



Basic Course Information

Semester:	Fall 2021	Instructor Name:	Julio Hernandez
Course Title & #:	AU T 125 – Automotive Brakes	Email:	julio.hernandez@imperial.edu
CRN #:	10566	Webpage (optional):	N/A
Classroom:	1102	Office #:	1102
Class Dates:	Aug. 16, 2021 – Dec. 8, 2021	Office Hours:	N/A
Class Days:	M – Lecture, W – Shop	Office Phone #:	N/A
Class Times:	6:00 PM – 9:10 PM	Emergency Contact:	Campus Nurse: (760)355-6128 Campus Safety: (760)483-7411
Units:	4.00	Class Format:	Hybrid (Live Zoom Lecture & Face-to-Face Shop Class)

Course Description

This course covers the principles and instruction in disassembly, inspection, installation, and adjustments of the modern brake system. Laboratory activities stress brake system diagnosis, repair, machining, and overhaul procedures and proper use of tools and equipment utilized in the industry. Upon successful completion of this course, students are prepared to take the Automotive Service Excellence (ASE) certification examination in brakes. (CSU)

Course Prerequisite(s) and/or Corequisite(s)

N/A

Student Learning Outcomes

Upon course completion, the successful student will have acquired new skills, knowledge, and or attitudes as demonstrated by being able to:

1. Identify and interpret brake system concern; determine necessary action. SLO1, SLO2, SLO3.
2. Diagnose pressure concerns in the brake system using hydraulic principles. (Pascal's Law) SLO1, SLO2, SLO3.
3. Diagnose poor stopping, noise, vibration, pulling, graving, dragging or pedal pulsation concerns; determine necessary action. SLO1, SLO2, SLO3
4. Identify and inspect electronic brake control systems components; determine necessary action. SLO1, SLO2, SLO3.

Course Objectives

Upon satisfactory completion of the course, students will be able to:

1. Comply with all safety shop procedures associated with the handling of all hazardous materials in accordance with the regulations.



2. Correctly identify the major components of the automotive braking system.
3. Be familiar with different types of parking, combination, and anti lock brake (ABS) systems.
4. Be familiar with different types of brake fluids and master, wheel, and caliper brake cylinders.
5. Understand the operation and service of different types of power-booster units.
6. Measure and adjust brake pedal according to manufacture's specifications. Check brake system for internal and external leaks and proper operation. Inspect brake lines and fitting for brake fluid leaks or damage, and replace or repair (double flare) brake lines. Diagnose poor brake stopping, pulling or noise problems. Inspect, test, adjust and replace metering brake valves, brake warning light system. Flush and bleed (Manual, Pressure or vacuum) Hydraulic brake system.
7. Diagnose brake problem. Remove inspect, and measure brake drum for excessive wear, cracks or other damage. Mount brake drum on lathe machine using correct setting. Complete brake job overhaul. Remove and service wheel cylinders. Adjust brake lining and parking brake before installing brake drums. Torque all lug nuts to factory specification.
8. Diagnose poor stopping, noise pulling or other brake problem. Remove disc calipers, assemble and inspect for wear, leaks and damage. Reassemble, lubricate and re-install caliper and related hardware. Clean, inspect and measure rotor with a dial indicator and compare measurements with specifications. Mount disc brake in lathe machine and finish rotor according to specifications. Fill master cylinder with recommended fluid and seat pads, inspect caliper for leaks.
9. Test brake pedal supply with vacuum gage for power booster operation. Inspect all vacuum hoses for vacuum leaks, check valve for proper operation.
10. Diagnose wheel bearing problem such as noises, wheel shimmy and vibration problem. Remove, clean, inspect, repack and reinstall race and wheel bearing and replace bearing seal. Adjust to wheel bearing according to specifications.
11. Check parking brake cables and components for wear or damage. Check parking brake operation with transmission in gear, check operation of parking brake indicator and light system, operation of brake stop light system.
12. Inspect, test and services anti brake system. Diagnose poor stopping, wheel lockup, noise problems and other related brake problems. Diagnose anti-lock brake system and electronic control (s) and components. Depressurized high pressure components of the anti-lock brake system and use recommended safety procedures from manufacturers. Bleed the anti-lock brake system's front and clear hydraulic circuits following manufacture's procedures. Perform a fluid pressure (hydraulic boost) diagnosis on the high pressure anti lock brake system (ABS). Remove and install anti-lock brake system electrical/electronic components. Diagnose anti-lock brake system braking problem cause by vehicle modification.
13. Be familiar with Automotive Services Excellence (ASE) examination requirements, and prepare to successfully pass exam.

