Lesson Plan

Name of Faculty : Ashok Kumar Garg, Assistant Professor in Mechanical Engineering Department
Subject & Semester : Automobile Engineering Lab (ME-407E) and 7th Semester Mechanical Engineering
Lesson Plan Duration : 15 weeks (from August, 2018 to Dec, 2018)
Work Load (Practical) per week (in hours): **(02+02) hours**

week	Aim	week	Actual Covered
1st	To study and prepare report on the constructional details, working principles and operation of the following Automotive Engine Systems & Sub Systems. (a) Multi-cylinder: Diesel and Petrol Engines. (b) Engine cooling & lubricating Systems. (c) Engine starting Systems. (d) Contact Point & Electronic Ignition Systems.	1st	
2nd	To study and prepare report on the constructional details, working principles and operation of the following Fuels supply systems: (a) Carburetors (b) Diesel Fuel Injection Systems (c) Gasoline Fuel Injection Systems.	2nd	
3rd	To study and prepare report on the constructional details, working principles and operation of the following Automotive Clutches. (a) Coil-Spring Clutch (b) Diaphragm – Spring Clutch. (c) Double Disk Clutch.	3rd	
4th	To study and prepare report on the constructional details, working principles and operation of the following Automotive Transmission systems. (a) Synchromesh – Four speed Range. (b) Transaxle with Dual Speed Range. (c) Four Wheel Drive and Transfer Case. (d) Steering Column and Floor – Shift levers.	4th	
5th	To study and prepare report on the constructional details, working principles and operation of the following Automotive Drive Lines & Differentials. (a) Rear Wheel Drive Line. (b) Front Wheel Drive Line. (c) Differentials, Drive Axles and Four Wheel Drive Line	5th	
6th	To study and prepare report on the constructional details, working principles and operation of the following Automotive Suspension Systems. (a) Front Suspension System. (b) Rear Suspension System.	6th	
7th	To study and prepare report on the constructional details, working principles and Operation of the following Automotive Steering Systems. (a) Manual Steering Systems, e.g. Pitman –arm steering, Rack & Pinion steering. (b) Power steering Systems, e.g. Rack and Pinion Power Steering System. (c) Steering Wheels and Columns e.g. Tilt & Telescopic steering Wheels, Collapsible Steering Columns.	7th	
8th	To study and prepare report on the constructional details, working principles and operation of the following Automotive Tyres & wheels. (a) Various Types of Bias & Radial Tyres. (b) Various Types of wheels.	8th	
9th	To study and prepare report on the constructional details, working principles and operation of the Automotive Brake systems. (a) Hydraulic & Pneumatic Brake systems. (b) Drum Brake System. (c) Disk Brake System. (d) Antilock Brake System. (e) System Packing & Other Brakes.	9th	
10th (EXTRA)	To study various Bio-fuels used by Automobiles. Also discuss the future trends in Automobile Engineering.	10th (EXTRA)	
11th	1st VIVA VOCCE	--------	----------
12th	To study and prepare report on the constructional details, working principles and operation of Automotive Emission / Pollution control systems.	12th	
13th	Discussion on MCQ on Automobile Engineering Questions and their answers.	13th	
14th EXTRA	To study and prepare the report on Construction & operation of Lead Acid Battery. Make report on the maintenance of Batteries.	14th EXTRA	
15th	2nd VIVA VOCCE	---------	----------

Ashok Kumar Garg
Assistant Professor in Mechanical Engineering Department

Lesson Plan

Name of Faculty : Ashok Kumar Garg, Assistant Professor in Mechanical Engineering Department
Subject & Semester : Automobile Engineering Theory (ME-401E) and 7th Semester Mechanical Engineering
Lesson Plan Duration : 15 weeks (from August, 2018 to Dec, 2018)
Work Load (Lecture) per week (in hours): **Lectures 04 hours**

