Lesson Plan

Name of the faculty : **Rahul Singh**

Discipline : **Mechanical Engineering**

Semester : **3rd Semester**

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

Work Load : **(L) (4 Periods) /Week**

	Theory	
Week	**LectureDay**	**Topics**
1st	1st	**Unit 1 Application and Advantage of Electricity-** Difference between ac and dc,various applications of electricity
	2nd	advantages of electrical energy over other typesof energy
	3rd	**Unit 2 Basic Electrical Quantities-** Definition ofvoltage, current, power and energy with their unit
	4th	name of instruments used for measuring above
2nd	5th	connection of these instruments in an electric
	6th	**Unit 3 AC Fundamentals-** Electromagneticinduction-Faraday's Laws, Lenz's Law;
	7th	Principles of a.c. Circuits; Alternating emf,
	8th	amplitude and time period. Instantaneous,average
3rd	9th	r.m.s and maximum value of sinusoidal wave
	10th	form factor and Peak Factor. Concept of phaseand phase
	11th	difference. Concept of resistance,
	12th	inductance and capacitance in simple a.c. circuit
4th	13th	power factor and improvement of power factor byuse of capacitors.
	14th	Concept of three phase system
	15th	star and delta connections
	16th	voltage and current relationship (no derivation)
5th	17th	Definition of cycle, frequency
	18th	**Unit 4 Transformers-**Introduction

	19th	Working principle and construction of singlephase transformer
	20th	**SESSIONAL I**
6th	21st	transformer ratio, emf equation
	22nd	losses and efficiency, cooling oftransformers
	23rd	isolation transformer, CVT
	24th	auto transformer (brief idea), applications.
7th	25th	**Unit 5 Distribution System**-Introduction
	26th	Difference between high and low voltage distribution system, identification of three-phasewires
	27th	neutral wire and earth wire in a low voltagedistribution system.
	28th	Identification of voltages between phases
8th	29th	between one phase and neutral. Difference between three-phase and single-phase supply
	30th	**Unit 6 Electric Motor**- Description and applications of single-phase and three-phase
	31st	Connection and starting of three-phase inductionmotors by star-delta starter
	32nd	Changing direction of rotation of a given 3 phase
9th	33rd	Motors used for driving pumps
	34th	compressors, centrifuge, dyers etc.
	35th	Totally enclosed submersible and flame proof
	36th	**Unit 7 Domestic Installation**- Introduction
10th	37th	[Simple problems on the above topics]
	38th	Distinction between light-fan circuit
	39th	**SESSIONAL II**
	40th	single phase power circuit, sub-circuits
11th	41st	various accessories and parts of domesticelectrical installation
	42nd	Identification of wiring systems
	43rd	Common safety measures and earthing
	44th	**Unit 8 Electrical Safety**-Introduction
12th	45th	Electrical shock and precautions against shock
	46th	treatment of electric shock
	47th	concept of fuses and their classification

	48th	selection and application,
13th	49th	concept of earthing and various types of earthing
	50th	applications of MCBs and ELCBs
	51st	**Unit 9 Basic Electronics**
	52nd	Basic idea of semiconductors – P and N type
14th	53rd	diodes, zener diodes and their applications
	54th	transistor – PNP and NPN
	55th	their characteristics and uses.
	56th	Characteristics and applications of a thyristor
15th	57th	characteristics and applications of stepper motors
	58th	servo motors in process control.
	59th	REVISION OF SYLLABUS
	60th	**SESSIONAL TEST –III**

LESSON PLAN

NAME OF FACULTY - PARVEEN KUMAR / RAMNIWAS

DISCIPLINE: MECHANICAL ENGINEERING

SEMESTER: 3rd

SUBJECT: MECHANICAL ENGINEERING

DRAWINGLESSON PLAN DURATION:

14WEEKS

WORK LOAD (LECTURE/PRACTICAL) PER WEEK: (02)

