Lesson Plan

Name of the faculty: Sh. Kuldeep Singh & Sh. Tasvir Singh

Discipline: Mechanical

Semester: 3rd Mechanical A & B

Subject: Basics of Electrical and Electronics Engineering

Lesson Plan Duration: 15 weeks

Work Load (Lecture/ Practical) per week (in hours): Lecture- 02

Week	**Theory**			
	Lecture day	**Topic (including assignment / test)**		
1st	1st	Definition of voltage, current, power and energy with their units, name of instruments used for measuring above quantities, connection of these instruments in an electric circuit.		
	2nd	Difference between ac and dc. Various applications of electricity.		
2nd	1st	Electromagnetic induction-Faraday's Laws, Lenz's Law; Fleming's rules, Principles of a.c. Circuits		
	2nd	Alternating emf, Definition of cycle, frequency, amplitude and time period. Concept of electrical power, Concept of phase and phase difference.		
3rd	1st	Concept of resistance, inductance and capacitance in simple a.c. circuit. Concept of three phase system; star and delta connections; voltage and current relationship		
	2nd	Revision		
4th	1st	Working principle and construction of single phase transformer, transformer ratio, emf equation, tapping of transformer		
	2nd	power transformer, auto transformer and distribution transformer (brief idea and difference between them), cooling of transformer, applications of various types of transformers.		
5th	1st	sessional		
	2nd	sessional		
6th	1st	Difference between high and low voltage distribution system, identification of three-phase wires, neutral wire and earth wire in a low voltage distribution system.		
	2nd	Identification of voltages between phases and between one phase and neutral. Difference between three-phase and single-phase supply		
7th	1st	Description and applications of single-phase and three-phase motors. Introduction to DC motor and its applications,		
	2nd	Difference between ac and dc motor, Connection and starting of three-phase induction motors by DOL and star-delta starter.		
8th	1st	Changing direction of rotation of a given 3 phase induction motor. Motors used for driving pump, compressor and e vehicles.		

	2nd	Revision		
9th	1st	Revision		
	2nd	Distinction between light-fan circuit and single phase power circuit, sub-circuits, various accessories and parts of domestic electrical installation.		
10th	1st	Different types of wires and their IS specification, Identification of wiring systems. Colour coding of electrical wires.		
	2nd	Second sessional		
11th	1st	Second sessional		
	2nd	Electrical shock and precautions against shock, treatment of electric shock, concept of fuses and their classification,		
12th	1st	concept of earthing and various types of earthing, brief description of range of protective devices like MCB, ELCB, and RCB		
	2nd	Concept of semi conductor, types- P and N type. Diodes and their applications, Transistor – PNP and NPN. Their characteristics and uses.		
13th	1st	Introduction to integrated circuit (IC), Different types of ICs used in electric drives and their control circuit.		
	2nd	Revision		
14th	1st	3rd sessional		
	2nd	3rd sessional		
15th	1st	Revision(Remedial Classes)		

Lesson Plan

Name of the faculty: Sh. Vikash Dahiya, Lecturer in Mechanical Engg.

Branch: Mechanical

Semester: 3rd Mechanical

Subject: Workshop Technology-II

Lesson Plan Duration: 15 weeks

Work Load (Lecture/ Practical) per week (in hours): Lectures- 03

Week	Theory		Practical	
	Lecture day	**Topic (including assignment / test)**	**Practical Day**	**Topic**
1st	1st	Resistance welding: Principle, advantages, limitations, working and applications of spot welding and seam welding		
	2nd	Other Welding Processes: Principle, advantages, limitations, working and applications of Shielded metal arc welding, submerged arc welding. Welding defects, methods of controlling welding defects and inspection of welded joints.		
	3rd	Modern Welding Methods: Methods, Principle of operation, advantages, disadvantages and applications of, ,		
2nd	1st	Tungsten inert gas (TIG) welding, Metal inert gas (MIG) welding.		
	2nd	Thermit welding, Electro slag welding, Electron beam welding, Ultrasonic welding, Laser beam welding, Robotic welding		
	3rd	Types of pattern, Pattern material, Pattern allowances, Pattern codes as per B.I.S.		
3rd	1st	Introduction to cores, core boxes and core materials,		
	2nd	Core making procedure, Core prints, positioning of cores		
	3rd	Moulding Sand: Properties of moulding sand, their impact and control of properties viz. permeability, refractoriness, adhesiveness, cohesiveness, strength, flowability, collapsibility,		
4th	1st	Various types of moulding sand, Testing of moulding sand		
	2nd	Mould Making: Types of moulds, Step involved in making a mould, Molding boxes, hand tools used for mould making,		
	3rd	Molding processes: Bench molding, floor molding, pit molding and machine molding.		
5th	1st	Sessional		
	2nd	Sessional		
	3rd	Casting Processes: Charging a furnace, melting and pouring both ferrous and non ferrous metals, cleaning of castings,		
6th	1st	Principle, working and applications of Die casting: hot chamber and cold chamber, Centrifugal casting		
	2nd	Gating and Risering System: Elements of gating system, Pouring basin, sprue, runner, gates, Types of risers, location of risers, Directional solidification.		