week	Theory			Actual Lesson Plan Covered
	Day	Topic (Including Assignment/Test)	week	Topic
		Unit-I ,II, III and IV		
1st	1	**Introduction to Automobiles:** Classification, Components, Requirements of Automobiles Body; Vehicle frame, Separate Body & Frame, Car Body Styles, Unitised Body, Bus Body.	1st	
	2	Commercial Vehicle Body types. Front Engine Rear Drive & Front Engine Front Drive Vehicles.		
	3	Four Wheel Drive Vehicles. Safety considerations; safety features of latest Vehicles.		
	4	Future trends in automobiles. **(END OF UNIT I)**		
2nd	5	----------Revision & Doubts session----------	2nd	
	6	**Clutches**: Introduction & function of clutch, Requirements of good clutching system. Principle of operation of Clutch.		
	7	Wet type & Dry type Clutches. Construction and operation of these clutches.		
	8	Cone Clutch & Single plate clutch. Construction and operation of these clutches.		
3rd	9	Diaphragm spring clutch, Multi plate clutch. Construction and Operation of these clutches.	3rd	
	10	Centrifugal & Electromagnetic Clutches. Construction and Operation of these clutches. Over running clutch, Clutch linkages. **(END OF UNIT II)**		
	11	----------Revision & Doubts session----------		
	12	----------Problems and solutions, Assignment 1----------		
4th	13	**Power Transmission:** Requirements of transmission system. General arrangement of Power Transmission system, Object of the Gear Box, Synchro- mesh Gear Boxes.	4th	
	14	Different types of Gear Boxes; Sliding Mesh, Constant Mesh.		\
	15	Epi-cyclic Gear Box and Freewheel Unit. Overdrive unit-Principle of Overdrive.		
	16	Advantage of Overdrive, Transaxle, Transfer cases. **(END OF UNIT III)**		
5th	17	----------Revision & Doubts session----------	5th	
	18	**Drive Lines**: Universal Joint, Differential and Drive Axles: Effect of driving thrust and torque reactions; Hotchkiss Drive.		
	19	Torque, Tube Drive and radius Rods; Propeller Shaft, Universal Joints, Slip Joint; Constant Velocity Universal Joints.		
	20	Various Drives, Front Wheel Drive; Principle, Function, Construction & Operation of Differential.		
6th	21	Types of Axles, Rear Axles, Types of load coming on Rear Axles.	6th	
	22	Full Floating, Three quarter Floating and Semi Floating Rear Axles. **(END OF UNIT IV)**		
	23	----------Revision & Doubts session----------		
	24	----------Problems and solutions, Assignment 2 ----------		
7th		**1st Minor Test**		
		Unit-V,VI, VII and VIII		
8th	25	**Suspension Systems**: Need of Suspension System, Importance of Suspension system.	8th	
	26	Types of Suspension; factors influencing ride comfort.		
	27	Suspension Spring; Constructional details and Characteristics of leaf springs. **(END OF UNIT V)**		
	28	----------Revision & Doubts session----------		
9th	29	**Steering System**: Introduction & importance of a good steering system, Front Wheel geometry.	9th	
	30	Wheel alignment viz. Caster, Camber, King pin Inclination, Toe-in/Toe-out.		
	31	Conditions for true rolling motions of Wheels during steering.		
	32	Different types of Steering Gear Boxes; Steering linkages and layout.		
10th	33	Power steering – Rack & Pinion Power Steering Gear, Electronics Steering.**(END OF UNIT VI)**	10th	
	34	----------Revision & Doubts session----------		
	35	----------Problems and solutions, Assignment 3 ----------		
	36	**Brakes:** Automotive Brakes, Tyres & Wheels: Classification of Brakes.		
11th	37	Principle and constructional details of Drum Brakes, Disc Brakes; Brake actuating systems.	11th	
	38	Mechanical, Hydraulic, Pneumatic Brakes; Factors affecting Brake performance. Power & Power Assisted Brakes.		
	39	Tyres of Wheels; Types of Tyre & their constructional details, Wheel Balancing, Tyre Rotation; Types of Tyre wear & their causes. .**(END OF UNIT VII)**		
	40	----------Revision & Doubts session----------		
12th	41	**Pollution and its Control**: Emission Control System & Automotive Electrical.	12th	
	42	Sources of Atmospheric, Pollution from the automobile.		
	43	Emission Control Systems – Construction and Operation of Positive Crank Case Ventilation (PVC).		
	44	Systems, evaporative emission Control.		
13th	45	Heated Air Intake System, Exhaust Gas Recirculation (ECR) Systems.	13th	
	46	Air Injection System and Catalytic Converters; Purpose construction & operation of lead acid Battery Capacity.		
	47	Rating & Maintenance of Batteries; Purpose and Operation of Charging Systems.		
	48	Purpose and Operations of the Starting System; Vehicle Lighting System		
14th		**2ndMinor Test**		
15th	49	----------Revision & Doubts session----------	15th	
	50	----------Problems and solutions, Assignment 4 ----------		
	51	---------- Mercy Test ----------		
	52	---------- Consolidation of Whole Sessions----------		

