

AUTO 155

Automotive Suspension & Wheel Alignment

Syllabus

Instructor: Jose Lopez

Office: 1102

E-mail:

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Semester Begins: August 19, 2013

Ends: December 7, 2013

Textbook:

Modern Automotive technology (classroom) 7th edition

Modern Automotive technology (workbook) 7th edition By James E. Duffy ISBN
978-1-59070-957-3

Course description:

This course covers the principles and construction of passenger vehicle and light truck steering, chassis, and suspension system. Emphasis is placed on 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 as alignment using either two or four wheel sensors. Upon successful completion of this course, students are prepared to take the Automotive Service Excellence (ASE) certification examination in steering wheel suspension. (CSU)

Student learning outcomes:

IVC as an Institution has adopted five Student Learning Outcomes (SLO'S). They are interconnected with each other. They will be inherent throughout this course:

1. Communication
2. Skills
3. Critical thinking Skills

4. Information Literacy
5. Global Awareness

Student with Disabilities:

Any Student with a documented disability who may need educational accommodations should notify his or her instructor or the Disabled Student Programs and Services (DSP&S) office as soon as possible. The DSP&S program is located in building 2117, Health Sciences Building, or you may contact them at (760) 355-6312.

Student Responsibilities:

Each student is required to comply with the schedule established by Automotive Program at Imperial Valley College. Students are required to attend class each day class is in session. If for any reason a student is absent he/she is responsible for making up any missed lecture or lab assignments. It is recommended that students call the office or leave a message at (760) 355-6361 to inform the instructor if he/she is ill and/or bring a doctor's note upon returning to class.

Basic Rules and Shop Safety:

- ❖ No music allowed in the auto shop
- ❖ No parking in front of the gate
- ❖ No work should be done without instructors permission
- ❖ No parking inside the shop during lecture time
- ❖ No long breaks (should be 10 minutes per hour class)
- ❖ Each student should clean the work area
- ❖ The student can not leave early without instructors permission
- ❖ No cell phones during class session
- ❖ No helpers or visitors during lab activities
- ❖ Safety glasses are required

Imperial Valley College

2013-2014 Academic Calendar

Fall Semester 2013

August	16 Thursday	Orientation (Service Day- All Faculty and Staff)
	19 Monday	First day of classes- Fall 2013 Semester Begins
	24 Saturday	First day of Fall 2013 Saturday Classes
September	2 Monday	Holiday (Labor Day)- Campus Closed
November	11 Monday	Holiday (Veterans Day)-Campus Closed
	28-30 Thursday-Saturday	Holiday (Thanksgiving)- Campus Closed
December	2-7 Saturday-Friday	Final Exams
	9-13 Monday-Friday	No Classes- Campus Open
	16-31 Monday-Friday	Winter Recess-Campus Closed

Spring Semester 2014

January	1-3 Wednesday-Friday	Winter Recess-Campus Closed
	6-17 Monday-Friday	No Classes-Campus Closed
	20 Monday	Holiday (Martin Luther King's Birthday)- Campus Closed
	21 Tuesday	First day of classes- Spring 2014 Semester Begins
February	14-15 Friday-Saturday	Holiday (Abraham Lincoln's Birthday)- Campus Closed
	17 Monday	Holiday (President's Day)-Campus Closed
April	21-26 Monday-Saturday	Spring Recess-Campus Closed
May	10-16 Saturday-Friday	Final Exams- Spring Semester 2014
	17 Saturday	Commencement
	26 Monday	Holiday (Memorial Day)- Campus Closed

Summer Session 2014*

May	16 Monday	Summer Session 2014 Begins
July	4 Friday	Holiday (Independence Day)-Campus Closed
	21-23 Monday-Wednesday	Final Exams- Summer Session 2014
	23 Wednesday	Summer Session 2014 Ends

There will be a mid-term and final exam. Each will be worth 25% of your grade. The mid-term will have 50 questions on ASE type, the final exam will have 100 ASE type questions. Quizzes will make up 25% of your grade. The last 25% of your grade will be on projects assigned as part of the lab section of class.

<u>Percentages</u>	<u>Scores</u>	<u>Letter grade</u>
25% Completed Assignments	100-90%	A
25% Quizzes	89-80%	B
25% Mid-term exams	79-70%	C
25% Final Exam	69-60%	D
	59-50%	F

Assignments and Exams:

Exams will consist of information from class lectures, reading assignments, homework, videos, and class/lab activities.

Assignments due every Thursday.

Note: Time can be flexible with lectures, Lab activities or exams.