WEEK	THEORY		PRACTICALS
	LECTURE NOS	TOPIC	
1st	1	**UNIT - 1**. Limit, fits and tolerance (02 sheet) 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 H7/g6, H7/m6, H8/p6. Basic terminology and Symbols of geometrical dimensioning and tolerances. Surface finish representation	
2nd	3	**UNIT -2** 2.1 Universal coupling and Oldham coupling (Assembly)	
	4	2.2 Bearings	
3rd	5	Bushed Bearing (Assembly Drawing) Ball Bearing and Roller Bearing (Assembled Drawing)	
	6	2.2.3 Plummer Block (Detail and Assembly Drawing)	
4th	7	2.2.4 Foot step Bearing (Assembled Drawing)	
	8	Pipe Joints (03 sheets) Types of pipe Joints, Symbol and line layout of pipelines	
		SESSIONAL TEST - 1	
5th	9	2.3.2 Expansion pipe joint (Assembly drawing)	
	10	2.3.3 Flanged pipe and right angled bend joint (Assembly Drawing)	

6th	11	2.4 Reading and interpretation of mechanical components and assembly drawings	
	12	2.5 Sketching practice of wall bracket.	
7th	13	**UNIT - 3**. Drilling Jig (Assembly Drawing)	
	14	**UNIT - 4**. Machine vices (Assembly Drawing)	
8th	15	**UNIT - 5**. I.C. Engine Parts	
	16	Piston	
	16	**SESSIONAL TEST - 2**	
9th	17	Connecting rod (Assembly Drawing)	
	18	Crankshaft and flywheel (Assembly Drawing)	
10th	19	**UNIT - 6**. Boiler Parts	
	20	Steam Stop Valve (Assembly Drawing)	
11th	21	Blow off cock. (Assembly Drawing)	
	22	**UNIT - 7**. Mechanical Screw Jack (Assembled Drawing)	
12th	23	**UNIT - 8**. Gears	
	24	Gear, Types of gears, Nomenclature of gears and conventional representation	
13th	25	Draw the actual profile of involutes teeth of spur gear	
	26	Approximate method and base circle method.	
14th	27	**SESSIONAL TEST - 3**	

LESSON PLAN

Name of faculty: **Mr.Manish Patidar**

Discipline : **Mechanical Engineering**

Semester : **3rd Semester**

Subject : **Strength of Material**

Lesson Plan Duration : **14 weeks**

Work load (Lecture/ Practical) per week (in hours) **4 Hours Lecture**

WEEK	LECTURE DAY	THEORY	PRACTICAL
		Topic (Including Assignment/test)	Topic
1st week	1st day	**Unit 1: Stresses and Strains** Basics concept of load, stress and strain	1.Tensile test of mild steel bar
	2nd day	Tensile, compressive, shear stress	
	3rd day	Linear, lateral, shear, volumetric strain Concept of elasticity, elastic limit, limit ofproportionality	
2nd week	1st day	Hooks law, elastic constants, nominal straiN	2.Tensile test of aluminum bar
	2nd day	Stress strain curve for ductile and brittle material	
	3rd day	Yield point, plastic stage, ultimate and breaking stress, Percentage elongation, proof and working stress	
3rd week	1st day	Factor of safety, poison's ratio, thermal stressand strain, introduction to principal stresses	Revision of practical no 1
	2nd day	Longitudinal and circumferential stresses In seamless thin walled cylindrical shells	
	3rd day	Unit2: Resilience strain energy, resilience, proof resilience and modulus of resilience	

4th week	1st day	Strain energy due to direct stress and shear stress	Revision of practical 2
	2nd day	Stress due to gradual, sudden and falling load	
	3rd day	Unit3: Moment of Inertia concept of moment of inertia	
5th week	1st day	Theorem of perpendicular and parallel axis	3. Bending tests on a steel bar
	2nd day	Second moment of area of rectangle ,triangle, circle and numericalofthese	
	3rdday	Second moment of area for L,T,I and numerical Section modulus	
6th week	1st day	Numerical problems and revision	4. Bending tests on wooden bar
	2nd day	Unit4: Bending Moment and Shearing Force Concept of various types of beams and loading	
	3rdday	Concept of end supports, hinged and fixed, Concept of bending moment and shear force	
7th week	1st day	B.M and S.F diagram for cantilever beam	5. Impact test on IZOD test
	2nd day	B.M. and S.F diagram for simply supported beam	
	3rdday	B.M and S.F diagram of cantilever and simply supported beams with or without overhang and U.D.L	
8th week	1st day	Numerical problems	6. Impact test on CHARPY test
	2nd day	Unit5: Bending Stresses concepts of bending stresses	
	3rdday	Theoryofsimplebending , Derivation of bending equation	

