AUTO 155
Automotive Suspension & Wheel Alignment Syllabus

Instructor: Jose Perez Office: 1102 Office phone: (760) 355-6262

Semester Begins: Jan 21, 2014 Ends: May 16, 2014

Text Book:
Modern Auto Technology (classroom) 7th Edition.
Modern Automotive Technology (workbook) 7th Edition by James E. Duffy ISBN 978-1-59070-957-5

Course Description:
This course covers the principles and construction of passengers 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 is steering wheel suspension. (CSU)

Student Learning Outcomes:
IVC as 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/her Instructor or the disabled Student Programs and Services (DSP&S) office as soon as possible. The DSP&S is located in building 2117, Health Services 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 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 massage at (760) 355-6361 to inform the instructor is he/she is ill and /or bring a doctor's note upon returning to class.

Basic Rulers and Shop Safety:

1. No music allowed in the Auto Shop.
2. No parking in front of the gate.
3. No work should be done without Instructors permission.
4. No parking inside the shop area during lecture time.
5. No long breaks (should be 10 minutes per hour class)
6. Each student should clean the work area.
7. The student cannot leave early without Instructors permission.
8. No cell phones during class session.
9. No helpers or visitors during lab activities.
10. Safety glasses are required.

Spring Semester 2014 important dates:

Jan. 20, Monday MLK Day (Campus Closed).
Jan. 21 Tuesday Spring 2014 Term Begins.
Jan. 25, Saturday Spring 2014 Saturday Classes Begin.
Feb. 14-15 Fri.-Sat. Lincoln's Birthday (Campus Closed).
Feb. 17 Monday Presidents Day (Campus Closed).
April 21-26 Spring Recess (Campus Closed).
May 16 Spring 2014 Term Ends.
May 17 Commencement (Faculty/Mandatory)
May 26 Memorial Day (Campus Closed).

Non-Discrimination/Sexual Harassment:

All forms of harassment are contrary to basic standards of conduct between individuals are prohibited by state and federal law, as well as this policy and will not be tolerated. The District environment that respects the dignity of individuals and groups. The District shall be free of sexual harassment and all forms of sexual intimidation and exploitation. Emergency numbers 911 for first aid ext. 6310/0300.

Objectives:

-Explain the function of the various front and rear suspension components.
-Name the three basic types of front and rear suspension systems.
-tell how a typical "Automatic Level Control System" works.
-Describe the makeup of manual rack-and-pinion and recirculating ball types of steering systems.
-State the operating principles of power rack-and-pinion steering gear assembly and the integral power steering gear assembly.
-Identify some typical suspension and steering system troubles and give possible causes.
-Compare basic tire types and tire sidewall markings.
-Describe excessive and uneven thread wear patterns and possible causes.
-Outline steps for checking wheel and tire radial and lateral run out.
-Demonstrate proper techniques for using a power operator tire changer to demount and mount tires on wheels.
-State several methods for making satisfactory permanent tire repairs.
-Tell why four-wheel alignment is necessary.
-Explain how various elements have an influence on tire-to-road contact.
-List preliminary steps required before wheel alignment angles are set.
-Identify and describe the angles involved in front wheel alignment.
-Define the six front wheel alignment angles and list the order in which they should be checked.
-List preliminary checks that are necessary before making measurements of caster, camber, and toe-in.
-Give Examples of typical front wheel caster and camber adjustment methods on both rear-wheel drive and front-wheel drive cars.
-Describe how various front-wheel-toe-in adjustments are made.
-Explain the importance of rear wheel tracking.
-Give examples of typical rear wheel camber and toe-in checks and adjustments.

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.

Percentages	*Scores*	*Letter grade*
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

Week:	**Automotive Suspension and Wheel alignment:**	**Homework/ Exam:**	**Workbook Activities:**	**Quiz:**	**Lab Activity:**
1st week	▪ Course introduction, orientation, safety - shop-procedures ▪ Tools/Equipment ▪ Videos and shop demonstrations	Need to purchase textbooks		Safety shop exam	

