IMPERIAL VALLEY COLLEGE

Basic Course Information

Semester:	**SPRING 2021**	Instructor Name:	**Ricardo Pradis**
Course Title & #:	**SUSPENSION & WHEEL ALIGNMENT AUT-155**	Email:	**ricardo.pradis@imperial.edu**
CRN #:	**20854**	Webpage (optional):	
Classroom:	**BLDG 1100**	Office #:	**1100 bldg.**
Class Dates:	**FEB. 16 – JUN 11 2021**	Office Hours:	
Class Days:	**R 8:00-11:10 AM** **T 8:00-11:10 AM**	Office Phone #:	**760-355-6403**
Class Times:	**FEB. 16 TO APRIL 2 CANVAS** **APRIL 12 TO JUNE 11 LAB**	Emergency Contact:	**760-355-6403**
Units:	**3.0**	Class Format:	

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 11 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 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.

Out of class:
Obtain information from a flat rate manual and a parts catalog and prepare a repair order for replacement and diagnosis of a fuel pump, starter, and a battery on a vehicle of your choice. Check the information for the amount of labor involved. Then, consult the parts catalog for the cost of the part. Add up the cost plus state tax (figure labor cost at $58/hour)

Reading and Writing:
Using sketches and principles you have learned about basic electricity, prepare a presentation showing how electricity can be created through magnetism.

What if I need to borrow technology or access to WIFI?

1. To request a loaner laptop, MYFI device, or other electronic device, please submit your request here: https://imperial.edu/students/student-equity-and-achievement/

2. If you'd like access the WIFI at the IVC campus, you can park in parking lots "I & J". Students must log into the IVC student WIFI by using their IVC email and password. The parking lots will be open Monday through Friday from 8:00 a.m. to 7:00 p.m.

Guidelines for using parking WIFI:
-Park in every other space (empty space BETWEEN vehicles)
-Must have facemask available
-For best reception park near buildings
-Only park at marked student spaces
-Only owners of a valid disabled placard may use disabled parking spaces
-Only members of the same household in each vehicle
-Occupants **MUST** remain in vehicles
-Restrooms and other on-campus services not available
-College campus safety will monitor the parking lot
-Student code of conduct and all other parking guidelines are in effect
-Please do not leave any trash behind
-No parking permit required If you have any questions about using parking WIFI, please call Student Affairs at 760- 355-645

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:
   - **Mid-Term** will be given on April 12.
   - **Final-Exam** will be given on June 7.
   - 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 engage 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 Policies

[Describe other policies such as attendance, academic honesty, netiquette, expected classroom behavior, etc.]

- 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

Date or Week	Activity, Assignment, and/or Topic	Pages/ Due Dates/Tests
Week 1 Feb. 16-19	Syllabus & Introduction Chapter 5 Auto Shop Safety	 Pages 75-84
Week 2 Feb. 22-26	 Chapter 1 Introduction to Automotive	 Pages 3-23
Week 3 March 1-5	 Chapter 4 Power Tools & Equipment	 Pages 59-72
Week 4 March 8-12	 Chapter 73 Tire, Wheels, and Wheel Bearing Fundamentals	 Pages 1449-1461
Week 5 March 15-19	 Chapter 75 Suspension System Technology	 Pages 1491-1508
Week 6 March 22-26	 Chapter 77 Steering System Technology	 Pages 1537-1554
Week 7 March 29-April 2	 MID-TERM	
Week 8-9 April 12-16 April 19-23	Chapter 74 Tire, Wheel & Wheel Bearing Service and Repair Lab: Tire Maintenance, Wheel Balance, Mounting & Dismounting Tires, Tire Puncture Repair, Wheel bearing Service.	 Pages 1467-1484 Lab. Exercise
Week 10-11 April 26-30 May 3-7	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 1513-1529 Lab Exercise
Week 12-13 May 10-14 May 17-21	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 1561-1574 Lab. Exercise
Week 14-15 May 24-28 June 1-4	Chapter 79 Wheel Alignment	 Pages 1581-1595 Lab. Exercise

Date or Week	Activity, Assignment, and/or Topic	Pages/ Due Dates/Tests
	Lab: Wheel Alignment Principles, Prealignment Inspection, Adjusting Wheel Alignment, Wheel Alignment Tools and Equipment, Alignment Machines.	
Week 16 June 7-11	FINAL-EXAM	

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