; clear safety glasses with side shields; and a uniform are required for this course.

Office Hours

Appointments can be made to accommodate student needs.

Learning Outcomes

1. When necessary, utilize information-literacy skills, including evaluation of information from a variety of media and proper MLA and/or APA documentation.
2. Use critical thinking and listening skills in written and oral communication as a tool for learning.
3. Read and demonstrate understanding of complex ideas by identifying key concepts.
4. Apply theory to practice using problem solving techniques and data analysis.
5. Solve problems using algebraic techniques.
6. Interpret information presented in charts and graphs or illustrate a scenario using graphic techniques.
7. Utilize quantitative methods to solve and/or assess complex problems to support decision making, forecasting, and recommendations.
8. Participate in a direct experience of scientific inquiry of the natural world using the scientific method.
9. Find and evaluate credible sources of scientific information using a variety of media to support a research need.
10. Demonstrate the capacity to make informed and ethical judgments about the impact of science and technology on the self, the environment, and the practice of sustainability.

End-of-Course Evaluation

Students complete evaluations for each course attended at SMCC. Evaluations are submitted online and can be accessed through the student portal. Students can access the course evaluations beginning one week before the end of classes. The deadline for submission of evaluations occurs Monday at 5 PM following the last day of the class. You will receive an email to your student email account when course evaluations are available.

ADA Syllabus Statement

Southern Maine Community College is an equal opportunity/affirmative action institution and employer. For more information, please call 207-741-5798. If you have a disabling condition and wish to request accommodations in order to have reasonable access to the programs and services offered by SMCC, you must register with the Disability Services Coordinator, Sandra Lynham, who can be reached at 741-5923. Further information about services for students with disabilities and the accommodation process is available upon request at this number. Course policies about online testing are modified to suit each individual's accommodations.

Add-Drop Policy

Students who drop a course during the one-week "add/drop" period in the fall and spring semesters and the first three days of summer sessions receive a 100% refund of the tuition and associated fees for that course. Please note any course that meets for less than the traditional semester length, i.e., 15 weeks, has a pro-rated add/drop period. There is no refund for non-attendance.

Withdrawal Policy

A student may withdraw from a course only during the semester in which s/he is registered for that course. The withdrawal period is the second through twelfth week of the fall and spring semesters and the second through ninth week of twelve-week summer courses. This period is pro-rated for shorter-length courses. To withdraw from a course, a student must complete and submit the appropriate course withdrawal form, available at the Enrollment Service Center (no phone calls, please). The designation "W" will appear on the transcript after a

student has officially withdrawn. A course withdrawal is an uncompleted course and may adversely affect financial aid eligibility. Failure to attend or ceasing to attend class does not constitute withdrawal from the course. There is no refund associated with a withdrawal.

Plagiarism Statement

Adherence to ethical academic standards is obligatory. Cheating is a serious offense, whether it consists of taking credit for work done by another person or doing work for which another person will receive credit. Taking and using the ideas or writings of another person without clearly and fully crediting the source is plagiarism and violates the academic code as well as the Student Code of Conduct. If it is suspected that a student in any course in which s/he is enrolled has knowingly committed such a violation, the faculty member should refer the matter to the College's Disciplinary Officer and appropriate action will be taken under the Student Code of Conduct. Sanctions may include suspension from the course and a failing grade in the course. Students have the right to appeal these actions to the Disciplinary Committee under the terms outlined in the Student Code of Conduct.

SMCC Pay-for-Print Policy

Per Page Costs

Each semester students receive a \$20 printing credit. The balance resets at the end of the semester and any remaining credits are removed. The cost varies depending upon page size and whether printing is done in black and white or color.

- a. There is a \$0.10 per page fee for standard 8.5" by 11" black and white documents. The reverse sides of duplex (double-sided) documents are free.
- b. There is a \$.50 per page fee for standard 8.5" by 11" color documents.
- c. There is a \$.20 per page fee for 8.5" by 14" (legal) or 11" by 17" (tabloid) black and white documents.
- d. There is a \$1.00 per page fee for 8.5" by 14" (legal) or 11" by 17" (tabloid) color documents.
- e. Duplex charges (printing on both sides of a page) work in the following fashion: One page is \$0.10, two pages are \$0.10, three pages are \$0.20, and four pages are \$0.20, etc. The flipsides are free, but another sheet of paper is \$0.10. Please be aware that a document with any color at all (when printed to a color printer) will by default be printed in color. You are responsible for setting the print job to print black and white if you do not need color. For directions, please go to the IT Help tab in My SMCC.

How does it work?

The College's pay-for-print system monitors printing on all printers (including those in general access labs, library printers, the Academic Achievement Center, Noisy Lounge and technology labs). Students can check the number of pages they have printed by using the Printing Balance tool available on SMCC computers (located in the lower right corner of the screen, near the clock). Departments with work study students who need to print documents for the department should contact the Help Desk at 741-5696 to have a special account set up.

Refunds

Print jobs are eligible for a refund in the event of mechanical or electronic error on the part of the printer, print server, or software used to submit the job. Jobs are not eligible for a refund in cases where the job was not set up correctly, was submitted multiple times, or the student is not satisfied with the result. To request a refund, please bring the offending print to the IT Department in the basement of the Ross Technology Center. Refunds

will be granted in the form of a credit to the student's account.

Why is SMCC charging for printing?

The pay-for-print system is an effort to control escalating printing costs. Charging for printing helps offset the increasing cost of supplies and encourages students to conserve resources. To find ways to reduce your printing charges, please go to the IT Help tab on My SMCC. If you have questions about the pay-for-printing policy or your printing charges, please contact the Help Desk at 741-5696 or send an email to helpdesk@smccme.edu. Be sure to log OUT of the system when you've finished your printing, to prevent unauthorized access to your account.