LESSON PLAN

Name of faculty : **Sh. Ravinder Kumar**
Discipline : **Mechanical Engineering**
Semester : **3RD Semester**
Subject : **Basics of Electrical and Electronics Engineering**
Duration : **15 weeks**
Work load (Lecture) per week (in hours): **2 Lectures/week**

WEEK	THEORY	
	Lecture	Topics to be Covered
1	1	**Basic Electrical Quantities** Definition of voltage, current, power and energy with their units, name of instruments used for measuring above quantities.
	2	Connection of the instruments in an electric circuit. Difference between ac and dc. Various applications of electricity.
2	3	**AC Fundamentals** Electromagnetic induction-Faraday's Laws, Lenz's Law; Fleming's rules, Principles of a.c. Circuits; Alternating emf, Definition of cycle, frequency, amplitude and time period.
	4	Concept of electrical power, Concept of phase and phase difference. Concept of resistance, inductance and capacitance in simple a.c. circuit.
3	5	Concept of three phase system; star and delta connections; voltage and current relationship.
	6	**Transformer** Working principle and construction of single phase transformer, transformer ratio, emf equation.
4	7	Tapping of transformer Power transformer, auto transformer and distribution transformer (brief idea and difference between them)
	8	Cooling of transformer, applications of various types of transformers.
5	9	**Distribution System** Difference between high and low voltage distribution system, identification of three-phase wires, neutral wire and earth wire in a low voltage distribution system.
	10	Identification of voltages between phases and between one phase and neutral. Difference between three-phase and single- phase supply.
6	11, 12	**Conduct of 1st Sessional Test**
7	13	**Electric Motor** Description and applications of single-phase and three-phase motors. Introduction to DC motor and its applications, Difference between ac and dc motor.
	14	Connection and starting of three-phase induction motors by DOL and star-delta starter.
8	15	Changing direction of rotation of a given 3 phase induction motor. Motors used for driving pump, compressor and e vehicles.
	16	**Domestic Installation** Distinction between light-fan circuit and single phase power circuit, sub-circuits

9	17	Various accessories and parts of domestic electrical installation Different types of wires and there IS specification.
	18	Identification of wiring systems. Colour coding of electrical wires.
10	19, 20	**Conduct of 2nd Sessional Test**
11	21	**Electrical Safety** Electrical shock and precautions against shock, treatment of electric shock,
	22	concept of fuses and their classification, concept of earthing and various types of earthing.
12	23	Brief description of range of protective devices like MCB, ELCB, and RCB
	24	**Basic Electronics** Concept of semi conductor, types- P and N type. Diodes and their applications.
13	25	Transistor – PNP and NPN. Their characteristics and uses.
	26	Introduction to integrated circuit (IC), Different types of ICs used in electric drives and their control circuit.
14	27, 28	**Conduct of 3rd Sessional Test**
15	29	Revision of the syllabus
	30	Doubt Session and discussion.

LESSON PLAN

Name of faculty : **Sh. Jitender / Sh. Ravinder Kumar**

Discipline : **Mechanical Engineering**

Semester : **3RD Semester**

Subject : **Mechanical Engineering Drawing-II**

Lesson Plan Duration : **15 weeks**

Work load (Practical) per week (in hours): **6 Hours**

WEEK	THEORY	
	Lecture	Topic(Including Assignment/Test)
1	1,2,3,	**LIMIT, FITS AND TOLERANCE-** Need of limit, fits and tolerance, Maximum limit of size, minimum limit of size,
	4,5,,6,	Tolerance, allowance, deviation, upper deviation, lower deviation, fundamental deviation, clearance, maximum clearance, minimum clearance.
2	7,8,9,	Fits – clearance fit, interference fit and transition fit. Hole basis system, shaft basis system, tolerance grades, calculating values of clearance, interference,
	10,11,12,	Hole tolerance, shaft tolerance with given basic size for common assemblies like H7/g6, H7/m6, H8/p6.
3	13,14,15,	Basic terminology and symbols of geometrical dimensioning and tolerances. Surface finish representation
	16,17,18,	**DRAWING OF THE FOLLOWING WITH COMPLETE DIMENSIONS, TOLERANCES, BILL OF MATERIAL AND SURFACE FINISH REPRESENTATION.** Universal coupling and Oldham coupling (Assembly)
4	19,20,21,	Bushed Bearing (Assembly Drawing)
	22,23,24,	Ball Bearing and Roller Bearing (Assembled Drawing)
5	25,26,27,	Plummer Block (Detail and Assembly Drawing)
	28,29,30,	Foot step Bearing (Assembled Drawing) **ASSIGNMENT - 1**
6	31,32,33,	**1ST SESSIONAL TEST**
	34,35,36,	Pipe Joints Types of pipe Joints, Symbol and line layout of pipe lines Expansion pipe joint (Assembly drawing)