	3rd	Melting Furnaces: Construction and working of Pit furnace, Cupola furnace, Crucible furnace – tilting type, Electric furnace		
7th	1st	Casting Defects: Different types of casting defects, Non destructive testing (NDT) of castings: die penetration test, radiography, magnetic particle inspection and ultrasonic inspection.		
	2nd	Revision		
	3rd	Revision		
8th	1st	Working principle and construction of shaper, slotter and planer		
	2nd	Type of shapers and slotters Type of planers Quick return mechanism applied to shaper and planer machine.		
	3rd	Work holding devices used on shaper and planer Types of tools used and their geometry.		
9th	1st	Specification of shaper and planer. Speeds and feeds in above processes.		
	2nd	Introduction to broaching Nomenclature of broach tools, types and material		
	3rd	Types of broaching machines – single ram and duplex ram horizontal type, vertical type pull up, pull down and push down.		
10th	1st	2nd Sessional		
	2nd	2nd Sessional		
	3rd	2nd Sessional		
11th	1st	Milling methods - up milling and down milling Specification and working principle of milling machine		
	2nd	Classification, brief description and applications of milling machines Details of column and knee type milling machine		
	3rd	Milling machine accessories and attachment – Arbors, adaptors, collets, vices, circular table, indexing head and tail stock, vertical milling attachment, rotary table.		
12th	1st	Identification of different milling cutters and work mandrels Work holding devices		
	2nd	Milling operations – face milling, angular milling, form milling, straddle milling and gang milling. Cutting parameters		
	3rd	Revision		
13th	1st	Importance and use of jigs and fixtures, difference between jig and fixture.		
	2nd	Principal of location Locating and clamping devices		
	3rd	Types of jigs – drilling jig, template jig and plate jig Types of fixtures – Milling and welding fixture		
14th	1st	3rd Sessional		
	2nd	3rd Sessional		
	3rd	3rd Sessional		
15th	1st	Revision		
	2nd	Revision		
	3rd	Revision		

LESSON PLAN

Name of faculty **Sh. Baljit Siwach & Sh. Rajesh Kumar**
Discipline **Mechanical Engineering**
Semester **3rd Semester**
Subject **Mechanical Engineering Drawing**
Lesson Plan Duration **15 weeks**
Work load (Lecture/ Practical) per week (in hours) **6 Hours Practical**

WEEK	PRACTICAL	
	Day Practical	**Practical Topic**
1	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, fundamental deviation, clearance, maximum clearance, minimum clearance. Fits – clearance fit, interference fit and transition fit
	2	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/g6, H_7/m6, H_8/p6. Basic terminology and symbols of geometrical dimensioning
2	3	tolerances. **Unit- 2** Drawing of the following with complete dimensions, tolerances, bill of material and surface finish representation.
	4	Universal coupling and Oldham coupling (Assembly)
3	5	Bearings - Bushed Bearing (Assembly Drawing)
	6	Ball Bearing and Roller Bearing (Assembled Drawing) & **Assignment No.-1.**
4	7	Plummer Block (Detail and Assembly Drawing)
	8	Foot step Bearing (Assembled Drawing)
5	9	Pulleys, Function of pulley, Types and materials of Pulley
	10	**1st Class Test**
6	11	Free hand Sketch of Various types of pulleys,Fast and loose pulley (Assembly Drawing)
	12	Pipe Joints, Types of pipe Joints, Symbol and line layout of pipe lines
7	13	Expansion pipe joint (Assembly drawing)
	14	Flanged pipe and right angled bend joint (Assembly Drawing)
8	15	**1st Sessional test**
	16	Lathe Tool Holder (Assembly Drawing), Reading and interpretation of mechanical components and assembly drawings. & **Assignment No.-2.**
9	17	Sketching practice of bearings and bracket.
	18	**2nd Class Test**
10	19	**Unit- 3** Drilling Jig (Assembly Drawing)
	20	**Unit- 4** Machine vices (Assembly Drawing)
11	21	**Unit- 5** I.C. Engine Parts – Piston, Connecting rod (Assembly Drawing)
	22	Crankshaft and flywheel (Assembly Drawing)
12	23	**2nd Sessional test**
	24	**Unit- 6** Boiler Parts, Steam Stop Valve (Assembly Drawing) & **Assignment No.-3.**
13	25	Blow off cock. (Assembly Drawing)
	26	**3rd Class Test**
14	27	**Unit- 7** Mechanical Screw Jack (Assembled Drawing)
	28	**Unit- 8** Gears, Types of gears, Nomenclature of gears, conventional representation of gears
15	29	Draw the actual profile of involute teeth of spur gear by different methods. **Assignment No.-4.**
	30	**3rd Sessional test**

Lesson Plan

Name of the faculty: Sh. Aakash Suran, Lecturer in Mechanical Engg.

