

LESSON PLAN

NAME OF FACULTY: ANKIT

DISCIPLINE: MECHANICAL ENGINEERING

SEMESTER: III

SUBJECT: BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

LESSON PLAN DURATION: 15 WEEKS

WORK LOAD (LECTURE/PRACTICAL) PER WEEK: (3 lectures, 2 Practical)

WEEK	THEORY		PRACTICALS
	LECTURE NOS	TOPIC	TOPIC
1 st	1	Unit -1. Electricity Application and Advantage	Practical-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	Practical-2 Connection of a single-phase induction motor with supply and reversing of its direction of rotation
	5	Unit-2- Basic Electrical Quantities ,Definition of voltage,	
	6	Definition of current, power and energy with their units,	
3 rd	7	name of instruments used for measuring above quantities,	Practical-3 Troubleshooting in domestic wiring system, including distribution board
	8	connection of these instruments in an electric circuit	
	9	Unit-3- AC Fundamentals	
4 th	10	Electromagnetic induction-Faraday's Laws,	Practical-4 Connection and reading of an electric energy meter
	11	Lenz's Law ,Fleming's rules,	
	12	Principles of A.C. Circuits; Alternating emf	
5 th	13	SESSIONAL TEST -I.	Practical-5 Use of ammeter, voltmeter, wattmeter, and multi-meter
	14	Unit-3- Definition of cycle, frequency, amplitude and time period, Instantaneous, average, r.m.s	
	15	maximum value of sinusoidal wave; form factor and Peak Factor, Concept of phase and phase difference	
6 th	16	Concept of resistance, inductance and capacitance in simple A.C. Circuit. Power factor and improvement of power factor by use of capacitors	Practical-6 Measurement of power and power factor in a given single phase ac circuit
	17	Concept of three phase system; star and delta connections; voltage and current relationship (no derivation)	
	18	Unit-4- Transformers, Working principle and construction of single phase transformer	

7 th	19	transformer ratio, emf equation, losses and efficiency	Practical-7 Study of different types of fuses, MCBs and ELCBs
	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	Practical-8 Study of zener diode as a constant voltage source and to draw its V-I characteristics
	23	Identification of voltages between phases and between one phase and neutral.	
	24	Difference between three-phase and single-phase supply	
9 th	25	SESSIONAL TEST -II	Practical-9 Study of earthing practices
	26	Unit-6- Electric Motor , Description and applications of single-phase and three-phase motors	
	27	Connection and starting of three-phase induction motors by star-delta starter. Changing direction of rotation of a given 3 phase induction motor	
10 th	28	Motors used for driving pumps, compressors, centrifuge, dyers etc	Practical-10 To draw V-I characteristics of a (i) NPN transistor (ii) thyristor (SCR)
	29	Totally enclosed submersible and flame proof motors	
	30	Unit-7- Domestic Installation, Distinction between light-fan circuit and single phase power circuit, sub-circuits	
11 th	31	Various accessories and parts of domestic electrical installation, Identification of wiring systems. Common safety measures and earthing	Practical-11 Study of construction and working of a (i) stepper motor and (ii) servo motor
	32	Unit-8- Electrical Safety, Electrical shock and precautions against shock treatment of electric shock,	
	33	concept of fuses and their classification, selection and application concept of earthing and various types of earthing, applications of MCBs and ELCBs	
12 th	34	Unit-9- Basic Electronics, Basic idea of semiconductors – P and N type; diodes,	Repeat of Practical1 to 4
	35	zener diodes and their applications, transistor – PNP and NPN, their characteristics and uses.	
	36	Characteristics and applications of a thyristor, characteristics and applications of stepper motors and servo motors in process control.	
13 th	37	SESSIONAL TEST –III	Repeat of Practical5 to 8
	38	Revised Sessional Test -1	
	39	Revised Sessional Test -2	
14 th	40	Revised Sessional Test -3	Repeat of Practical9 to 11
	41	Seminar	
	42	Seminar	
15 th	43	Any Other Query	Repeat of Practicals

LESSON PLAN

NAME OF FACULTY: MR. VIKAS KUMAR

DISCIPLINE: MECHANICAL ENGINEERING –

SEMESTER: III

SUBJECT: WORKSHOP TECHNOLOGY-1

LESSON PLAN DURATION: 15 WEEKS

WORK LOAD (LECTURE/PRACTICAL) PER WEEK: (4 lectures)