9th week	1st day	Concept of moment of resistance	7. Torsion test of solid specimen of circular section of different metals for determining modulus ofrigidity
	2nd day	Bending stress diagram, section modulus for rectangles	
	3rdday	Section modulus for circular and symmetrical I section, Bending stress in beams of rectangular	
10th week	1st day	Bending stress in circular and T section	Revision of practical 7
	2nd day	Numerical and revision	
	3rdday	Unit6: Columns Concept of column, modes of failure, Types of columns, modes of failure of column	
11th week	1st day	Buckling load, crushing load, slenderness ratio	8.To plot a graph betweenload and extension and to determine thestiffness of a helical spring
	2nd day	Effective length, end restraints	
	3rdday	Factor effecting strength of a column, Strength of column by Euler formula without derivation	
12th week	1st day	Rankin gourdan formula	Revision of practical 8
	2nd day	Unit7: Torsion concept of torsion, difference between torque and torsion	
	3rdday	Derivation of torsion equation, Use of torsion equation for circular shaft (solid and hollow)	
13th week	1st day	Comparison of solid and hollow shaft	9.hardness test on different material
	2nd day	Power transmitted by shaft	
	3rdday	Concept of mean and maximum torque	

14th week	1st day	Unit8: Springs Closed coil helical springs subjected to *axial load*	Revision of practical 9
	2nd day	Calculation of stress deformation, Stiffness, angle of twist, strain energy	
	3rdday	Determination of number of plates of laminated springs	

LESSON PLAN	
Name of Faculty	: **Sorabh Prasad**
Discipline	: **Mechanical Engineering**
Semester	: **3rd Semester**
Subject	: **THERMODYNAMICS - I**
Lesson Plan Duration:	: **15 Weeks**
Work Load (Lecture/Practical)	: **3Hrs. Lecture & 3 Practical**

Week	Day	Topic(Including Assignment/Test)	Practical
1	1	Fundamental Concepts Thermodynamic stateand system, boundary, surrounding, universe, thermodynamic systems – closed, open, isolated, adiabatic, homogeneous and heterogeneous, macroscopic and microscopic	Determination of temperature by thermocouple
	2	properties of system – intensive and extensive, thermodynamic equilibrium, quasi – static process, reversible and irreversible processes	
	3	Zeroth law of thermodynamics	
2	4	definition of properties like pressure, volume, temperature, enthalpy and internal energy	Determination of temperature by pyrometer
	5	Laws of Perfect Gases Definition of gases, explanation of perfect gas laws – Boyle's law, Charle's law, Avagadro's law, Regnault's law	
	6	Universal gas constant, Characteristic gas constants and its derivation.	
3	7	Specific heat at constant pressure, specific heatat constant volume of a gas, derivation of an expression for specific heats with characteristics	Determination of temperature by Infrared thermometer
	8	simple numerical problems on gas equation	

	9	Thermodynamic Processes Types of thermodynamic processes	
4	10	isochoric, isobaric, isothermal	Demonstration of mountings and accessoriesof a boiler.
	11	adiabatic, isentropic, polytropic	
	12	throttling processes, equations representing the processes	
5	13	Derivation of work done, change in internal energy, change in entropy, rate of heat transferfor the above process.	Study theworking of Lancashire boiler and Nestler boiler.
	14	1st Class test	
	15	1st sessional test	
6	16	Laws of Thermodynamics Laws of conservationof energy, first law of thermodynamics (Joule's experiment) and its limitations	Study of working of high pressure boiler
	17	Application of first law of thermodynamics to Non-flow systems – Constant volume, Constantpressure, Adiabatic and polytropic processes	
	18	Steady flow energy equation, Application of steady flow energy equation for turbines, pump,boilers, compressors, nozzles, and evaporators.	
7	19	Heat source and sink, statements of second laws of thermodynamics: Kelvin Planck's statement, Classius statement, equivalency ofstatements	Study of boilers (Through industrial visit)
	20	Perpetual motion Machine of first kind, second kind	

	21	Carnot engine,	
8	22	Introduction of third law of thermodynamics	Study of boilers (Through industrial visit)
	23	concept of irreversibility and concept of entropy.	
	24	Concept of ideal gas, enthalpy and specificheat capacities of an ideal gas, P – V – T surface of an ideal gas	
9	25	triple point, real gases, Vander-Wall's equation	Study of boilers (Through industrial visit)
	26	Formation of steam and related terms, thermodynamic properties of steam, steam tables	
	27	sensible heat, latent heat, internal energy of steam, entropy of water, entropy of steam, T- Sdiagrams, Mollier diagram (H – S Chart)	
10	28	Expansion of steam, Hyperbolic, reversible adiabatic and throttling processes, determinationof quality of steam (dryness fraction)	VIVA
	29	2nd class test	
	30	2nd sessional test	
11	31	Uses of steam, classification of boilers, functionof various boiler mounting and accessories	Determination of Dryness fractionof steam using calorimeter.
	32	comparison of fire tube and water tube boilers	
	33	Construction and working of Lancashire boiler, Nestler boiler, Babcock & Wilcox Boiler	