Discipline: Mechanical

Semester: 3rd Mechanical A & B

Subject: Thermodynamics - I

Duration: 15 weeks

Work Load (Lecture/ Practical) per week (in hours): Lectuers- 03, Practicals-02

Week	Theory		Practical	
	Lecture day	**Topic (including assignment / test)**	**Practical Day**	**Topic**
1st	1st	Thermodynamic state and system, boundary, surrounding, universe, thermodynamic systems – closed, open, isolated, adiabatic, homogeneous and heterogeneous, macroscopicand microscopic	1st & 2nd	Determination of temperature by 1.Thermocouple 2.Pyrometer 3.Infrared thermometer
	2nd	properties of system – intensive and extensive, thermodynamic equilibrium, quasi – static process		
	3rd	reversible and irreversible processes, Zeroth law of thermodynamics, definition of properties like pressure, volume, temperature, enthalpy and internal energy.		
2nd	1st	revision		
	2nd	Definition of gases, explanation of perfect gas laws – Boyle's law, Charle's law, Avagadro's law, Regnault's law		
	3rd	Universal gas constant, Characteristic gas constants and its derivation.		
3rd	1st	Specific heat at constant pressure, specific heat at constant volume of a gas, derivation of an expression forspecific heats with characteristics	1st & 2nd	Study the working of Nestler boiler.
	2nd	numerical problems on gas equation		
	3rd	Types of thermodynamic processes – isochoric, isobaric, isothermal, adiabatic, isentropic		
4th	1st	polytropic and throttling processes, equations representing the processes		
	2nd	Derivation of work done, change in internal energy, change in entropy, rate of		

		heat transfer for the above processes		
	3rd	Revision		
5th	1st	Laws of conservation of energy, first law of thermodynamics (Joule's experiment) and its limitations	1st & 2nd	Study of working of high pressure boiler.
	2nd	Application of first law of thermodynamics to Non-flow systems – Constant volume, Constant pressure		
	3rd	Adiabatic and polytropic processes, steady flow energy equation		
6th	1st	Application of steady flow energy equation for turbines, pump, boilers, compressors, nozzles, and evaporators.		
	2nd	Heat source and sink, statements of second laws of thermodynamics: Kelvin Planck's statement		
	3rd	Classius statement, equivalency of statements, Perpetual motion Machine of first kind, second kind		
7th	1st	Carnot engine, Introduction of third law of thermodynamics, concept of irreversibility and concept of entrop	1st & 2nd	Demonstration of mountings and accessories on a boiler.
	2nd	Revision		
	3rd	Revision		
8th	1st	Concept of ideal gas, enthalpy and specific heat capacities of an ideal gas		
	2nd	P – V – T surface of an ideal gas		
	3rd	triple point, real gases, Vander-Wall's equation		
9th	1st	Revision	1st & 2nd	Determination of dryness fraction of steam using calorimeter.
	2nd	Revision		
	3rd	Formation of steam and related terms, thermodynamicproperties of steam, steam tables, sensible heat, latent heat, internal energy of steam,entropy of water, entropy of steam		
10th	1st	T- S diagrams, Mollier diagram (H – S Chart),		
	2nd	Expansion of steam, Hyperbolic, reversible adiabatic and throttling processes, determination of quality of steam(dryness fraction),		

	3rd	Revision		
11th	1st	Revision	1st & 2nd	Demonstrate the working of air compressor.
	2nd	Uses of steam, classification of boilers, function of various boiler mounting and accessories		
	3rd	comparison of fire tube and water tube boilers. Construction and working of Lancashire boiler, Nestler boiler		
12th	1st	Babcock & Wilcox Boiler. Introduction to modern boilers.		
	2nd	Meaning of air standard cycle – its use, condition of reversibility of a cycle		
	3rd	Description of Carnot cycle, Otto cycle, Diesel cycle, simple problems on efficiency for different cycles		
13th	1st	Comparison of Otto, Diesel cycles for same compression ratio, same peak pressure developed and same heat input	1st & 2nd	Industrial visit may be planned to show working of boilers.
	2nd	Reasons for highest efficiencyof Carnot cycle and all other cycles working between same temperature limits		
	3rd	Revision		
14th	1st	Functions of air compressor – uses of compressed air, type of air compressors		
	2nd	Single stage reciprocating air compressor, its construction and working, representation of processes involved on P – V diagram, calculation of work done		
	3rd	Multistage compressors – advantages over single stage compressors, use of air cooler, condition of minimum work in two stage compressor (without proof), simple problems		
15th	1st	Rotary compressors – types, working and construction of centrifugal compressor, axial flow compressor, vane type compressor		
	2nd	Revision		
	3rd	Revision		

Lesson Plan

Name of the faculty: Sh. Mohit Kadyan, Lecturer in Mechanical Engg.