WEEK	THEORY	
	LECTURE NOS	TOPIC
1 st	1	Unit-1- Welding Process 1.1- Principle of welding, Classification of welding processes, Advantages and limitations of welding, Industrial applications of welding
	2	Welding positions and techniques, symbols. Safety precautions in welding. 1.2- Gas Welding, Principle of operation, Types of gas welding flames and their applications
	3	Gas welding equipment - Gas welding torch, Oxygen cylinder, acetylene cylinder, cutting torch, Blow pipe, Pressure regulators,
2 nd	4	Filler rods and fluxes and personal safety equipment for welding. 1.3- Arc Welding, Principle of operation, Arc welding machines and equipment. A.C. and D.C. arc welding, Effect of polarity, current regulation and voltage regulation, Electrodes
	5	Classification, B.I.S. specification and selection, Flux for arc welding. Requirements of pre heating, post heating of electrodes and work piece. Welding defects and their testing methods. 1.4- Other Welding Processes
	6	Resistance welding: Principle, advantages, limitations working and applications of spot welding, seam welding, projection welding and percussion welding,
3 rd	7	Atomic hydrogen welding, Shielded metal arc welding, submerged arc welding, Welding distortion,
	8	welding defects, methods of controlling welding defects and inspection of welded joints
	9	1.5 Modern Welding Methods, Methods, Principle of operation,
4 th	10	Modern Welding advantages, disadvantages and applications ,Tungsten inert gas (TIG) welding
	11	Metal inert gas (MIG) welding, Thermit welding,Electro slag welding, Electron beam welding,
	12	Ultrasonic welding, Laser beam welding, Robotic welding
5 th	13	SESSIONAL TEST -I.
	14	Unit-2- Foundry Techniques ,2.1- Pattern Making, Types of pattern, Pattern material, Pattern allowances, Pattern codes as per B.I.S., Introduction to cores 2.2.. Moulding and Casting
	15	2.2.1. Moulding Sand, Properties of moulding sand, their impact and control of properties viz. permeability, refractoriness,

		adhesiveness
6 th	16	cohesiveness, strength, flow ability, collapsibility, Various types of moulding sand, Testing of moulding sand. Safety precautions in foundry.
	17	2.2.2. Mould Making-Types of moulds, Step involved in making a mould, Molding boxes, hand tools used for mould making,
	18	Molding processes: Bench molding, floor molding, pit molding and machine molding, Molding machines squeeze machine, jolt squeeze machine and sand slinger.
7 th	19	2.2.3 Casting Processes- Charging a furnace, melting and pouring both ferrous and non ferrous metals, cleaning of castings,
	20	Principle, working and applications of Die casting: hot chamber and cold chamber, Centrifugal casting
	21	2.2.4. Gating and Riser System --Elements of gating system, Pouring basin, sprue, runner, gates,
8 th	22	Types of risers, location of risers, Directional solidification
	23	2.2.5 Melting Furnaces --Construction and working of Pit furnace, Cupola furnace, Crucible furnace – tilting type, Electric furnace
	24	2.2.6 Casting Defects Different types of casting defects, Testing of defects: radiography, magnetic particle inspection and ultrasonic inspection
9 th	25	SESSIONAL TEST -II
	26	Unit-3- Metal Forming Processes-3.1 Press Working - Types of presses, type of dies, selection of press die, die material.
	27	Press Operations-Shearing, piercing, trimming, punching, notching, shaving, gearing, embossing, stamping
10 th	28	3.2 Forging - Open die forging, closed die forging, Press forging, upset forging,
	29	swaging, up setters, roll forging, Cold and hot forging 3.3 Rolling - Elementary theory of rolling
	30	Types of rolling mills, Thread rolling, roll passes, Rolling defects and remedies
11 th	31	3.4 Extrusion and Drawing - Type of extrusion- Hot and Cold, Direct and indirect.
	32	Pipe drawing, tube drawing, wire drawing
	33	Unit-4 Plastic Processing
12 th	34	4.1 Industrial use of plastics, and applications- Advantages and limitations of ,use of plastics.
	35	4.2 Injection moulding-principle, working of injection moulding machine.
	36	4.3 Compression moulding-principle, and working of compression moulding machine.
13 th	37	SESSIONAL TEST –III
	38	Revised Sessional Test -1
	39	Revised Sessional Test -2
14 th	40	Revised Sessional Test -3

	41	Seminar
	42	Seminar
15th	43	Any Other Query

LESSON PLAN

NAME OF FACULTY: MR. JASWINDER

DISCIPLINE: MECHANICAL ENGINEERING

SEMESTER: III

SUBJECT: MATERIALS AND METALLURGY

LESSON PLAN DURATION: 15 WEEKS

WORK LOAD (LECTURE/PRACTICAL) PER WEEK: (4 lectures, 2 Practical)