Outline and Activities

<u>Week:</u>	<u>Automotive Suspension and Wheel alignment:</u>	<u>Homework/Exam:</u>	<u>Workbook Activities:</u>	<u>Quiz:</u>	<u>Lab Activity:</u>
1 st week	<ul style="list-style-type: none"> ▪ Course introduction, orientation, safety shop-procedures ▪ Tools/Equipment ▪ Videos and shop demonstrations 	Need to purchase textbooks		Safety shop exam	
2 nd week	<u>Chapter 1</u> <u>The automobile</u> <ul style="list-style-type: none"> ▪ Parts, Assemblies, and systems ▪ Hybrid vehicle 	<u>Textbook</u> Chapter 1 - Review the main components and systems of the automobile. Pages 1-20	<u>Open activity</u> Use your Workbooks and identify the following parts, assembling and systems Pages 9, 10, 11, 12, 13 14		<u>Instructor</u> Show student a part component assembly, and system (out of a vehicle)
3 rd week Part I	<u>Chapter 3</u> <ul style="list-style-type: none"> ▪ Basic hand tools ▪ Identify common hand-tools ▪ Safety rules for hand tools ▪ Use hand tools safely 	<u>Textbook Homework</u> Chapter 3 Review ASE questions on page 46	<u>Open activity Workbook</u> Basic Tools Chapter 3 Pages 19-22		<u>Demonstration</u> Basic tools
Part II	<u>Chapter 4</u> <ul style="list-style-type: none"> ▪ Power tools/equipment ▪ Types of tools/equipment 	<u>Textbook Homework</u> Chapter 4 Review ASE Questions	<u>Open Activity Workbook</u> Power tools and equipment pages 23-30	<u>Quiz on</u> Basic tools	<u>Demonstration</u> Basic equipment

	<ul style="list-style-type: none"> ▪ Safety procedures for tools/equipment 				
4th Week Part I	<u>Chapter 65</u> <u>Tire, wheel, and wheel bearing fundamentals</u> <ul style="list-style-type: none"> ▪ Identify the parts of a tire and wheel ▪ Tire and wheel sizes ▪ Tire Rating Hub and Wheel bearing assemblies	<u>Textbook</u> <u>Chapter 65</u> Review ASE questions on page 1255	<u>Open Activity</u> <u>Workbook</u> Answer pages 331-336		<u>Demonstration</u> Tires, wheel hubs and wheel bearing assembly
Part II	Chapter 66 <ul style="list-style-type: none"> ▪ Tire, wheel and wheel bearing problems ▪ Tire inflation and rotation procedures ▪ Static/dynamic wheel balance ▪ Service procedures for wheel bearings ▪ Safe-practices while servicing tires/wheels. 	<u>Textbook</u> Chapter 66 Review ASE Questions on page 1275	<u>Open activity</u> <u>Workbook</u> Answer pages 337 340		<u>Demonstration</u> Tire/wheel run out Wheel/tire balance Tire machine
5th	<u>Chapter 67</u>	<u>Exam</u>	<u>Open activity</u>		<u>Demonstration</u>

<p>week</p>	<p><u>Suspension system fundamentals</u></p> <ul style="list-style-type: none"> ▪ Major parts of a suspension ▪ Function of each part ▪ Operation of the four common types of springs ▪ Various types of suspension ▪ Automatic Suspension leveling systems 	<p>chapters 65-66</p> <p><u>Textbook</u></p> <p>Chapter 67</p> <p>Homework review questions on page 1300</p>	<p>Workbook</p> <p>Answer page 341-344</p>		<p>Suspension parts</p>
<p>6th week</p>	<p><u>Chapter 68</u></p> <p><u>Suspension system Diagnosis and repair</u></p> <ul style="list-style-type: none"> ▪ Diagnosis problems ▪ Replace shock absorbers and ball ▪ The removal and Replacement of springs ▪ Service a strut assembly ▪ Replace control aim bushings 	<p><u>Textbook</u></p> <p>Chapter 68</p> <p>Review ASE questions pages 1321, 1322</p>	<p><u>Open activity</u></p> <p>Workbook</p> <p>Answer for pages 345-348</p>		<p><u>Demonstration and worksheets</u></p> <ul style="list-style-type: none"> ▪ Diagnosis Dry test ▪ Shock absorbers ▪ Coil Springs ▪ Struts ▪ Control Arm bushings ▪ Wheel bearings
<p>7th week</p>	<p><u>Chapter 69</u></p> <p><u>Steering System</u></p>	<p><u>Mid Term Exam</u></p> <p><u>Chapters 65, 66,</u></p>	<p><u>Workbook</u></p> <p>Answers for</p>		<p><u>Demonstration and Worksheets</u></p>

