

LESSON PLAN

Name of Faculty: GUEST FACULTY

Discipline:AUTOMOBILE ENGG

Semester: 3rd

Subject:AED

Lesson plan Duration: 15 WEEKS

Work Load (Lecture/Practical) per week:(3+3) PERIODS

Drawing Lab Practical

WEEK	LECTURE	TOPIC
1	1 Chapter 1	Limit, tolerance, Geometrical Tolerance, deviation, allowance, fits:
	2	clearance, interference, transition fit, Hole and shaft basis system.
2	3 Chapter 2	Assembly Drawings of the following automotive components: Joints and Bearings, Universal joint,
	4	Slip joint , Bush bearing
3	5	Plummer block or pedestal bearing
	6	Ball bearing
4	7	Roller bearing
	8	Drawings of the following automotive components:

5	9	Four Stroke Petrol Engine Piston
	10	Diesel Engine Piston
6	11	Connecting rod
	12	Fuel injector
7	13	Crank shaft – 4 cylinder Engine
	14	Cam shaft
8	15	Spark Plug
	16	Drawing of the following components: Chassis components Shock absorber
9	17	Wheel cylinder
		Master Cylinder
9	18	Brake drum (assembly) Single plate clutch

10	19	Gears Nomenclature of gears Profile of spur gear by 'Approximate method'
	20	Profile of spur gear by "Unwin's Method"
11	21	Class test
	22	Cam Profile Different types of cams and followers Drawing of cam profile for following motion of follower Uniform velocity motion
12	23	Simple harmonic motion (SHM)
	24	Uniformly accelerated and retarded motion.
13	25	Free hand sketching Battery ignition system
	26	Magneto ignition system
14	27	Lighting system Leaf spring suspension

	28	Overhead and side valve mechanism
15	29	Evaluation and revision
	30	Class test

Lesson Plan

Name of the Faculty : Guest Faculty
 Discipline : Automobile Engg.
 Semester : 3rd
 Subject : Applied Mechanics
 Lesson plan duration : 15 Weeks(July 2018 to Nov 2018)

Week	Theory		Practical	
	Lecture Day	Topic (including assignments /tests)	Practical Day	Topic
Week-1	1 st	Concept of engineering mechanics definition of mechanics, statics, dynamics	1 st	Overview of the subject, Importance in industry & Applications of the subject.
	2 nd	Application of engineering mechanics in practical fields		
	3 rd	Different systems of units (FPS, CGS, MKS and SI)	2 nd	Overview of the subject, Importance in industry & Applications of the subject
	4 th	Their conversion from one to another e.g. density, force, pressure, work, power, velocity, acceleration		
Week 2	1 st	Simple Numerical Problems	1 st	Verification of the polygon law of forces using Gravesand's apparatus.
	2 nd	Fundamental Units and Derived Units.		
	3 rd	Concept of rigid body, scalar and vector quantities	2 nd	Verification of the polygon law of forces using Gravesand's apparatus.
	4 th	Revision		
Week 3	1 st	Mock Test	1 st	To verify the forces in different members of jib crane.
	2 nd	Laws of forces Definition of force, Bow's Notations, types of force		
	3 rd	Point force/concentrated force & Uniformly distributed force, effects of force, characteristics of a force.	2 nd	To verify the forces in different members of jib crane.
	4 th	Different force systems, principle of transmissibility of forces, law of superposition		
	1 st	Composition and resolution of coplanar concurrent forces, resultant force, method of composition of forces	1 st	To verify the reaction at the supports of a simply supported beam.
	2 nd	laws of forces, triangle law of forces		

Week4	3 rd	polygon law of forces - graphically, analytically, resolution of forces	2 nd	To verify the reaction at the supports of a simply supported beam.
	4 th	Free body diagram Equilibrant force and its determination		
Week 5	1 st	Lami's theorem [Simple problems on above topics]	1 st	To find the mechanical advantage, velocity ratio and efficiency in case of an inclined plane.
	2 nd	Moment - Concept of moment Moment of a force and units of moment		
	3 rd	Varignon's theorem (definition only) Principle of moment and its applications	2 nd	To find the mechanical advantage, velocity ratio and efficiency in case of an inclined plane.
	4 th	(Levers – simple and compound, steel yard, safety valve, reaction at support)		
Week 6	1 st	Parallel forces (like and unlike parallel force), calculating their resultant	1 st	To find the mechanical advantage, velocity ratio and efficiency of a screw jack.
	2 nd	Concept of couple, its properties and effects General conditions of equilibrium of bodies under coplanar forces		
	3 rd	Position of resultant force by moment [Simple problems on the above topics]	2 nd	To find the mechanical advantage, velocity ratio and efficiency of a screw jack.
	4 th	Revision of Chapter		
Week 7	1 st	Mock Test	1 st	Practice
	2 nd	Friction - Definition and concept of friction, types of friction, force of friction, Limiting Friction		
	3 rd	Laws of static friction, coefficient of friction, angle of friction, angle of repose.	2 nd	Practice
	4 th	Equilibrium of a body lying on a horizontal plane, equilibrium of a body lying on a rough inclined plane.		