7	37,38,39,	Reading and interpretation of mechanical components and assembly drawings
	40,41,42,	Sketching practice of wall bracket.
8	43,44,45,	**DRILLING JIG (ASSEMBLY DRAWING)**
	46,47,48,	**MACHINE VICES (ASSEMBLY DRAWING)** Lathe Tool Holder (Assembly Drawing) Lathe tail stock (assembly drawing)
9	49,50,51,	**I.C. ENGINE PARTS -** Piston
	52,53,54,	Connecting rod (Assembly Drawing)
10	55,56,57,	Crankshaft and flywheel (Assembly Drawing) **ASSIGNMENT- 2**
	58,59,60,	**2ND SESSIONAL TEST**
11	61,62,63,	**BOILER PARTS-** Steam Stop Valve (Assembly Drawing)
	64,65,66,	Blow off cock. (Assembly Drawing)
12	67,68,69,	**MECHANICAL SCREW JACK (ASSEMBLED DRAWING)**
	70,71,72,	**GEARS** Gear, Types of gears,
13	73,74,75,	Nomenclature of gears and conventional representation
	76,77,78,	Draw the actual profile of involutes teeth of spur gear by approximate method.
14	79,80,81,	Draw the actual profile of involutes teeth of spur gear by base circle method.
	82,83,84,	**ASSIGNMENT - 3**
		3RD SESSIONAL TEST
15	85,86,87,	Revision
	88,89,90,	Revision

LESSON PLAN

NAME OF FACULTY: SH. VIKAS

DISCIPLINE: MECHANICAL ENGINEERING

SEMESTER: III

SUBJECT - STRENGTH OF MATERIAL

LESSON PLAN DURATION: 15 weeks
Work load (Lecture/Practical in hours) per week: 3 Lectures/4 Practicals

WEEK	LECTURE NO.	THEORY	PRACTICALS
I	1	**UNIT-1 :STRESS AND STRAINS** 1.1.Basic concept of load, stress and strain 1.2. Tensile, compressive and shear stresses	1. Tensile test on bars of Mild steel and Aluminum.
	2	1.3. Linear strain, Lateral strain, Shear strain, Volumetric strain. 1.4 Concept of Elasticity, Elastic limit and limit of proportionality 1.5 Hook's Law and Elastic Constants	
	3	1.6. Stress-strain curve for ductile and brittle materials 1.7 Nominal stress 1.8 Yield point, plastic stage	
II	4	1.9 Ultimate stress and breaking stress 1.10 Percentage elongations 1.11 Proof stress and working stress 1.12. Factor of safety	2. Bending tests on a steel bar or a wooden beam.
	5	1.13 Poisson's Ratio 1.14 Thermal stress and strain	
	6	1.15 Longitudinal and circumferential stresses in seamless thin walled cylindrical shells. 1.16 Introduction to Principal stresses	
III	7	**UNIT-2 :RESILIENCE** 2.1 Strain Energy, Resilience, proof resilience and modulus of resilience	3. Impact test on metals a) Izod test b) Charpy test
	8	2.2 Strain energy due to direct stresses and Shear Stress	
	9	2.3 Stresses due to gradual, sudden and falling load.	
IV	10	**UNIT -3 :MOMENT OF INERTIA** 3.1. Concept of moment of inertia and second moment of area 3.2 Radius of gyration	4. Torsion test of solid specimen of circular section of different metals for determining modulus of rigidity.
	11	3.3 Theorem of perpendicular axis and parallel axis (with derivation)	
	12	3.4 Second moment of area of common geometrical sections : Rectangle, Triangle, Circle (without derivation);	
V	13	Second moment of area for L,T and I section 3.5 Section modulus	5. To plot a graph between load and extension and to determine the stiffness of a helical spring.
	14	**UNIT- 4 :BENDING MOMENT AND SHEARING FORCES** 4.1 Concept of various types of beams and	

