AUTO 155

Automotive Suspension & Wheel Alignment

Syllabus

Instructor: Jose Lopez Office: 1102

E-mail: Office phone: (760) 355-6362

Semester Begins: August 20 2012 Ends: December 9, 2012

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 is he/she is ill and/or bring a doctor's note upon returning to class.

Basic Rulers ad 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

FALL SEMESTER 2012 IMPORTANT DATES AND DEADLINES

NOTE: The deadlines below are for full-term classes. Deadlines for short-term classes vary with the length of the class. Most deadlines are mandated in the CA Code of Regulations and are a percentage of the length of the class.

Beginning March 15	New and returning students may file admission application
July 16 – July 30	Priority registration for continuing and re-enrolling students. NEW: **Students may register for a maximum of 16 units during the Priority Registration period.**
July 30	Registration begins for students new to IVC and continues for current and former IVC students.
July 31	Students on Academic and/or Lack-of-progress Probation may enroll in up to 8 units.
August 6	**Unit cap is now increased to 19 units for all students.**
August 2	Registration begins for students concurrently enrolled in grades K-12
August 19	Residency determination date
August 20	**Classes begin.** Beginning on first day each class meets, add authorization code from instructor required to register for that class, filled or open
August 20 – September 1	**Late Registration. Beginning on first day each class meets, add authorization code from instructor required to register for that class, filled or open.**
September 1	**Deadline to register for full-term courses** **Deadline to drop full-term classes without owing fees and/or be eligible for refund.** **Deadline to select P/NP grading option for courses with that option** (see section on *Change Grading Options*). Does not pertain to Non-credit Program courses.
September 3	**Deadline to drop without course appearing on transcript (without receiving W). Note:** fees will be charged and no refunds given for courses dropped on September 2 or 3. See Sept. 1.
September 3	Holiday – Labor Day; no classes
September 4	Census
September 4	Ticketing for parking violations in student spaces on main campus begins. Note: tickets are issued for reserved (faculty/staff), disabled, metered, 15-minute, and no-parking spaces year around.
September 28	**Deadline to make up incomplete grade (I) granted Spring or Summer 2012**
October 24	Financial Aid Return to Title IV drop deadline.
November 1	**Deadline to submit *Petition for Graduation* for degree to be awarded Fall 2012.** Completed petition must be received in Admissions & Records Office by this date. Students must meet with a Counselor and have an evaluation completed and petition signed before this date.
November 12	Holiday – In Honor of Veterans' Day; no classes.
November 10	**Deadline to drop full-term classes**
November 22 – 24	Holiday – Thanksgiving – No Classes Thursday, Friday, and Saturday.
December 3-7	Last week of classes including final examinations.
December 10 – January 11	No Classes (College closed December 17 through January 1).
January 14 – May 10, 2013	Spring Semester 2013.
May 11, 2013	Commencement

Fall 2011 Important Dates:

❖ Late Registration	August 22-Setember 3
❖ Ticketing for parking violation starts	September 6
❖ Deadline to make up incomplete grade	September 30
❖ Financial Aid return to Title IV drop deadline	October 27
❖ Deadline to drop full term classes	September 3
❖ Holidays	Sep. 5/ Nov. 11-12/ Nov. 24-26
❖ Last week of classes including final examinations	December 5-9

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 is committed to provide an academic and work 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 number 911 for first Aid ext. 6310/0300

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

IMPERIAL VALLEY COLLEGE
INDUSTRIAL TECHNOLOGY DEPARTMENT

AUTOMOTIVE TECHNOLOGY PROGRAM

AU T 155: Automotive Suspension and Steering Systems

The following worksheets are required, in order to successfully pass this course. If you have not yet completed or do not have you worksheets please let your instructor know before finals week.

No.	Worksheet	Completed	Incomplete	Instructor Initials	Student Initials	Date
1.	Wheel and Tire Runout					
2.	Types of Tires					
3.	Tire Rotation					
4.	Tire Changing					
5.	Off the Vehicle Wheel Dynamic Balance					
6.	Wheel Bearings					
7.	Front Wheel Bearing Replacement					
8.	V-Joint Inspection/Replacement					
9.	U-Joint Angle Measurement					
10.	Drive Axle shaft R & R					
11.	CV Joint Boot Replacement					
12.	Dry park test (steering)					
13.	Steering Component ID					
14.	Pre-Alignment Inspection					
15.	Rack and Pinion R & R					
16.	Tie-Rod end replacement					
17.	Idle Arm Replacement					
.8.	Accessory Drive Belt Inspection					
19.	Power Steering System Test					

20.	Flushing/ Power Steering					
21.	Bleeding/Power Steering					
22.	Power Steering Pump R & R					
23.	Suspension Identification					
24.	Front Shock Absorber Replacement					
25.	Rear Shock Absorber Replacement					
26.	Strut Service					
27.	Ball-Joint Testing					
28.	Ball-Joint Replacement					
29.	Alignment Specification					
30.	Measuring Toe					
31.	Alignment Setup					
32.	Thrust Angle Alignment					
33.	Four Wheel Alignment					

Audio Source Videos

1. ☐ Introduction Suspension Components
2. ☐ Wheel and Tires
3. ☐ Wheel and Tire Balance
4. ☐ Control and Springs
5. ☐ Wheel Bearing Service
6. ☐ Types of Suspension
7. ☐ Shock Absorbers/Springs

Student Name _____ Instructor _____

Semester _____ Date _____