	1 st	Calculation of least force required to maintain equilibrium of a body on a rough inclined plane subjected to a force: a) Acting along the inclined plane	1 st	To find the mechanical advantage, velocity ratio and efficiency of worm and worm wheel.
	2 nd	b) At some angle with the inclined plane		
Week 08	3 rd	Ladder friction Advantages and Disadvantages of friction	2 nd	To find the mechanical advantage, velocity ratio and efficiency of worm and worm wheel.
	4 th	Methods of increasing/decreasing the force of friction.(Simple problems)		
Week 09	1 st	Assignment	1 st	To find mechanical advantage, velocity ratio and efficiency of single purchase crab.
	2 nd	Test		
	3 rd	Centre of Gravity - Concept, definition of centroid of plain figures	2 nd	To find mechanical advantage, velocity ratio and efficiency of single purchase crab.
	4 th	centre of gravity of symmetrical solid bodies, difference between centroid and C.G		
Week 10	1 st	Determination of centroid of plain and composite lamina using moment method only	1 st	Practice
	2 nd	centroid of bodies with removed portion		
	3 rd	Determination of center of gravity of solid bodies - cylinder	2 nd	Practice
	4 th	Determination of center of gravity of solid bodies - cube, cuboid		
Week 11	1 st	Determination of center of gravity of solid bodies- sphere	1 st	To find out center of gravity of regular lamina.
	2 nd	Determination of center of gravity of solid bodies- composite bodies and bodies with portion removed		
	3 rd	Simple problems on the above topics	2 nd	To find out center of gravity of regular lamina.
	4 th	Simple problems on the above topics		

Week12	1 st	Assignment on Chapter Centre of Gravity	1 st	To find out center of gravity of irregular lamina.
	2 nd	Mock Test		
	3 rd	Simple Machines- Definition of Simple and compound machine (Examples)	2 nd	To find out center of gravity of irregular lamina.
	4 th	Definition of load, effort, velocity ratio, mechanical advantage and efficiency of a machine		
Week 13	1 st	load, effort, velocity ratio, mechanical advantage their relationship, law of machines and efficiency of a machine	1 st	Practice
	2 nd	Definition of ideal machine, reversible and self locking machine		
	3 rd	Effort lost in friction, Load lost in friction	2 nd	Practice
	4 th	Determination of maximum mechanical advantage and maximum efficiency		
Week 14	1 st	System of pulleys (first, second)	1 st	To determine coefficient of friction between three pairs of given surface.
	2 nd	Third system of pulleys		
	3 rd	Determination of velocity ratio, mechanical advantage and efficiency	2 nd	To determine coefficient of friction between three pairs of given surface.
	4 th	Working principle and application of wheel and axle, Weston's Differential Pulley Block		
Week 15	1 st	simple screw jack, worm and worm wheel	1 st	Practice
	2 nd	single and double winch crab.		
	3 rd	Expression for their velocity ratio and field of their application [Simple problems on the above topics]	2 nd	Practice
	4 th	Mock Test		

LESSON PLAN

Name of Faculty: Sh. Satyawan

Discipline: Automobile engineering

Semester: 3th

Subject: AUTOMOBILE WORKSHOP

Lesson plan Duration: 15 WEEKS

Work Load (Lecture/Practical) per week: 4 PERIODS

WEEK	PRACTICAL	
	PRACTICAL DAY	TOPIC
1 ST	1	1. General safety procedures to be followed in automobile workshop; and familiarization to safety equipment and their uses.
2 ND	2	2. Identification and sketching of general tools of automobile workshop and practice to use them
3 RD	3	3. Identification and sketching of special purpose tools and gauges of automobile workshop.
4 TH	4	4. Removal and fitting of wheels and tyres of a two wheeler and repairing of punctures of tube.
5 TH	5	REVISION
6 TH	6	5. Removal and fitting of wheels and tyres of car/jeep, tyre pressure measurement, repair of punctures of tubeless tyres.
7 TH	7	6. Washing, greasing, wiping and polishing of a vehicle.
8 TH	8	7. Removal, greasing and refitting of wheel bearing.
9 TH	9	8. Replacement of clutch and brake wires of a two wheeler.
10 TH	10	REVISION
11 TH	11	9. Removal and refitting of radiator and water hoses.

