IMPERIAL VALLEY COLLEGE

Basic Course Information

Semester:	**FALL 2024**	Instructor Name:	**Ricardo Pradis**
Course Title & #:	**SUSPENSION & WHEEL ALIGNMENT AUT-155**	Email:	**ricardo.pradis@imperial.edu**
CRN #:	**10916**	Webpage (optional):	
Classroom:	**BLDG 1100**	Office #:	**1100 bldg.**
Class Dates:	**AUG-12 – DEC-7**	Office Hours:	**12:50-1:20 pm T/TH**
Class Days:	**TUESDAY'S & THURSDAYS**	Office Phone #:	**760-355-6403**
Class Times:	**R 1:20 – 4:30 PM** **T 1:20 - 4:30 PM**	Emergency Contact:	**760-355-6361 Secretary**
Units:	**4.0**	Class Format:	**Face to Face**

Course Description

This course covers the principles and construction of passenger vehicle and light truck steering, chassis, and suspension system. Emphasis is placed the skill required in the diagnosis repair and adjustment of wheel alignment including two and four-wheel alignment angles. Complete suspension and overhaul will be done in laboratory activities as well alignment using either two or four wheel sensors. Upon successful completion of this course, the students are prepared to take the Automotive Service Excellence (ASE) Certification Examination in steering wheel suspension.

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

None

Student Learning Outcomes

1. Identify and interpret suspension and steering system concerns; determined necessary action.

2. Diagnose steering column noises, looseness, and binding concerns (including tilt mechanisms); determine necessary action.

3. Inspect, remove, and replace shock absorbers.

4. Inspect tire condition; identify tire wear patterns; check and adjust air pressure; determine necessary action.

Course Objectives

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

2. Correctly identify the major components of the suspension and steering system and how they relate to each other to control the vehicle.

3. Have a basic understanding of how a tire and wheel is constructed.

4. Learn different styles of automotive front and rear suspension.

5. Understand the purpose for shock an absorber and stabilizer bars.

6. Understand the operation of both major styles of steering gears.

7. Understand the purpose for the various front and rear wheel alignment angles.

8. Diagnose Mac-Phersons strut and short/long arm suspension system for wears, noise, cracks, uneven, riding height or other related problem. Remove, Inspect and replace upper and lower control arm bushings, or other related components. Remove and replace coil spring, insulator, torsion bars, bushings and links. Remove Inspect and replace strut cartridge, coil spring, and bearing mount. Diagnose and repair shock absorber, wheel bearing and electronically controlled components.

9. Disable air bag system in accordance with manufacture's procedures. Diagnose steering column, looseness, and binding problems. Diagnose power non-rack and pinion steering gear bushing, uneven turning effort, looseness, hard steering and fluid leakage problems. Adjust steering gear box system for pinion preload and sector lash. Inspect and replace steering gear rod ends and components. Remove, inspect and replace power steering accessories as needed perform power steering system pressure test and adjust or replace components of electronically controlled steering system.

10. Diagnose wheel alignment problems. Measure vehicle front/rear height suspension. Check and adjust front/rear wheel alignment angles. Check steering axis inclination, rear wheel-thrust angle, and front wheel setback.

11. Diagnose tire vibration, shimmy, or other related symptoms. Rotate tires according to manufacturer's recommendation. Measure wheel/tire and hub run out and adjust or replace according to specifications. Balance wheel and tire assembly (static and dynamic) dismount, inspect, repair and remount tire on wheel and torque lug nuts.

12. Be familiar with automotive services excellence (ASE) examination requirements, and prepare to successfully pass the exam

Textbooks & Other Resources or Links

Textbook: Modern Automotive Technology 10th edition ISBN: 978-1-64564-688-4

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.

Out-of-class

Library: Computer software practice questions. The student must review and answer the assignment for Level I, Level II, and Level III. After completion of the three levels, students will print and submit a report for evaluation to see the technical level were he/she needs additional support in.

Reading and Writing

Review and answer Automotive Service Excellence (ASE) questions from ASE A4 class booklet motor age Areas: Suspension and steering system 1. General suspension and steering systems diagnosis-10 questions 2. Steering systems diagnosis and repair-8 questions 3. Suspension systems

diagnosis and repair-9 questions 4. Related suspension and steering service-10 question 5. Wheel alignment diagnosis, adjustment and repair-13 questions

Course Grading Based on Course Objectives

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:
    - **Mid-Term** will be given on Oct 3.
    - **Final-Exam** will be given on Dec 5.
    - 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 participative.

Grades:

	Points
Book worksheets, quizzes.	140
Lab activity, hands-on worksheets.	240
Mid-term	60
Final-exam	60
Total points	500

Course Grade:
The course grade is based on total points accumulated during the semester. There is a total of 500 points available. Grades are determined by dividing the total points you earn by the total points available to get your percentage. (Total points may vary if I change the assignments in a particular week).

Grading of Hands-on Assignments:
The most common problem students experience is not being detailed enough in their answers and not spending the right amount of time in the repair procedures. Always be as specific as you can and use examples from your readings. Make sure to answer all parts of the questions. Points will be deducted for inadequate responses. Feedback will be given after each assignment and, hopefully, you will improve as you proceed with the course. The following grading rubric is used when grading assignments.