WEEK	THEORY		PRACTICALS
	LECTURE NOS	TOPIC	TOPIC
1 st	1	Unit-1 Introduction, Material, Engineering materials, History/Timeline of Material Origin, Scope of	Classification of about 25

		Material Science, Overview of different engineering materials and applications,	specimens of materials/machine parts into (i)Metals and non metals (ii)Metals and alloys Ferrous and non ferrous metals Ferrous and non ferrous alloys
	2	Importance, Classification of materials, Difference between metals and non-metals,	
	3	Physical and Mechanical properties of various materials,	
2 nd	4	Present and future needs of materials, Various issues of Material Usage-Economical Environment and Social	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
	5	Overview of Biomaterials and semi-conducting materials	
	6	Unit-2 Crystallography, Fundamentals: Crystalline solid and amorphous solid, Unit Cell, Space Lattice,	
3 rd	7	Arrangement of atoms in Simple Cubic Crystals, BCC, FCC and HCP Crystals, Number of atoms per unit Cell,	a) Study of heat treatment furnace. b) Study of a thermocouple/ pyrometer.
	8	Atomic Packing Factor, coordination number (without derivation),	
	9	Defects/Imperfections, types and effects in Solid materials	
4 th	10	Deformation: Overview of deformation behaviour and its mechanisms,	Study of a metallurgical microscope and a specimen polishing machine
	11	Elastic and Plastic deformation, behaviour of material under load and stress-strain curve.	
	12	Failure Mechanisms: Overview of failure modes, fracture, fatigue and creep	
5 th	13	SESSIONAL TEST -I.	Repeat of Practicals 1 to 4
	14	Unit-3- Metallurgy- Introduction, Cooling curves of pure metals, dendritic solidification of metals, effect of grain size on mechanical properties,	
	15	Binary alloys, , Thermal equilibrium diagrams, Lever rule, Solid Solution alloys	
6 th	16	Unit-4- Metals And Alloys- Ferrous Metals: Different iron ores, Flow diagram for production of iron and steel,	Repeat of Practicals 1 to 4
	17	allotropic forms of iron- Alpha, Delta, Gamma	
	18	Basic process of manufacturing of pig iron and steel-making.	
7 th	19	Cast Iron: Properties, types of Cast Iron, manufacture and their use.	To prepare specimens of

	20	Steels: Plain carbon Steels and alloy steel, Classification of plain carbon steels,	following materials for microscopic examination and to Examine the microstructure of the specimens of following materials (At least any two) i) Brass ii) Copper iii) Cast Iron , iv) Mild Steel v) HSS, vi) Aluminium
	21	Properties and application of different types of Plain Carbon Steels,	
8 th	22	Effect of various alloying elements on properties of steel,	
	23	Uses of alloy steels (high speed steel, stainless steel, silicon steel, spring steel),	
	24	Non Ferrous Materials: Properties and uses of Copper, Aluminium and their alloys	
9 th	25	SESSIONAL TEST -II	To anneal a given specimen and find out difference in hardness as a result of annealing.
	26	Unit-5 Heat Treatment, Definition and objectives of heat treatment, Iron carbon equilibrium diagram, different microstructures of iron and steel .. Formation and decomposition of Austenite, Martensitic Transformation. Various heat treatment processes- hardening, tempering,	
	27	annealing, normalizing, surface hardening , carburizing, nitriding, cyaniding. Hardenability of Steels, Types of heat treatment furnaces (only basic idea), measurement of temperature of furnaces.	
10 th	28	Unit-6- Plastics, Importance of plastics, Classification- thermoplastic and thermoset,	To normalize a given specimen and to find out the difference in hardness as a result of normalizing.
	29	plastic and their uses, Various trade names of plastics, Plastic coatings	
	30	food grade plastics. Applications of plastics in automobile and domestic use.	
11 th	31	Rubber classification - Natural and synthetic. Selection of rubber	To harden and temper a specimen and to find out the difference in hardness due to tempering.
	32	Unit-7- Advanced Materials, Heat Insulating materials- Asbestos, glasswool, thermocole.	
	33	Ceramics-Classification, properties, applications Refractory materials –Dolomite, porcelain ,Glass – Soda lime, borosil.	
12 th	34	Joining materials/Adhesives – Classification, properties and applications Abrasive materials	Repeat of Practicals 5 to 8
	35	Composites-Classification, properties, applications Materials for bearing metals	
	36	Materials for Nuclear Energy Smart materials- properties and applications	
13 th	37	SESSIONAL TEST –III	Repeat of Practicals 5 to 8
	38	Revised Sessional Test -1	