		form of loading 4.2 Concept of end supports-Roller, hinged and fixed	
	15	4.3 Concept of bending moment and shearing force	
VI			
	16	**SESSIONAL TEST - I**	6. Hardness test on different metals.
	17,18	4.4 B.M. and S.F. Diagram for cantilever and simply supported beams with and without overhang subjected to concentrated and U.D.L	
VII	19	**UNIT-5 :BENDING STRESSES** 5.1 Concept of Bending stresses 5.2. Theory of simple bending, Derivation of Bending Equation 5.3. Use of the equation	Revision
	20	5.4. Concept of moment of resistance 5.5. Bending stress diagram 5.6 Section modulus for rectangular, circular and symmetrical I section.	
	21	5.7. Calculation of maximum bending stress in beams of rectangular, circular, and T section.	
VIII	22	**UNIT -6 :COLOUMNS** 6.1. Concept of column, modes of failure 6.2. Types of columns, modes of failure of columns	Revision
	23	6.3. Buckling load, crushing load 6.4. Slenderness ratio 6.5. Effective length 6.6 End restraints	
	24	6.7 Factors effecting strength of a column 6.8 Strength of column by Euler Formula without derivation 6.9. Rankine Gourdan formula (without derivation)	
IX	25	**UNIT -7 :TORSION** 7.1. Concept of torsion, difference between torque and torsion. 7.2. Derivation of Torsion Equation,	Revision
	26	Use of torsion equation for circular shaft, (solid and hollow	
	27	7.3. Comparison between solid and hollow shaft with regard to their strength and weight	

X	28	**SESSIONAL TEST - II**	
	29	7.4. Power transmitted by shaft 7.5 Concept of mean and maximum torque to axial load	Revision
	30	**UNIT -8 :SPRINGS** 8.1. Closed coil helical springs subjected to axial load, calculation of Stress deformation,	
XI	31,32	Calculation of Stiffness and angle of twist and strain energy, Strain energy and proof resilience 8.2. Determination of number of plates of laminated spring (semi elliptical type only)	Revision
	33	Revision	
XII	34	Revision	Revision
	35	Revision	
	36	Revision	
XIII	37	Revision	Revision
	38	**SESSIONAL TEST - III**	
	39	Revision	
XIV	40	Revision	Revision
	41	Revision	
	42	Revision	
XV	43	Revision	Revision

LESSON PLAN

Name of faculty: **SH. JITENDER**

Discipline: **Mechanical Engineering**

Semester:**3rd Semester**

Subject:**Thermodynamics-1**

Lesson Plan Duration:**15 weeks**

Workload (Lecture/Practical) per week (in hours): **3 Lecture& 4Practicals**

Week	Theory		Practicals
	Day/ Lecture	Topic(Including Assignment/Test)	
1	1	**UNIT 1** **Fundamental Concepts:** Thermodynamic state and system, boundary, surrounding, universe	**Practical-1:** Determination of temperature by thermocouple
	2	Thermodynamic systems–closed, open, isolated, adiabatic	
	3	Homogeneous and heterogeneous, macroscopic and microscopic	
2	4	Properties of system – intensive and extensive, thermodynamic equilibrium, Quasi – static process	**Practical-2:** Determination of temperature by pyrometer
	5	Quasi – static process, Zeroth law of thermodynamics	
	6	Definitionofpropertieslikepressure,volume,temperature, enthalpyandinternalenergy	
3	7	**Laws of Perfect Gases:** Definition of gases, explanation of perfect gas laws – Boyle's law, Charle's law, Avogadro's law, Regnault's law	**Practical-3:** Determination of temperature by Infrared thermometer
	8	Universal gas constant, Characteristic gas constants and its derivation.	
	9	Specific heat at constant pressure, Specific heat at constant volume of a gas	
4	10	Derivation of an expression for specific heats with characteristics	**Practical-4:** Study the working of Nestler boiler.
	11	Simple numerical problems on gas equation	
	12	**UNIT 2** **Thermodynamic Processes:** Types of thermodynamic processes	
5	13	Isochoric, isobaric, isothermal, adiabatic, isentropic, polytropic	**Practical-5:** Study of working of high pressure boiler.
	14	Throttling processes, equations representing the processes	
	15	Derivation of work done, change in internal energy,	

		change in entropy	
6	16	Rate of heat transfer for the above process. **ASSIGNMENT - 1**	**Practical-6:** Demonstration of mountings and accessories on a boiler.
	17	**1ST SESSIONAL TEST**	
	18	Sessional's doubt session.	