12	34	Introduction to modern boilers.	Determination of Dryness fractionof steam using calorimeter.
	35	Meaning of air standard cycle – its use, condition of reversibility of a cycle	
	36	Description of Carnot cycle, Otto cycle	
13	37	Diesel cycle, simple problems on efficiency for different cycles.	Demonstrate the working of air compressor.
	38	Comparison of Otto, Diesel cycles for same compression ratio, same peak pressure developed and same heat input	
	39	Reasons for highest efficiency of Carnot cycle and all other cycles working between same temperature limits	
14	40	Functions of air compressor – uses of compressed air, type of air compressors	Demonstrate the working of air compressor.
	41	Single stage reciprocating air compressor, its construction and working, representation of processes involved on P – V diagram, calculation of work done	
	42	Multistage compressors – advantages over single stage compressors, use of air cooler, condition of minimum work in two stage compressor (without proof) simple problems Multistage compressors	
15	43	3rd class test	VIVA
	44	Rotary compressors – types, working and construction of centrifugal compressor, axial flow compressor, vane type compressor	
	45	**3rd sessional test**	

LESSON PLAN

NAME OF FACULTY: ADITYA

GUPTA DISCIPLINE: MECHANICAL

ENGINEERINGSEMESTER: 3rd

SUBJECT: WORKSHOP TECHNOLOGY-1

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

WEEK	THEORY	
	LECTURE NOS	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, Pressureregulators,
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 ofpolarity, current regulation and voltage regulation, Electrodes
	5	Classification, B.I.S. specification and selection, Flux for arc welding. Requirements of pre heating, post heating ofelectrodes and work piece. Welding defects and their testing methods. **1.4-** Other Welding Processes
	6	Resistance welding: Principle, advantages, limitations workingand 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, Laser beam welding, Robotic welding
5th	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, theirimpact and control of properties viz. permeability, refractoriness, adhesiveness
6th	**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 mouldmaking,
	18	Molding processes: Bench molding, floor molding, pit moldingand machine molding, Molding machines squeeze machine, jolt squeeze machine and sand slinger.
7th	**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 chamberand cold chamber, Centrifugal casting
	21	2.2.4. Gating and Risering System --Elements of gating system, Pouring basin, sprue, runner, gates,
8th	**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
9th	**25**	**SESSIONAL TEST –II**
	26	**Unit-3- Metal Forming Processes-3.1**Press Working - Typesof presses, type of dies, selection of press die, die material.
	27	Press Operations-Shearing, piercing, trimming, punching, notching, shaving, gearing, embossing, stamping
10th	**28**	3.2 Forging - Open die forging, closed die forging, Pressforging, upset forging,
	29	swaging, up setters, roll forging, Cold and hot forging 3.3Rolling - Elementary theory of rolling
	30	Types of rolling mills, Thread rolling, roll passes, Rollingdefects and remedies
11th	**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**
12th	**34**	4.1 Industrial use of plastics, and applications- Advantagesand 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 moudling machine.

13th	37	**SESSIONAL TEST –III**
	38	**Revised Sessional Test -1**
	39	**Revised Sessional Test -2**
14th	40	**Revised Sessional Test -3**

Lesson Plan

Name of the faculty	**:**	**JS Narang/Hanish Saini**
Discipline	**:**	**Mechanical Engineering**
Semester	**:**	**5th**
Subject	**:**	**CNC Machines and Automation**
Lesson Plan Duration	**:**	**16weeks**
Work Load	**:**	**(L/P) (3 Periods/ 2 periods) /Week**