	39	Revised Sessional Test -2	
14th	40	Revised Sessional Test -3	Repeat of Practicals 5 to 8
	41	Seminar	
	42	Seminar	
15th	43	Any Other Query	

LESSON PLAN

NAME OF FACULTY: GAURAV PANDEY

DISCIPLINE: MECHANICAL ENGINEERING

SEMESTER: III

SUBJECT: APPLIED MECHANICS

LESSON PLAN DURATION: 15 WEEKS

WORK LOAD (LECTURE/PRACTICAL) PER WEEK: (04 lectures,02 Practical)

WEEK	THEORY		PRACTICALS
	LECTURE NOS	TOPIC	TOPIC
1 st	1	Unit-1- Introduction-1.1- Concept of engineering mechanics definition of mechanics, statics, dynamics,	Practical-1 Verification of the polygon law of forces using Gravesand's apparatus.
	2	application of engineering mechanics in practical fields 1.2 Different systems of units (FPS, CGS, MKS and SI) and their conversion from one to another e.g. density, force, pressure	
	3	work, power, velocity, acceleration(Simple Numerical Problems), Fundamental Units and Derived Units	
2 nd	4	1.3 Concept of rigid body, scalar and vector quantities	Practical-2 To verify the forces in different members of jib crane.
	5	Unit-2. Laws of forces - Definition of force,	
	6	Bow's Notations, types of force: Point force/concentrated force &	
3 rd	7	Uniformly distributed force, effects of force, characteristics of a force.	Practical-3 To verify the reaction at the supports of a simply supported beam.
	8	2.2 Different force systems, principle of transmissibility of forces, law of super-position	
	9	2.3 Composition and resolution of coplanar concurrent forces, resultant force, method of composition of forces,	
4 th	10	laws of forces, triangle law of forces, polygon law of forces - graphically, analytically, resolution of forces	Practical-4 To find the mechanical advantage, velocity ratio and efficiency in case of an inclined plane.
	11	2.3 Free body diagram 2.5 Equilibrant force and its determination	
	12	2.6 Lami's theorem[Simple problems on above topics]	
5 th	13	SESSIONAL TEST -I.	Repeat of Practicals 1 to 4
	14	Unit-3 Moment ,Concept of Moment,Concept of a	

		force and units of moment, Varignon's theorem (definition only)	
	15	Principle of moment and its applications (Levers – simple and compound, steel yard, safety valve, reaction at support)	
6 th	16	Parallel forces (like and unlike parallel force), calculating their resultant, Concept of couple, its properties and effects	Repeat of Practicals 1 to 4
	17	General conditions of equilibrium of bodies under coplanar forces, Position of resultant force by moment [Simple problems on the above topics]	
	18	Unit-4- Friction, Definition and concept of friction, types of friction, force of friction, Limiting Friction	
7 th	19	Laws of static friction, coefficient of friction, angle of friction, angle of repose	Practical-5 To find the mechanical advantage, velocity ratio and efficiency of a screw jack.
	20	Equilibrium of a body lying on a horizontal plane, equilibrium of a body lying on a rough inclined plane.	
	21	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.(b)At some angle with inclined pane.	
8 th	22	Ladder friction,	Practical-6 To find the mechanical advantage, velocity ratio and efficiency of worm and worm wheel
	23	Advantages and Disadvantages of friction	
	24	Methods of increasing/decreasing the force of friction. [Simple problems on the above topics]	
9 th	25	SESSIONAL TEST -II	Practical-7 To find mechanical advantage, velocity ratio and efficiency of single purchase crab.
	26	Unit-5- Centre of Gravity , Concept, definition of centroid of plain figures and centre of gravity of symmetrical solid bodies, difference between centroid and C.G. ,Determination of centroid of plain and composite lamina using moment method only	
	27	centroid of bodies with removed portion, Determination of center of gravity of solid bodies - cylinder, cube, cuboid and sphere;	
10 th	28	composite bodies and bodies with portion removed [Simple problems on the above topics]	Practical-8 To find out center of gravity of regular lamina.
	29	Unit-6- Simple Machines, Definition of Simple and compound machine (Examples)	
	30	Definition of load, effort, velocity ratio, mechanical advantage and efficiency of a machine and their relationship, law of machines	
11 th	31	Definition of ideal machine, reversible and self locking machine, Effort lost in friction, Load lost in friction,	Practical-9 To find out center of gravity of