Textbooks & Other Resources or Links

Modern Automotive Technology by James E. Duffy ISBN: 978-1-63563-424-2 or Canvas Common Cartridge Access Key Code

Course Requirements and Instructional Methods

Method of Instruction: Methods of instructions may include, but are not limited to, the following: lectures, textbook worksheets, hands-on worksheets, internet readings, large and small group discussions, audiovisual aids, and demonstrations.

Reading and Writing: Reading articles from magazines, book chapters, answering questions, and/or writing short essays when directed.

Course Grading Based on Course Objectives

Grading Criteria:

1. Grading system:
 - A=90%-100% of points= Excellent
 - B=80%-89% of points= Good
 - C=70%-79% of points= Satisfactory
 - D= 60%-69% of points= Pass, less than satisfactory
 - F= Less than 60% of points= Failing
2. Very important:
 - There are no make-up exams unless you have a very good reason and make arrangements with the instructor before the exam.
 - Final grades can be raised or lowered based on your preparation and participation in class. It benefits you to be engaged and participate.

Grades:

Quizzes + HW	25%
Shop/Lab Assignments	25%
Midterm Exam	25%
Final Exam	25%
Total	100%

Course Policies

- A student who fails to attend the first meeting of a class or does not complete the first mandatory activity of an online class will be dropped by the instructor as of the first official meeting of that class. Should readmission be desired, the student's status will be the same as that of any other student who desires to add a class. It is the student's responsibility to drop or officially withdraw from the class. See General Catalog for details.
- Regular attendance in all classes is expected of all students. A student whose continuous, unexcused absences exceed the number of hours the class is scheduled to meet per week may be dropped. For online courses, students who fail to complete required activities for two consecutive weeks may be considered to have excessive absences and may be dropped.
- Absences attributed to the representation of the college at officially approved events (conferences, contests, and field trips) will be counted as 'excused' absences.
- What is netiquette? Netiquette is internet manners, online etiquette, and digital etiquette all rolled into one word. Basically, netiquette is a set of rules for behaving properly online.

Students are to comply with the following rules of netiquette: (1) identify yourself, (2) include a subject line, (3) avoid sarcasm, (4) respect others' opinions and privacy, (5) acknowledge and return messages promptly, (6) copy with caution, (7) do not spam or junk mail, (8) be concise, (9) use appropriate language, (10) use appropriate emoticons (emotional icons) to help convey meaning, and (11) use appropriate intensifiers to help convey meaning [do not use ALL CAPS or multiple exclamation marks (!!!!)].

What does it mean to “attend” an online class?

Attendance is critical to student success and for IVC to use federal aid funds. Acceptable indications of attendance are:

- Student submission of an academic assignment
- Student submission of an exam
- Student participation in an instructor-led Zoom conference
- Documented student interaction with class postings, such as an interactive tutorial or computer-assisted instruction via modules
- A posting by the student showing the student's participation in an assignment created by the instructor
- A posting by the student in a discussion forum showing the student's participation in an online discussion about academic matters
- An email from the student or other documentation showing that the student has initiated contact with a faculty member to ask a question about an academic subject studied in the course. Logging onto Canvas alone is NOT adequate to demonstrate academic attendance by the student.

Other Course Information

Shop/ Lab Area

- Safety test must be passed to work in the shop and complete required lab exercise.
- Safety glasses are required to be worn at all times while in the shop area, safety glasses are the student responsibility (students not wearing safety glasses will be ask to leave the class for that day no exceptions).
- Clean up your area and any other lose debris or trash.
- Wear all required safety protection and comply with posted signs.
- No shorts or open toe foot wear, always be prepared to go into the lab area.
- Comply with tool check out policy and return tools clean.
- Do not perform any work on any vehicle outside the assigned task without permission from your instructor.