	Theory		Practical
Week	**Lecture Day**	**Topics**	**Topics**
1st	1st	**Unit 1 Introduction-** Introduction to NC, Basic Components of NC,	Study of constructional detail of CNC lathe.
	2nd	binary coding, MCU, input devices, advantages /disadvantages of NC machines over conventional machines	
	3rd	CNC & DNC, their types, their advantages, disadvantages and applications,	
2nd	4th	Selection of parts to be machined on CNC machines,	Study of constructional detail of CNC lathe.
	5th	Problems with conventional NC,	
	6th	Rules for Axis identification, New developments in NC, PLC Control and its purpose.	
3rd	7th	**Unit 2 Construction and Tooling-** Design features, special mechanical design features,	Study the constructional details and working of: Automatic tool changer and tool setter Multiple pallets Swarf removal Safety devices
	8th	specification Chart of CNC machines	
	9th	types of slideways, balls, rollers, motor-servo/stepper ,axis drive and leadscrew,	
4th	10th	swarf removal, safety and guarding devices,	Develop a part programme for following lathe operations and make the job on CNC lathe and CNC turning center.(for finish pass only) – (At least two)
	11th	Various cutting tools for CNC machines,	
	12th	Overview of tool holder, different pallet systems and automatic tool changer system	
5th	13th	tool change cycle, management of a tool room.	Calculating coordinate points for a cylindrical job by considering sign convention for lathe Plain turning and facing operations
	14th	**Unit 3 System Devices-** Control System ,	
	15th	Feedback control classification (open loop, closedloop),	
6th	16th	Actuators, Transducers and Sensors, characteristics of sensors,	Develop a part programme for the following milling operations and make the joB on CNC milling (for finish Pass only)- At least two
	17th	Tachometer, LVDT,	
	18th	**SESSIONAL I**	
7th	19th	optointerrupters,	

	20th	potentiometers for linear and angular position,	Calculate coordinate points for a zig zag job by considering sign convention for milling
	21st	encoder and decoder	
8th	22nd	Axis drives, other classifications of CNC machines-	Develop a part program by using canned cycle on CNC lathe for turning , facing
	23rd	Feedback, motion , positioning	
	24th	Revision/doubt session	
9th	25th	**SESSIONAL TEST -II**	Preparation of work instruction for machine operator
	26th	**Unit 4 Part Programming**- Part programming and basic procedure of part programming	
	27th	NC words, Blocks,	
10th	28th	Part programming formats,	Preparation of preventive maintenance schedule for CNC machine
	29th	simple programming for rational components (Point to point, Straight line, curved surface),	
	30th	tool off sets,	
11th	31st	cutter radius compensation and wear compensation.	Demonstration through industrial visit for awareness of actual working of FMS in production.
	32nd	Advanced structures: Advantages of using advanced structures,	
	33rd	part programming using canned cycles, subroutines and do loops, mirror image	
12th	34th	**Unit 5 Problems in CNC Machines** Common problems in mechanical, electrical, pneumatic, electronic.	Use of software for turning operations on CNC turning center
	35th	PC components of NC machines,	
	36th	diagnostic study of common problems and remedies, use of on-line fault finding diagnosis tools in CNC machines,	
13th	37th	methods of using discussion forums, environmental problems.	Use of software for milling operations on machine centres.
	38th	**Unit 6 Automation and NC system**- Automation, suitability of production system to automation , types,	
	39th	emerging trends in automation, automatic assembly	
14th	40th	manufacture of printed circuit boards, manufacture of integrated Circuits,	FILE CHECK
	41st	Overview of FMS, AGV, ASRS, Group technology, CAD/CAM and CIM, Automated Identification system , concept of AI, Robotics, nomenclature of joints, motion.	
	42nd	**SESSIONAL III**	
15th	43rd		VIVA-VOCE