	32	Determination of maximum mechanical advantage and maximum efficiency, System of pulleys (first, second, third system of pulleys),	irregular lamina.
	33	determination of velocity ratio, mechanical advantage and efficiency	
12 th	34	Working principle and application of wheel and axle,	Practical-10
	35	Weston's Differential Pulley Block , simple screw jack, worm and worm wheel, single and double winch crab.	To determine coefficient of friction between three pairs of given surface.
	36	Expression for their velocity ratio and field of their application [Simple problems on the above topics]	
13 th	37	SESSIONAL TEST -III	Repeat Practical 5 to 10
	38	Revised Sessional Test -1	
	39	Revised Sessional Test -2	
14 th	40	Revised Sessional Test -3	Repeat Practical 5 to 10
	41	Seminar	
	42	Seminar	
15 th	43	Any Other Query	Repeat Practical

LESSON PLAN

NAME OF FACULTY:- GAURAV PANDEY

DISCIPLINE: MECHANICAL ENGINEERING

SEMESTER: III

SUBJECT: MECHANICAL ENGINEERING DRAWING

LESSON PLAN DURATION: 15 WEEKS

WORK LOAD (LECTURE/PRACTICAL) PER WEEK: (06 Practical)

WEEK	PRACTICALS	
	LECTURE NOS	TOPIC
1 st	1	Unit-1- Limit, fits and tolerance , Need of limit, fits and tolerance, Maximum limit of size, minimum limit of size, tolerance, allowance, deviation, upper deviation, lower deviation,
	2	fundamental deviation, clearance, maximum clearance, minimum clearance. Fits – clearance fit, interference fit and transition fit. Hole basis system, shaft basis system, tolerance grades, calculating values of clearance, interference, hole tolerance, shaft tolerance with given basic size for common assemblies like H ₇ /g ₆ , H ₇ /m ₆ , H ₈ /p ₆ . Basic terminology and symbols of geometrical dimensioning and tolerances.
	3	Unit-2- Drawing of the following with complete dimensions, tolerances, bill of material and surface finish representation
2 nd	4	2.1 Universal coupling and Oldham coupling (Assembly)
	5	2.2 Bearings
	6	2.2.1 Bushed Bearing (Assembly Drawing), 2.2.2 Ball Bearing and Roller Bearing (Assembled Drawing)
3 rd	7	2.2.3 Plummer Block (Detail and Assembly Drawing)
	8	2.2.4 Foot step Bearing (Assembled Drawing)
	9	2.3 Pulleys
4 th	10	2.3.1 Pulleys, Function of pulley, Types and materials of Pulley.
	11	2.3.2 Free hand Sketch of Various types of pulleys.
	12	2.3.3 Fast and loose pulley (Assembly Drawing)
5 th	13	SESSIONAL TEST -I.
	14	Unit-2 - 2.4 Pipe Joints,
	15	2.4.1- Types of pipe Joints,
6 th	16	Symbol and line layout of pipe lines
	17	2.4.2 Expansion pipe joint (Assembly drawing)
	18	2.4.3 Flanged pipe and right angled bend joint (Assembly Drawing)
	19	2.5- Lathe Tool Holder (Assembly Drawing)

7 th	20	2.6- Reading and interpretation of mechanical components and assembly drawings
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	21	2.7- Sketching practice of bearings and bracket
8 th	22	Unit-3 Drilling Jig (Assembly Drawing)
	23	Unit-4 -Machine vices (Assembly Drawing)
	24	
9 th	25	SESSIONAL TEST -II
	26	Unit-5- I.C. Engine Parts
	27	Piston Connecting rod (Assembly Drawing)
10 th	28	Crankshaft and flywheel (Assembly Drawing)
	29	Unit-6- Boiler Parts
	30	Steam Stop Valve (Assembly Drawing)
11 th	31	Blow off cock. (Assembly Drawing)
	32	Unit-7- Mechanical Screw Jack (Assembled Drawing)
	33	Unit-8- Gears
12 th	34	Gear, Types of gears,
	35	Nomenclature of gears and conventional representation
	36	Draw the actual profile of involute teeth of spur gear by different methods
13 th	37	SESSIONAL TEST –III
	38	Revised Sessional Test -1
	39	Revised Sessional Test -2
14 th	40	Revised Sessional Test -3
	41	Seminar
	42	Seminar
15 th	43	Any Other Query