	Grading Rubric for Hands-on Assignment	Points
A	Focused and clearly organized. Contains critical thinking and content analysis. Convincing evidence is provided to support conclusions. Ideas are clearly communicated. Clearly meets or exceeds assignments requirements.	18-20
B	Generally focused and contain some development of ideas, may be simplistic or repetitive. Evidence is provided which supports conclusions. Meet assignments requirements.	16-17
C	May be somewhat unfocused, underdeveloped, or rumbling. But does have some coherence. Some evidence is provided which support conclusions. Meets minimum assignment requirements.	14-15
D	Unfocused, underdeveloped. Minimal evidence is used to support conclusion. Does not respond appropriately to the assignment.	12-13
F	Minimal effort by the student. Unfocused, underdeveloped. Evidence is not used to support conclusion. Block overall understanding. Does not meet assignment requirements.	0-11

Course Policie

- 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.

There are many different forms of academic dishonesty. The following kinds of honesty violations and their definitions are not meant to be exhaustive. Rather, they are intended to serve as examples of unacceptable academic conduct.

- Plagiarism is taking and presenting as one's own the writings or ideas of others, without citing the source. You should understand the concept of plagiarism and keep it in mind when taking exams and preparing written materials. If you do not understand how to "cite a source" correctly, you must ask for help.

- Cheating is defined as fraud, deceit, or dishonesty in an academic assignment, or using or attempting to use materials, or assisting others in using materials that are prohibited or inappropriate in the context of the academic assignment in question.

Anyone caught cheating or plagiarizing will receive a zero (0) on the exam or assignment, and the instructor may report the incident to the Campus Disciplinary Officer, who may place related documentation in a file. Repeated acts of cheating may result in an F in the course and/or disciplinary action. Please refer to the General Catalog for more information on academic dishonesty or other misconduct. Acts of cheating include, but are not limited to, the following: (a) plagiarism; (b) copying or attempting to copy from others during an examination or on an assignment; (c) communicating test information with another person during an examination; (d) allowing others to do an assignment or portion of an assignment; (e) using a commercial term paper service.

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Other Course Information

Automotive Technology Classroom & Shop Policy

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, no loud music.
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.

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Anticipated Class Schedule/Calendar

Date or Week	Activity, Assignment, and/or Topic	Pages/ Due Dates/Tests
Week 1 Aug 12-16	Syllabus & Introduction, there will be a quiz for every chapter. Ford Service Training. Chapter 5 Auto Shop Safety	Pages 55-66
Week 2 Aug 19-23	Chapter 1 Introduction to Automotive Lab: Identify major components, use of lift.	Pages 3-19
Week 3 Aug 26-30	Chapter 7 Service information and work orders Lab: Service information (pro-on-demand) complete work order.	Pages 78-86
Week 4 Sep 3-6	Chapter 21 Wiring Diagrams and repair Lab: Read wiring diagram, identify protection devices	Pages 237-261
Week 5 Sep 19-12	Chapter 73 Tire, Wheels, and Wheel Bearing Fundamentals Lab: Identify tires and wheels, inflation and rotation.	Pages 1103-1118
Week 6-7 Sep 16-20 Sep 23-27	Chapter 74 Tire, Wheel & Wheel Bearing Service and Repair Lab: Tire Maintenance, Wheel Balance, Mounting & Dismounting Tires, Tire Puncture Repair, Wheel bearing Service.	Pages 1119-1138
Week 8 Sep 30-Oct 4	MID-TERM	Exam
Week 9 Oct 7-11	Chapter 75 Suspension System Technology Lab: Identify suspension components.	Pages 1139-1158
Week 10-11 Oct 14-18 Oct 21-25	Chapter 76 Suspension System Diagnosis & Repair Lab: Shock Absorber Service, Suspension Spring Service, Ball joint Service, Suspension Bushing Service, MacPherson Strut Service, Computerized Suspension Diagnosis	Pages 1159-1179
Week 12 Oct 28-Nov 1	Chapter 78 Steering System Diagnosis & Repair Lab: Steering System Maintenance, Steering Column Service, Steering Linkage Service, Manual Rack & Pinion Service, and Power Steering System Service.	Pages 1201-1212
Week 13-14-15 Nov 4-8 Nov 12-15 Nov 18-22	Chapter 79 Wheel Alignment Lab: Wheel Alignment Principles, Prealignment Inspection, Adjusting Wheel Alignment, Wheel Alignment Tools and Equipment, Alignment Machines, caster, camber, and toe adjustments.	Pages 1213-1228
Week 16 Dec 2-6	FINAL-EXAM	Exam

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

Work-based Learning

Career possibilities in the automotive industry:

Work-based learning (WBL) allows students to apply classroom content in professional settings while gaining real-work experiences. These opportunities will provide you with a deeper, more engaging and relevant learning environment. Some examples of WBL assignments are job shadowing, informational interviews, and guest speakers. In this course, you will be working on workplace simulations and will be using Ford Service Training online program. It is intended to provide students with simple knowledge (basic) to complex skills (advance) training.

Contact:

Office Phone: (760) 355-5721

Email: careerservicescenter@imperial.edu

Hours of Operation:

Monday - Friday; 8:00 a.m. to 5:00 p.m.