LESSON PLAN

Name of faculty : **Mr. Rohit Kumar /Parveen Kumar**

Discipline : **Mechanical Engineering**Semester : **5th Semester**

Subject : **Machine Design**

Lesson Plan Duration : **15 weeks**

Work load (Lecture/ Practical) per week (in hours) **4 Hours Lecture**

WEEK	THEORY	
	Day Lecture	**Topic(Including Assignment/Test)**
1	1	Design – Definition, Type of design, necessity of design
	2	Comparison of designed and undersigned work
	3	Design procedure
	4	Characteristics of a good designer
2	5	Design terminology: stress, strain, factor of safety,
	6	Factors affecting factor of safety
	7	Stress concentration, methods to reduce stress concentration, fatigue, endurance limit.
	8	General design consideration
3	9	Codes and Standards (BIS standards)
	10	Engineering materials and their mechanical properties
	11	Properties of engineering materials: elasticity, plasticity,
	12	malleability, ductility
4	13	Toughness, hardness and resilience.
	14	Fatigue, creep, tenacity and strength etc.
	15	Selection of materials, criteria of material selection
	16	Assignment 1
5	17	Design Failure ,Various design failures-maximum stress theory
	18	maximum strain theory
	19	Classification of loads
	20	Design under tensile, compressive and torsional loads.
6	21	Type of shaft, shaft materials, Type of loading on shaft, standard sizes of shaft available
	22	Shaft subjected to torsion only, -Rigidity criterion
	23	**1st Sessional test**
	24	determination of shaft diameter (hollow and solid shaft) on the basis of :Strength criterion, Rigidity criterion
7	25	Determination of shaft diameter (hollow and solid shaft) subjected to combined torsion and bending.
	26	Design of Key Types of key, materials of key, functions of key
	27	Failure of key (by Shearing and Crushing).
	28	Design of key (Determination of key dimension)

8	29	Effect of keyway on shaft strength. (Figures and problems).
	30	Design of Joints Types of joints - Temporary and permanent joints,
	31	Utility of various joints
	32	Temporary Joint: Knuckle Joints – Different parts of the joint
9	33	Material used for the joint, type of knuckle Joint
	34	Design of the knuckle joint. (Figures and problems).
	35	Cotter Joint – Different parts of the spigot and socket joints,
	36	Design of spigot and socket joint.
10	37	Welded Joint - Welding symbols. Type of welded joint.
	38	Strength of parallel andtransverse fillet welds.
	39	Strength of combined parallel and transverse weld.
	40	**2nd Sessional test**
11	41	Riveted Joints. : Rivet materials, Rivet heads,
	42	Leak proofing of riveted joint – caulking and Fullering.
	43	Different modes of rivet joint failure.
	44	Design of riveted joint – Lap and butt,
12	45	
	46	Design of Flange Coupling
	47	Single and Multi riveted joint.
	48	Numerical
13	49	Necessity of a coupling, advantages of a coupling
	50	types of couplings
	51	Design of muff coupling,
	52	Design of flange coupling. (Protected type and unprotected type).
14	53	Design of Screwed Joints ,Introduction
	54	Advantages and Disadvantages of screw joints, Location of screw joints.
	55	Important terms used in screw threads, designation of screw threads
	56	Initial stresses due to screw up forces, stresses due to combined forces
15	57	Design of power screws (Press, screw jack, screw clamp)
	58	Use of design data book during the examination is allowed.
	59	The paper setter should normally provide all the relevant data for the machine Design in the question paper.
	60	**3rd Sessional test**

LESSON PLAN

NAME OF FACULTY: HITESH CHAWLA

DISCIPLINE: MECHANICAL ENGINEERING

SEMESTER: V

SUBJECT: REFRIGERATION AND AIR CONDITIONING

LESSON PLAN DURATION: 15 WEEKS

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

WEEK	THEORY		PRACTICALS
	LECTURE NOS	TOPIC	TOPIC
1st	1	**Unit-1 – REFRIGERATION,** Fundamentals of Refrigeration	Practical-1 Identify various tools of refrigeration kit and practice in cutting, bending, flaring, swaging and brazing of tubes
	2	Introduction to refrigeration, and air conditioning	
	3	meaning of refrigerating effect, units of refrigeration, COP, methods of refrigeration	
2nd	4	Natural System and Artificial System	Practical-2 Study of thermostatic switch, LP/HP cut out overload protector filters, strainers and filter driers.
	5	**Unit-2** Vapour Compression System	
	6	Introduction, principle, function, parts and necessity of vapour compression system,	
3rd	7	T- ϕ and p– H charts, dry, wet and superheated compression.	Practical-3 Identify various parts of a refrigerator and window air conditioner.
	8	Effect of sub cooling, super heating,	
	9	mass flow rate, entropy, enthalpy	
4th	10	work done, Refrigerating effect and COP.	Practical-4 To find COP of Refrigeration system
	11	actual vapour compression system	
	12	Introduction to air refrigeration system, advantage and disadvantage of air refrigeration over vapour compression system.	
5th	13	**SESSIONAL TEST -I**	Repeat Practical 1 to 4
	14	**Unit-3** Refrigerants, Functions, classification of refrigerants,	
	15	Properties of R – 717 R – 22, R–134 (a) and CO_2	
6th	16	Properties of ideal refrigerant, selection of refrigerant	Repeat Practical 1 to 4
	17	**Unit-4**- Vapour Absorption System, Introduction	
	18	Principle and working of simple absorption system and domestic electrolux refrigeration systems	
7th	19	Solar power refrigeration system, advantages and disadvantages of	Repeat Practical 1 to 4