Ashok Kumar Garg
Assistant Professor in Mechanical Engineering Department

Lesson Plan

Name of Faculty : Ashok Kumar Garg, Assistant Professor in Mechanical Engineering Department
Subject & Semester : Practical Training II (ME-413E) and 7th Semester Mechanical Engineering
Lesson Plan Duration : 15 weeks (from August, 2018 to Dec, 2018)
Work Load (Practical) per week (in hours): **(03+03) hours**

week	Aim	week	Actual Covered
1st	Introduction to Subject - Seminar: Importance/Requirement/Usefulness.	1st	
2nd	Requirement of Practical Training in Industry and need of this training in Profession for engineering students.	2nd	
3rd	Report preparation and presentation including the attested copy of certificate from the industry.	3rd	
4th	Presentation of First Four Students: Seminar Delivery, Question Answer Session, Knowledge Sharing, Consolidation, Report Submission.	4th	
5th	Presentation of Next Four Students: Seminar Delivery, Question Answer Session, Knowledge Sharing, Consolidation, Report Submission.	5th	
6th	Presentation of Next Four Students: Seminar Delivery, Question Answer Session, Knowledge Sharing, Consolidation, Report Submission.	6th	
7th	Presentation of Next Four Students: Seminar Delivery, Question Answer Session, Knowledge Sharing, Consolidation, Report Submission.	7th	
8th	Presentation of Next Four Students: Seminar Delivery, Question Answer Session, Knowledge Sharing, Consolidation, Report Submission.	8th	
9th	Presentation of Next Four Students: Seminar Delivery, Question Answer Session, Knowledge Sharing, Consolidation, Report Submission.	9th	
10th	Presentation of Next Four Students: Seminar Delivery, Question Answer Session, Knowledge Sharing, Consolidation, Report Submission.	10th	
11th	Presentation of Next Four Students: Seminar Delivery, Question Answer Session, Knowledge Sharing, Consolidation, Report Submission.	11th	
12th	Presentation of Next Four Students: Seminar Delivery, Question Answer Session, Knowledge Sharing, Consolidation, Report Submission.	12th	
13th	Presentation of any Student who left earlier: Seminar Delivery, Question Answer Session, Knowledge Sharing, Consolidation, Report Submission	13th	
14th	Viva voce and Report Submission of any student who left earlier.	14th	
15th	Consolidation	15th	

Ashok Kumar Garg
Assistant Professor in Mechanical Engineering Department
CDLSIET, PANIWALA MOTA (SIRSA)

Lesson Plan

Name of Faculty : Ashok Kumar Garg, Assistant Professor in Mechanical Engineering Department
Subject & Semester : Refrigeration and Air Conditioning Lab (ME-409E) and 7th Semester ME
Lesson Plan Duration : 15 weeks (from August, 2018 to Dec, 2018)
Work Load (Practical) per week (in hours): **02 hours**

week	Aim	week	Actual Covered
1st	Introduction to Refrigeration and Air Conditioning Lab.	1st	
2nd	To study the vapour compression Refrigeration System and determine its C.O.P. and draw P-H and T-S diagrams.	2nd	
3rd	To Study the Mechanical heat pump and find its C.O.P.	3rd	
4th	To study the Air and Water heat pump and find its C.O.P.	4th	
5th	To study the cut- sectional models of Reciprocating and Rotary Refrigerant compressor.	5th	
6th	To study the various controls used in Refrigerating & Air Conditioning systems.	6th	
7th	To study the Ice- plant, its working cycle and determine its C.O.P and capacity.	7th	
8th	To study the humidification, heating, cooling and dehumidification processes and plot them on Psychrometric charts.	8th	
9th	To determine the By-pass factor of Heating & Cooling coils and plot them on Psychrometric charts on different inlet conditions.	9th	
10th (EXTRA)	To study the Air Craft Refrigeration Systems. Discuss the recent developments in the Air Craft Refrigeration.	10th (EXTRA)	
11th	1st VIVA VOCCE	-------	----------
12th	To study the chilling plant and its working cycle.	12th	
13th	To determine sensible heat factor of Air on re-circulated air-conditioning set up.	13th	
14th EXTRA	Make report on the various Layouts of Air Conditioning Systems. Study the list of classification of these systems.	14th EXTRA	
15th	2nd VIVA VOCCE	-------	----------

Ashok Kumar Garg
Assistant Professor in Mechanical Engineering Department

Lesson Plan

Name of Faculty : Jagjeet Singh, Assistant Professor
Discipline : Mechanical Engg.
Semester : 7th
Subject : Refrigeration and Air Conditioning , RAC lab
Lesson Plan Duration: 15 weeks (from August, 2018 to April, 2018)
Work Load (Lectutre/Practical) per week (in hours): **Lectures 04 hours**, **Practical -04 hours**