Parking:

No student parking by the building, the only exception is on lab time if your vehicle is a project (instructor approved). Speed limit must be kept at or under 5MPH.

Parking permit is required at all times.

Projects:

All projects are to be taken with the student’s unless otherwise approve by the instructor.

All approve projects must be removed from campus prior to finals.

All projects must have a written work order (R/O).

Shop Maintenance:

All work will cease 20 minutes prior to end of class.

All work areas must be cleaned.

Tools must be cleaned and returned to the tool room.

Any broken or missing tools must be reported immediately. Tools are student’s responsibility.

IVC Student Resources

IVC wants you to be successful in all aspects of your education. For help, resources, services, and an explanation of policies, visit <http://www.imperial.edu/studentresources> or click the heart icon in Canvas.

Anticipated Class Schedule/Calendar

***Note:** Every Monday class will be held online via a real-time Zoom lecture. Every Wednesday class will be face-to-face in the shop. In both cases, attendance is required.

Week	Date	Activity, Assignment, and/or Topic	Chapter
1	Mon 8/16	Syllabus & Introduction/ Shop Safety/ Tools	
	Wed 8/18	Shop Class: Auto Shop Safety + Brake Tools + Equipment	Ch. 3, Ch. 4, Ch. 5
2	Mon 8/23	Brake System Principles + Hydraulics + System Components	
	Wed 8/25	Shop Class: Inspecting & Testing Brake System Components, Brake System Fluid Flush/Bleed	Ch. 80
3	Mon 8/30	Disc Brake System Components + Drum System Components	
	Wed 9/1	Shop Class: Inspecting & Testing Disc/ Drum Brakes	Ch. 80
4	Mon 9/6	HOLIDAY (NO Class/Lecture)	
	Wed 9/8	Shop Class: Measuring Brake System Components & Resurfacing Drums + Discs (Rotors)	
5	Mon 9/13	Brake Systems Diagnosis	
	Wed 9/15	Shop Class: Disc Brake Service (Front + Rear) + Brake Pedal "Free-play" Adjustment	Ch. 81
6	Mon 9/20	Brake System Service + Repair	
	Wed 9/22	Shop Class: Drum Brake Service + Emergency Brake Adjustment	Ch. 81
7	Mon 9/27	Tires + Wheel Bearings	
	Wed 9/29	Shop Class: Tires + Wheel Bearing Service	Ch. 73
8	Mon 10/4	MIDTERM Exam	
	Wed 10/6	Shop Class: 4x4 Hub Bearings + CV Joints Service	
9	Mon 10/11	Wheel Bearings + CV Joints Diagnosis	
	Wed 10/13	Shop Class: Brake Rotors/ Bearing Assemblies Pressed Type Using Hydraulic Press	Ch. 74
10	Mon 10/18	Anti-Lock Brake Systems	
	Wed 10/20	Shop Class: Servicing ABS Components	Ch. 82



IMPERIAL VALLEY COLLEGE

Week	Date	Activity, Assignment, and/or Topic	Chapter
11	Mon 10/25	Traction + Stability Control	Ch. 82
	Wed 10/27	Shop Class: ABS Code Scanning	
12	Mon 11/1	ABS System Electric/ Hydraulic Diagram Analysis	Video + Hand out Papers
	Wed 11/3	Shop Class: Testing Electric/ Electronic Components	
13	Mon 11/8	Brake Booster Types (Vacuum + Hydraulic)	Video + Article
	Wed 11/10	Shop Class: Vacuum Booster + Hydraulic Booster Diagnosis + Repair	
14	Mon 11/15	Trailer Brakes (Electric & Hydraulic)	Videos
	Wed 11/17	Shop Class: Trailer Brake Service	
15	Mon 11/22	THANKSGIVING WEEK (NO Class/Lecture)	
	Wed 11/24	THANKSGIVING WEEK (NO Shop Class)	
16	Mon 11/29	Brake Service Work Order Information	Ch. 7
	Wed 12/1	Shop Class: Perform a Complete Vehicle Inspection & Prepare a Work Order w/ Estimate	
17	Mon 12/6	FINAL Exam Pt. 1 (Based on Lectures)	
	Wed 12/8	FINAL Exam Pt. 2 (Based on Shop Classes)	

*****Subject to change without prior notice*****