12TH	12	10. Removal and refitting of front and rear bumpers of a car/jeep.
13TH	13	11. Removal and refitting of battery.
14TH	14	REVISION
15TH	15	FINAL VIVA & EVALUATION

LESSON PLAN

Name of faculty

Discipline: Automobile Engineering

Semester: 3rd

Subject: **BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING**

Lesson plan duration: 15 weeks

Work load (lecture/practical)per week: 3/2 Periods

Week	THEORY		PRACTICAL	
	Lecture day	TOPIC	PRACTICAL DAY	TOPIC
1 st	1	Unit 1: introduction Application and Advantage of Electricity	1	Connection of a three-phase motor and starter with fuses and reversing of direction of rotation
	2	Difference between ac and dc,		
	3	various applications of electricity		
2 nd	4	advantages of electrical energy over other types of energy	2	Connection of a single-phase induction motor with supply and reversing of its direction of rotation
	5	Unit 2 Basic Electrical Quantities Definition		
	6	Definition of voltage, current, power and energy with their units		
3 rd	7	name of instruments used for measuring above quantities	3	Troubleshooting in domestic wiring system, including distribution board
	8	connection of these instruments in an electric circuit		
	9	Unit 3 AC Fundamentals Electromagnetic induction-		

		Faraday's Laws, Lenz's Law; Fleming's rules		
4th	10	Principles of a.c. Circuits; Alternating emf, Definition of cycle, frequency, amplitude and time period	4	Connection and reading of an electric energy meter
	11	Instantaneous, average, r.m.s and maximum value of sinusoidal wave; form factor and Peak Factor		
	12	Concept of phase and phase difference		
5th	13	Concept of resistance, inductance and capacitance in simple a.c. circuit	5	REVISION
	14	Power factor and improvement of power factor by use of capacitors		
	15	Concept of three phase system; star and delta connections; voltage and current relationship (no derivation)		
6th	16	SESSIONAL TEST 1	6	Use of ammeter, voltmeter, wattmeter, and multi-meter
	17	Unit 4 Transformers Working principle and construction of single phase transformer		
	18	transformer ratio, emf equation, losses and efficiency		
7 th	19	cooling of transformers, isolation transformer	7	Measurement of power and power factor in a given single phase ac circuit
	20	CVT, auto transformer (brief idea), applications		
	21	Unit 5 Distribution System Difference between high and low voltage distribution system		
8 th	22	identification of three-phase wires, neutral wire and earth wire in a low voltage distribution system	8	Study of different types of fuses, MCBs and ELCBs
	23	Identification of voltages between phases and between one phase and neutral		
	24	Difference between three-phase		

		and single-phase supply		
9 th	25	Unit 6 Electric Motor Description and applications of single-phase and three-phase motors	9	REVISION
	26	Connection and starting of three-phase induction motors by star-delta starter		
	27	Changing direction of rotation of a given 3 phase induction motor		
10 th	28	Motors used for driving pumps, compressors, centrifuge, dyers	10	Study of Zener diode as a constant voltage source and to draw its V-I characteristics
	29	Totally enclosed submersible and flame proof motors		
	30	Unit 7 Domestic Installation Distinction between light-fan circuit and single phase power circuit		
11 th	31	SESSIONAL TEST 2	11	Study of earthing practices
	32	sub-circuits, various accessories and parts of domestic electrical installation		
	33	Identification of wiring systems		
12 th	34	Common safety measures and earthing	12	To draw V-I characteristics of a (i) NPN transistor (ii) thyristor (SCR)
	35	Unit 8 Electrical Safety Electrical shock and precautions against shock		
	36	treatment of electric shock, concept of fuses and their classification, selection and application		
13 th	37	concept of earthing and various types of earthing	13	Study of construction and working of a (i) stepper motor and (ii) servo motor

	38	applications of MCBs and ELCBs		
	39	Unit 9 Basic Electronics Basic idea of semiconductors – P and N type		
14 th	40	diodes, zener diodes and their applications	14	REVISION
	41	transistor – PNP and NPN, their characteristics and uses		
	42	Characteristics and applications of a thyristor		
15	43	characteristics and applications of stepper motors	15	VIVA AND FINAL EVALUATION
	44	characteristics and applications of servo motors in process control		
	45	SESSIONAL TEST 3		