Discipline: Mechanical

Semester: 3rd Mechanical A & B

Subject: STRENGTH OF MATERIALS

Lesson Plan Duration: 15 weeks

Work Load (Lecture/ Practical) per week (in hours): Lectures- 03, Practicals-02

Week	Theory		Practical	
	Lecture day	**Topic (including assignment / test)**	**Practical Day**	**Topic**
1st	1st	Basic concept of load, stress and strain.	1st & 2nd	Tensile test on bars of Mild steel and Aluminium.
	2nd	Tensile, compressive and shear stresses		
	3rd	Linear strain, Lateral strain, Shear strain, Volumetric strain. Concept of Elasticity, Elastic limit and limit of proportionality		
2nd	1st	Hook's Law and Elastic Constants Stress-strain curve for ductile andbrittle materials	1st & 2nd	Tensile test on bars of Mild steel and Aluminium.
	2nd	Nominal stress Yield point, plastic stage Ultimate stress and breaking stress		
	3rd	Percentage elongation Proof stress and working stress, Factor of safety		
3rd	1st	Poisson's Ratio Thermal stress and strain	1st & 2nd	Bending tests on a steel bar or a wooden beam.
	2nd	Longitudinal and circumferential stresses in seamless thin walled cylindrical shells.		
	3rd	Introduction to Principal Stresses, Numerical Problems.		
4th	1st	Strain Energy, Resilience, proof resilience and modulus of resilience	1st & 2nd	Impact test on metals a) Izod test b) Charpy test
	2nd	Strain energy due to direct stresses and Shear Stress		
	3rd	Stresses due to gradual, sudden and falling load.		
5th	1st	Concept of moment of inertia and second moment of area		
	2nd	Radius of gyration, Theorem of perpendicular axis and parallel axis (with derivation).		

	3rd	Second moment of area of common geometrical sections		
6th	1st	Rectangle, Triangle, Circle (without derivation);	1st & 2nd	Impact test on metals a) Izod test b) Charpy test
	2nd	Second moment of area for L,T and I section		
	3rd	Section modulus and Numerical Problems		
7th	1st	Concept of various types of beams and form of loading	1st & 2nd	Torsion test of solid specimen of circular section of different metals for determining modulus of rigidity.
	2nd	Concept of end supports-Roller, hinged and fixed		
	3rd	Concept of bending moment and shearing force, B.M. and S.F. Diagram forcantilever		
8th	1st	simply supported beams with and without overhang subjected to concentrated and U.D.L.		
	2nd	Concept of Bending stresses		
	3rd	Theory of simple bending Derivation of Bending Equation Use of the equation $\frac{M}{I}=\frac{\sigma}{y}=\frac{E}{R}$		
9th	1st	Concept of moment of resistance $\frac{M}{I}$ $\frac{E}{R}$	1st & 2nd	To plot a graph between load and extension and to determine the stiffness of a helical spring.
	2nd	Bending stress diagram Section modulus for rectangular,circular and symmetrical I section.		
	3rd	Calculation of maximum bending stress in beams of rectangular section		
10th	1st	Calculation of maximum bending stress in beams circular, and T section.		
	2nd	Numerical Problems		
	3rd	Concept of column, modes of failure, Types of columns, modes offailure of columns		
11th	1st	Buckling load, crushing load	1st & 2nd	Hardness test on different metals.
	2nd	Slenderness ratio		
	3rd	Effective length and End restraints		
12th	1st	Factors effecting strength of a column		
	2nd	Strength of column by Euler Formula without derivation		
	3rd	Rankine Gourdan formula (without derivation)		
13th	1st	Concept of torsion, difference		

		between torque and torsion.		
	2nd	Derivation of Torsion Equation,use of torsion equation for circular shaft(solid and hollow)		

	3rd	Comparison between solid and hollow shaft with regard to their strength and weight. Power transmitted by shaft		
14th	1st	Concept of mean and maximum torque		
	2nd	Numerical Problems		
	3rd	Closed coil helical springs subjected to axial load and calculation of: Stress deformation		
15th	1st	Stiffness and angle of twist and strain energy		
	2nd	Strain energy and proof resilience		
	3rd	Determination of number of plates of laminated spring (semi elliptical type only)		