	<p><u>Fundamentals</u></p> <ul style="list-style-type: none"> ▪ Major parts of a steering system ▪ Operation principles of steering system. ▪ Difference between linkage steering and a rack-and pinion steering system ▪ Describe the operation of hydraulic and electric assist power steering systems. 	<p><u>67, and 68</u></p> <hr/> <p><u>Textbook</u> <u>Chapter 69</u> Review ASE questions pages 1345-1346</p>	<p>pages 349-352</p>		<ul style="list-style-type: none"> ▪ Steering ▪ Linkages ▪ Rack-and pinion ▪ Power-steering ▪ tools
<p>8th week part I</p> <hr/> <p>9th week part II</p>	<p><u>Chapter 70</u> <u>Steering System</u> <u>Diagnosis and repair</u></p> <ul style="list-style-type: none"> ▪ Describe common steering system problems ▪ Inspect and determine the condition of a steering system ▪ Basic steering column repair <p>OPERATIONS</p>	<p><u>Textbook</u> <u>Chapter 70</u> Review ASE questions pages 1364-1365</p>	<p><u>Workbook</u> <u>Open activity</u> answers for pages 353-356</p>		<p><u>Demonstration</u> <u>"Quiz"</u> <u>Worksheets</u></p> <ul style="list-style-type: none"> ▪ Inspection Steering ▪ Rack-and pinion ▪ Power steering pump service

	<ul style="list-style-type: none"> Describe service and repair procedures for a rack-and pinion steering gear Service power steering belts, hoses and fluid. 				
10th week part I <hr/> 11th week part II	<u>Chapter 74</u> <u>Wheel alignment</u> <ul style="list-style-type: none"> Principle of wheel alignment List the purpose of each wheel alignment setting Pre-alignment inspection Describe caster, camber, and toe adjustment. Explain toe-out on turns, steering axis inclination and tracking Describe the use of different types of wheel alignment equipment 	<u>Textbook Chapter 74</u> homework Review ASE Questions pages 1463-1464	<u>Workbook Chapter 74</u> Open activity provide answers for pages	<u>Quiz</u> on chapter 74	<u>Demonstration and worksheets</u> <ul style="list-style-type: none"> Pre-alignment inspection Wheel dynamic balance Wheel bearing Suspension system inspection Steering system inspection Measuring: camber, caster, toe in (four wheel alignment)

12th week	<u>Chapter 64</u> <u>Transaxle and Front drive axle diagnosis and repair</u> <ul style="list-style-type: none"> ▪ Diagnose common transaxle and drive axle problems ▪ Remove and install 	<u>Textbook</u> <u>Homework</u> Chapter 64 Review ASE questions pages 1234-1235	<u>Workbook</u> Open activity Answer pages 327-330		<u>Demonstration</u> <u>Worksheets</u> <ul style="list-style-type: none"> ▪ Remove drive shaft ▪ Universal Joint service ▪ CV-Joint service

	<p>a transaxle assembly</p> <ul style="list-style-type: none"> ▪ Replace CV-Joints on front drive axles. 				
13th week	<p><u>Chapter 6</u> <u>Automotive measurement and math</u></p> <ul style="list-style-type: none"> ▪ Measuring systems ▪ Measuring tools ▪ Other measurements ▪ Using basic mathematics ▪ Workplace skills 	<p><u>Textbook</u> <u>Homework</u> Chapter 6 Review ASE questions page 84</p>	<p><u>Workbook</u> Open activity answer pages 31-34</p>		<p><u>Demonstrations</u> <u>Worksheets</u></p> <ul style="list-style-type: none"> ▪ Shop measurement † ▪ Using ruler ▪ Using conversion charts ▪ Using a micrometer and caliper ▪ Using a dial indicator ▪ Using a temperature ▪ Using a digital multimeter
14th week	<p><u>Chapter 80</u> <u>Career success</u></p> <ul style="list-style-type: none"> ▪ Traits of desirable employees ▪ Earnings 	<p><u>Textbook</u> <u>Homework</u> Chapter 80 Review ASE questions pages 1562-1563</p>	<p><u>Workbook</u> <u>Chapter 80</u> open activity answer pages 401-402</p>		<p><u>Discussion</u> Types of careers</p>

	<ul style="list-style-type: none"> ▪ Types of shops ▪ Getting a job as an automobile technician 				
15th week	<p><u>Preparation</u> for Automotive Service (ASE) exams</p> <p>Consists of:</p> <p>Multiple choice questions.</p> <ul style="list-style-type: none"> ▪ Most-likely-type questions ▪ Except-type questions ▪ Least-likely-type questions 		<p><u>Activities</u> with ASE</p> <p>booklets:</p> <ul style="list-style-type: none"> ▪ Suspension ▪ Steering ▪ Power Steering 		
16th week	<u>FINAL EXAM</u>				