LESSON PLAN

Name of faculty: GUEST FACULTY

Discipline: Automobile Engineering

Semester: 3rd

Subject: Materials and metallurgy

Lesson plan duration: 15 weeks

Work load (lecture/practical) per week: 4/2 Periods

Week	THEORY		PRACTICAL	
	Lecture day	TOPIC	PRACTICAL DAY	TOPIC
1 st	1	Unit 1: introduction Introduction of material, engineering materials.	1	Classification of about 25 specimens of materials machine parts into (1) Metals and non metals (2) Metals and alloys
	2	History of material origin		
	3	Scope of material science		
	4	Overview of different engineering, materials and applications ,importance		
	5	Classification of materials,difference between metals and non matels		
2 nd	6	Physical and mechanical properties of various materials , present and future need of materials	2	Classification of about 25 speacimens of materials/machine parts into (1) Ferrous and non ferrous metals Ferrous and non ferrous alloys
	7	Various issues of materials, usage economical		
	8	Environment and social, over view of biomaterials and semi conducting materials		
3 rd	9	Unit 2 nd : crystallongraphy Fundamentals crystalline solid and amorphous solid	3	Given a set of specimen of metals and alloys (copper, brass, aluminum, cast iron, HSS, Gunmetal); identify and indicate the various properties possessed by them
	10	Unit cell space lattice arrangement of atoms in simple cubic crystals bcc, fcc and hcp crystals		

	11	Number of atoms per unit cell, atomic packing factor, coordination number		
	12	Defects /imperfections, types and effects in solid materials		
4 th	13	Deformation overview of deformation behavior and its mechanisms	4	Continued given a set of specimen of metals and alloys (copper, brass, aluminium, cast iron, HSS, Gun metal); identify and indicate the various properties possessed by them
	14	Elastic and plastic deformation,		
	15	Behavior of material under load and stress strain curve		
	16	Failure mechanisms overview of failure modes, fracture, fatigue and creep.		
5 th	17	Unit 3 rd : metallurgy Introduction of metallurgy	5	Study of heat treatment furnace
	18	Cooling curves of pure metals, dendritic solid fication of metals effect of grain size on mechanical properties, binary alloys		
	19	Thermal equilibrium diagrams, lever rule, solid solution alloys		
	20	Unit 4 th : metals and alloys periods Introduction of ferrous metals		
6 th	21	Different iron ores of ferrous metals	6	Study of a metallurgical microscope and specimen polishing machine
	22	Flow diagram for production of iron and steels		
	23	Allotropic forms of iron alpha ,delta, gamma		
	24	Basic process of manufacturing		
7 th	25	Pig iron and steel making	7	To prepare specimens of following materials for microscopic examination and to Examine the microsturcture of the specimens of (1)Brass (2) copper
	26	Properties of cast iron		
	27	Types of cast iron , Manufacturer of cast iron		
	28	Introduction of steel , Plain carbon steels and alloy steel		
8 th	29	Classification of plain carbon steels	8	To prepare specimens of following materials for microscopic examination and to Examine their microstructure
	30	Effect of various alloying elements		
	31	Properties of steel		

	32	Uses of alloy steels		(3) Grey (4) Malleable (5) Low carbon steel (6) High carbon steel (7) HSS
9 th	33	High speed stainless steel silicon steel spring steel	9	To measure hardness of a given specimen and anneal it.
	34	Non ferrous material		
	35	Properties and uses of copper, aluminium and their alloys		
	36	Unit 5 th : heat treatment Definition and objective of heat treatment,		
10 th	37	Iron carbon equilibrium diagram	10	To find out the difference in hardness as a result of annealing
	38	Different microstructures of iron and steel		
	39	Formation and decomposition of austenite, martensitic transformation		
	40	Various heat treatment processes		
11 th	41	Hardening tempering annealing	11	To measure hardness of a given specimen and normalize it.
	42	Normalizing, surface hardening carburizing nitriding, cyaniding.		
	43	Hardenability of steels types of heat treatment furnaces		
	44	Measurement of temperature of furnaces		
12 th	45	Unit 6 th : plastics Importance of plastics	12	To find out the difference in hardness as a result of normalizing
	46	Classification of thermoplastics		
	47	Thermoset plastics and their uses		
	48	Various trade name of plastics, plastics coatings, food grade plastic		
13 th	49	Application of plastic in automobile and domestic use	13	To measure hardness of a given specimen and harden & temper it.
	50	Rubber classification natural and synthetic selection of rubber		
	51	Unit 7 th : advanced materials Heat insulating materials asbestos glasswool, thermocole.		
	52	Ceramics classification, properties, applications		
14 th	53	Refractory materials dolomite, porcelain	14	To find out the difference in hardness as a result of hardening and tempering
	54	Glass soda lime, borosil		