Week	Theory		Practical	
	Lecture Day	Topic (Including Assignment/Test)	Practical Day	Topic
1st	1	Definition of refrigeration & air conditioning	1	To study the vapour compression Refrigeration System and determine its C.O.P. and draw P-H and T-S diagrams
	2	Necessity; Methods of refrigeration		
	3	Unit of refrigeration;Coefficientof performance (COP), Fundamentals of air-conditioning system		
	4	Refrigerants- Definition, Classification,Nomenclature, Desirable properties		
2nd	5	Comparative study, secondary refrigerants, Introduction to eco-friendly Refrigerants; Introduction to Cryogenics.	2	To study the Air and Water heat pump and find its C.O.P.
	6	Carnot refrigeration cycle. Temperature. Limitations		
	7	Brayton refrigeration or the Bell Coleman air refrigeration cycle		
	8	Necessity of cooling the aero plane; Air craft refrigeration systems		
3rd	9	Simple cooling and Simple evaporative types, Boot strap and Boot strap evaporative types	3	To Study the Mechanical heat pump and find its C.O.P.
	10	Regenerative type and Reduced Ambient type system		
	11	Comparison of different systems, problems		
	12	Problems and Solutions		
5th	13	Simple Vapour Compression (VC) Refrigeration Systems-Limitations of Reversed Carnot cycle with vapour as the refrigerant	4	To study the cut- sectional models of Reciprocating and Rotary Refrigerant compressor
	14	Analysis of VC cycle considering degrees of sub cooling and superheating		
	15	VC cycle on p-v, t-s and p-h diagrams; Effects of operating conditions on COP; Comparison of VC cycle with Air Refrigeration cycle.		
	16	Multistage Ref. Systems- Necessity of compound compression, Compound VC cycle , Inter-cooling with liquid sub –cooling and / or water inter cooler		
6th	17	Multistage compression with flash inter-cooling and / or water inter-cooling; systems with individual or multiple expansion valves	5	To study the various controls used in Refrigerating & Air Conditioning systems.
	18	Individual compression system with individual or multiple expansion valves		
	19	Individual compression systems with individual or multiple expansion valves but with and without intercoolers		
	20	Problems and Solutions		
7th		**----------Ist Minor test ----------**		
8th	21	Vapour Absorption Refrigeration Systems – Basic Systems, Actual COP of the System, Performance,	6	**Viva- Voice—1**
	22	Relative merits and demerits; Properties of aqua		

		ammonia; Electrolux Refrigeration		
	23	Steam Jet Refrigerating System- Introduction, Analysis, Relative merits and demerits, Performance Applications		
	24	Problems and Solutions		
9th	25	Cascade Refrigerating Systems-Necessity Selection of Pairs of refrigerants for the system,	7	To study the Ice- plant, its working cycle and determine its C.O.P and capacity.
	26	Concept of cascade temperature, Analysis, Multistaging,		
	27	Comparison with V.C. systems, Applications,		
	28	Problems and Solutions		
10th	29	Properties of moist Air-Gibbs Dalton law, Specific humidity, Dew point temperature, Degree of saturation, Relative humidity, 127 Enthalpy, Humid specific heat, Wet bulb temp.	8	To study the humidification, heating, cooling and dehumidification processes and plot them on Psychrometric charts
	30	Thermodynamics wet bulb temp., Psychrometric chart; Psychrometry of air-conditioning processes		
	31	Mixing Process, Basic processes in conditioning of air		
	32	Psychrometric processes in air washer		
11th	33	Outside and inside design conditions; Sources of heating load; Sources of cooling load	9	To determine the By-pass factor of Heating & Cooling coils and plot them on Psychrometric charts on different inlet conditions.
	34	Heat transfer through structure, Solar radiation, Electrical applications		
	35	Infiltration and ventilation, Heat generation inside conditioned space;		
	36	Apparatus selection; Comfort chart		
12th	37	Classifications, Layout of plants; Equipment selection; Air distribution system	10	To determine sensible heat factor of Air on re-circulated air-conditioning set up.
	38	Duct systems Design; Filters; Refrigerant piping		
	39	Design of summer air-conditioning and Winter air conditioning systems;		
	40	Temperature sensors, Pressure sensors, Humidity sensors		
13th	41	Actuators, Safety controls; Accessories	11	To study the chilling plant and its working cycle
	42	Type of compressors and their performance curves		
	43	Types of Condensers, Heat transfer in condensers;		
	44	Types of expansion devices; types of evaporators		
14th		**----------2nd Minor test----------**		
15th	45	Cooling and Dehumidifying coils		**Viva- Voice -2**
	46	Problems and Solutions		
	47	Problems and Solutions		

Jagjeet Singh
Assistant Prof.
Mech. Engg. Department