7	19	**UNIT 3- Laws of Thermodynamics:** Laws of conservation of energy, first law of thermodynamics (Joule's experiment) and its limitations, Steady flow energy equation	**Practical-7:** Study of boilers(Through industrial visit)
	20	Application of steady flow energy equation for turbines, pump, boilers, compressors, nozzles, and evaporators.	
	21	Heat source and sink, statements of second laws of thermodynamics: Kelvin Planck's statement, Classius statement	
8	22	Equivalency of statements, Perpetual motion Machine of first kind second kind	**Practical-8:** Repeat Practical 1 & 2
	23	Carnot engine, Introduction of third law of thermodynamics, concept of irreversibility and concept of entropy.	
	24	**UNIT 4** **Steam Generators** Uses of steam, classification of boilers	
9	25	Comparison of fire tube and water tube boilers	**Repeat Practical 8** Repeat Practical 3 & 4
	26	Construction and working of Nestler boiler, Babcock & Wilcox Boiler	
	27	Function of various boiler mounting and accessories	
10	28	Introduction to modern boilers – Benson boiler	**VIVA**
	29	Doubt session. **ASSIGNMENT-2**	
	30	**2ND S ESSIONAL TEST**	
11	31	**Properties of Steam:** Formation of steam and related terms, thermodynamic properties of steam, steam tables	**Practical-9** Determination of Dryness fraction of steam using calorimeter
	32	Sensible heat, latent heat, internal energy of steam, entropy of water, entropy of steam	
	33	T- S diagrams, Mollier diagram (H – S Chart)	
12	34	Expansion of steam, Hyperbolic, reversible adiabatic and throttling processes	**Repeat practical 9**
	35	Determination of quality of steam (dryness fraction)	
	36	**UNIT V** **Ideal and Real Gases:**Concept of ideal gas, enthalpy and specific heat capacities of an ideal gas	
13	37	P – V – T surface of an ideal gas, triple point, real gases, Vander-Wall's equation	**Practical-10** Demonstrate the working of air compressor.
	38	P – V – T surface of an ideal gas, triple point, real gases, Vander-Wall's equation	
	39	**Air Compressors**: Functions of air compressor – uses of compressed air, type of air compressors	

14	40	Type of air compressors	**Repeat practical no 10**
	41	Doubt session**. ASSIGNMENT- 3**	
	42	**3RD SESSIONAL TEST**	
15	43	Sessional's doubt session.	**VIVA**
	44	Revision	
	45	Revision	

LESSON PLAN

NAME OF FACULTY: SH. BHARAT BHUSHAN

DESIGNATION: SENIOR LECTURER

DISCIPLINE: MECHANICAL ENGINEERING

SEMESTER: 3rd

SUBJECT: WORKSHOP TECHNOLOGY-II

LESSON PLAN DURATION: 15 WEEKS

WORKLOAD (LECTURE/PRACTICAL) PER WEEK:(3 lectures)

WEEK	THEORY	
	LECTURE	**TOPIC**
1st	**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,
2nd	**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,
3rd	**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,
4th	**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,
5th	**13**	Laser beam welding, Robotic welding
	14	Unit-2-FoundryTechniques 2.1-Pattern Making, Types of pattern, Pattern material, Pattern allowances, Pattern codes as

		Moulding and Casting, Mould Making
	15	Casting Processes , Gating and Risering System, Melting Furnaces, Casting Defects
6th	**16**	**SESSIONALTEST–I**
	17	**UNIT III: Shaping, Slotting and Planing:** Working principle and construction of shaper, slotter and planer
	18	Type of shapers and slotters Type of planers Quick return mechanism applied to shaper and planer machine.
7th	**19**	Work holding devices used on shaper and planer Types of tools used and their geometry.
	20	Specification of shaper and planer, Speeds and feeds in above Processes. Broaching: Introduction to broaching
	21	Nomenclature of broach tools, types and material
8th	**22**	Types of broaching machines
	23	Single ram and duplex ram horizontal type,
	24	Vertical type pull machine
9th	**25**	up pull down and push down
	26	Revision, Doubt Session and discussion
	27	Revision, Doubt Session and discussion
10th	**28**	**SESSIONALTEST–II**
	29	**Milling:** Milling methods - up milling and down milling, Specification and working principle of milling machine
	30	Classification, brief description and applications of milling machines, Details of column and knee type milling machine
11th	**31**	Milling machine accessories and attachment – Arbors, adaptors, collets, vices, circular table, indexing head and tailstock, vertical Milling attachment, rotary table.
	32	Identification of different milling cutters and work mandrels, Work holding devices
	33	Milling operations – face milling, angular milling, form milling, straddle milling and gang milling. Cutting parameters
12th	**34**	Jigs and Fixtures Importance and use of jigs and fixtures
	35	Difference between jig and fixture. Principal of location
	36	Locating and clamping devices
	37	Types of jigs–drilling jig, template jig and plate jig

13th	**38**	Types of fixtures–Milling fixture
	39	Welding fixture
14th	**40**	**SESSIONALTEST–III**
	41	Revision of the syllabus
	42	Revision of the syllabus
15th	**43**	Doubt Session and Discussion
	44	Doubt Session and Discussion
	45	Doubt Session and Discussion