2nd week	Chapter 1 The automobile ▪ Parts, Assemblies, and systems ▪ Hybrid vehicle	Textbook Chapter 1 – Review the main components and systems of the automobile. Pages 1-20	Open activity Use your Workbooks and identify the following parts, assembling and systems Pages 9. 10, 11, 12, 13 14		Instructor Show student a part component assembly, and system (out of a vehicle)
3rd week Part I	Chapter 3 ▪ Basic hand tools ▪ Identify common hand-tools ▪ Safety rules for hand tools ▪ Use hand tools safely	Textbook Homework Chapter 3 Review ASE questions on page 46	Open activity Workbook Basic Tools Chapter 3 Pages 19-22		Demonstration Basic tools
Part II	Chapter 4 ▪ Power tools/equipment ▪ Types of tools/equipment ▪ Safety procedures for tools/equipment	Textbook Homework Chapter 4 Review ASE Questions	Open Activity Workbook Power tools and equipment pages 23-30	Quiz on Basic tools	Demonstration Basic equipment
4th Week Part I	Chapter 65 Tire, wheel, and wheel bearing fundamentals ▪ Identify the parts of a tire	Textbook Chapter 65 Review ASE questions on page 1255	Open Activity Workbook Answer pages 331-336		Demonstration Tires, wheel hubs and wheel bearing assembly

	and wheel ▫ Tire and wheel sizes ▫ Tire Rating Hub and Wheel bearing assemblies				
Part II	Chapter 66 ▫ 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.	Textbook Chapter 66 Review ASE Questions on page 1275	Open activity Workbook Answer pages 337 340		Demonstration Tire/wheel run out Wheel/tire balance Tire machine
5th week	Chapter 67 Suspension system fundamentals ▫ Major parts of a suspension ▫ Function of each part ▫ Operation of the four common	Exam chapters 65-66 Textbook Chapter 67 Homework review questions on page 1300	Open activity Workbook Answer page 341-344		Demonstration Suspension parts

	types of springs ▪ Various types of suspension ▪ Automatic Suspension leveling systems				
6th week	Chapter 68 Suspension system Diagnosis and repair ▪ Diagnosis problems ▪ Replace shock absorbers and ball ▪ The removal and Replacement of springs ▪ Service a strut assembly ▪ Replace control aim bushings	Textbook Chapter 68 Review ASE questions pages 1321, 1322	Open activity Workbook Answer for pages 345-348		Demonstration and worksheets ▪ Diagnosis Dry test ▪ Shock absorbers ▪ Coil Springs ▪ Struts ▪ Control Arm bushings ▪ Wheel bearings
7th week	Chapter 69 Steering System Fundamentals ▪ Major parts of a steering system ▪ Operation principles of steering system. ▪ Difference between linkage	Mid Term Exam Chapters 65, 66, 67, and 68 Textbook Chapter 69 Review ASE questions pages 1345-1346	Workbook Answers for pages 349-352		Demonstration and Worksheets ▪ Steering ▪ Linkages ▪ Rack-and pinion ▪ Power-steering ▪ tools

	steering and a rack-and pinion steering system ▪ Describe the operation of hydraulic and electric assist power steering systems.				
8th week part I 9th week part II	Chapter 70 Steering System Diagnosis and repair ▪ Describe common steering system problems ▪ Inspect and determine the condition of a steering system ▪ Basic steering column repair OPERATIONS ▪ Describe service and repair procedures for a rack-and pinion steering gear ▪ Service power steering belts, hoses and fluid.	Textbook Chapter 70 Review ASE questions pages 1364-1365	Workbook Open activity answers for pages 353-356		Demonstration "Quiz" Worksheets ▪ Inspection Steering ▪ Rack-and pinion ▪ Power steering pump service

10th week part I 11th week part II	Chapter 74 Wheel alignment ▪ 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 an tracking ▪ Describe the use of different types of wheel alignment equipment	Textbook Chapter 74 homework Review ASE Questions pages 1463-1464	Workbook Chapter 74 Open activity provide answers for pages	Quiz on chapter 74	Demonstration and worksheets ▪ Pre-alignment inspection ▪ Wheel dynamic balance ▪ Wheel bearing ▪ Suspension system inspection ▪ Steering system inspection ▪ Measuring: camber, vaster, toe in (four wheel alignment)
12th week	Chapter 64 Transaxle and Front drive axle diagnosis and repair ▪ Diagnose common transaxle and drive axle problems	Textbook Homework Chapter 64 Review ASE questions pages 1234-1235	Workbook Open activity Answer pages 327-330		Demonstration Worksheets ▪ Remove drive shaft ▪ Universal Joint service ▪ CV-Joint

	*computer control system *components of a computer *sensors *electronic control module operation *actuators	Pages 157-158		(homework)
13th week	Computer Control System Troubleshooting *on board diagnostic system *diagnostic trouble codes *activating self-diagnostic system	Study guide Worksheets pages 161-163	Quiz #7	Review questions Page 396 (homework)
14th week	Career Opportunities and Technician Certification *automotive careers *the job descriptions *entrepreneurship	Study guide Worksheets Page 281-287		
15th week	Preparation for Automotive Service Excellence (ASE) Suspension Exams. Consist of: *Multiple choice questions *most-likely-type questions *except-type questions *least-likely-type questions			
16th week	Review and			