	55	Classification of joining materials		
	56	Properties, applications of abrasive materials		
15 th	57	Classification of composites	15	Viva voce and final evaluation
	58	Properties and application of composites		
	59	Materials for bearing metals Materials for nuclear energy		
	60	Properties of smart materials Application of smart materials		

LESSON PLAN

Name of Faculty: Guest Faculty

Discipline: Automobile engineering

Semester:3rd

Subject: Workshop technology-I

Lesson plan Duration: 15 WEEKS

Work Load (Lecture) per week:Lecture-04

WEEK	THEORY	
1 ST	LECTURE DAY	TOPIC
	1	UNIT-1 Welding Process,Principle of welding,
	2	Classification of welding processes
	3	Advantages and limitations of welding
	4	Industrial applications of welding, Welding positions and techniques
2 ND	5	Welding symbols. Safety precautions in welding
	6	Gas Welding,Principle of operation
	7	Types of gas welding flames and their applications
	8	Gas welding equipment - Gas welding torch, Oxygen cylinder, acetylene cylinder
3 RD	9	Gas welding equipment- cutting torch, Blow pipe, Pressure regulators
	10	Filler rods and fluxes and personal safety equipment for welding
	11	Arc Welding, Principle of operation, Arc welding machines and equipment
	12	A.C. and D.C. arc welding, Effect of polarity, current regulation and voltage regulation
4 TH	13	Electrodes: Classification, B.I.S. specification and selection
	14	Flux for arc welding. Requirements of pre heating
	15	Post heating of electrodes and work piece. Welding defects and their testing methods
	16	Resistance welding: Principle, advantages, limitations,
5 TH	17	Working and applications of spot welding, seam welding ,Projection welding
	18	Percussion welding, Atomic hydrogen welding, Shielded metal arc welding, submerged arc welding, Welding distortion
	19	Welding defects, methods of controlling welding defects and inspection of welded joints
	20	Principle of operation, advantages, disadvantages and applications of Tungsten inert gas (TIG) welding
6 TH	21	Principle of operation, advantages, disadvantages and applications of Metal inert gas (MIG) welding, Thermit welding
	22	Electro slag welding, Electron beam welding, Ultrasonic welding, Laser beam welding, Robotic welding
	23	Revision ,checking of class work and home assignments
	24	UNIT-2 Foundry Techniques ,Pattern Making ,Types of pattern
7 TH	25	Pattern allowances, Pattern codes as per B.I.S
	26	Introduction to cores, core boxes and core materials
	27	Core making procedure, Core prints, positioning of cores
	28	Properties of moulding sand
8 TH	29	Various types of moulding sand
	30	Testing of moulding sand. Safety precautions in foundry
	31	Types of moulds, Step involved in making a mould
	32	Molding boxes, hand tools used for mould making
9 TH	33	Molding processes: Bench molding, floor molding, pit molding and machine molding
	34	Molding machines squeeze machine, jolt squeeze machine and sand slinger
	35	Casting Processes, Charging a furnace, melting and pouring both ferrous and non-ferrous metals, cleaning of castings
	36	Principle, working and applications of Die casting: hot chamber and cold chamber, Centrifugal casting
10 TH	37	Elements of gating system, Pouring basin, sprue, runner, gates
	38	Types of risers, location of risers, Directional solidification

	39	Construction and working of Pit furnace, Cupola furnace
	40	Construction and working of Crucible furnace – tilting type, Electric furnace
11TH	41	Casting Defects
	42	Revision ,checking of class work and home assignments
	43	UNIT-3 Metal Forming Processes ,Press Working - Types of presses, type of dies
	44	Selection of press die, die material.
12TH	45	Press Operations-Shearing, piercing, trimming, punching, notching, shaving, gearing, embossing, stamping
	46	Forging - Open die forging, closed die forging,
	47	Press forging, upset forging
	48	Swaging, up setters, roll forging
13TH	49	Cold and hot forging
	50	Rolling - Elementary theory of rolling
	51	Types of rolling mills, Thread rolling, roll passes
	52	Rolling defects and remedies
14TH	53	Extrusion and Drawing - Type of extrusion- Hot and Cold
	54	Direct and indirect. Pipe drawing, tube drawing, wire drawing
	55	Revision, checking of class work and homeassignment
	56	UNIT-4 Plastic Processing
15TH	57	Industrial use of plastics, and applications- Advantages and limitations of use of plastics
	58	Injection Moulding -principle, working of injection moulding machine.
	59	Compression moulding-principle, and working of compression moulding machine
	60	Revision, checking of class work and home assignment