		solar power refrigeration system over vapour compression system	
	20	**Unit-5-**Refrigeration Equipment, Compressor - Function, various types of compressors	
	21	Condenser - Function, various types of condensers, Evaporator - Function, types of evaporators	
8th	**22**	Expansion Valve - Function, various types such as capillary tube, thermostatic expansion valve	Practical-5 To detect trouble / faults in a refrigerator/window type air conditioner
	23	low side and high side float valves, application of various expansion valves	
	24	Safety Devices-Thermostat, overload protector LP, HP cut out switch	
9th	**25**	**SESSIONAL TEST -II**	Practical-**6** Charging of a refrigerator/window type air conditioner.
	26	**Unit-6**- Psychrometry Definition, importance, specific humidity, relative humidity, degree of saturation	
	27	DBT, WBT, DPT, sensible heat, latent heat, Total enthalpy of air.	
10th	**28**	Unit-7 Applied Psychrometry and Heat Load Estimation. Psychrometric chart, various lines	Practical-7 Study of cut section of single cylinder compressor
	29	Psychrometric processes	
	30	By pass factor, room sensible heat factor, effective room sensible heat factor, grand sensibleheat factor	
11th	**31**	ADP, room DPT.	Practical-8 Visit to an ice plant, cold storage plant, central air conditioning plant
	32	Heating and humidification, cooling and dehumidification	
	33	Window air-conditioning,	
12th	**34**	split type air conditioning,	Repeat Practical 5 to 8
	35	Central air-conditioning,	
	36	Car air-conditioning	
13th	**37**	**Unit -8**, Latest development in refrigeration and air conditioning	Repeat Practical 5 to 8
	38	Inverter technology, auto-defrosting	
	39	Blast cooling, star rating.	
14th	**40**	**SESSIONAL TEST -III**	Repeat Practical 5 to 8
	41	Revision	
	42	Practice of Numericals	
15th	**43**	Query	Repeat Practical

LESSON PLAN

NAME OF FACULTY: SH. HANISH SAINI / ROHIT KUMAR

DISCIPLINE: MECHANICAL ENGINEERING **SEMESTER:**-V

SUBJECT: THEORY OF MACHINES LESSON PLAN

DURATION: 15 WEEKS

WORK LOAD (LECTURE/PRACTICAL) PER WEEK: (3 Lectures & 2 Practical's)

WEEK	THEORY		PRACTICALS
	LECTURE NOS.	TOPIC	TOPIC
1st	1	**Unit -1**. Simple Mechanisms- Kinematics of Machines: - Definition of Kinematics, Dynamics, Statics, Kinetics, Kinematic link.	Practical-1: To study inversion of Four Bar Mechanism, Single Slider Crank Chain Mechanism and Double Slider Crank Chain Mechanism with the help of workin gmodels.
	2	Kinematic Pair and its types, constrained motion.	
	3	Constrained motion and its types, Kinematic chain & its types, Mechanism, inversion	
2nd	4	Machine and structure, Inversions of Kinematic Chain: Inversion of four bar chain, coupled wheels of Locomotive & Pantograph	Practical-2 : To study various kinds of belts drives and gear trains with the help of working models
	5	Inversion of Single Slider Crank chain- Rotary I.C.Engines mechanism, Crank and Slotted lever quick return mechanism.	
	6	Inversion of Double Slider Crank Chain- Scotch Yoke Mechanism & Oldham's Coupling.	
3rd	7	**Unit-2** Power Transmission- Introduction to Belt and Rope drives, types of belt drives.	Practical-3: To find the moment of inertia of a flywheel. .
	8	Concept of velocity ratio, slip and creep; crowning of pulleys (simple numerical)	
	9	Flat and V belt drive: Ratio of driving tensions, power transmitted	
4th	10	Centrifugal tension, and condition for maximum horse power	Practical-4: To Study the different types of centrifugal governors & to plot graph between R.P.M & Displacement
	11	Simple Numerical	
	12	Different types of chains and their terminology	
5th	13	Gear Drive - Simple, compound, reverted and epicyclic gear trains	Repeat Practical 1 to 4
	14	Simple numerical	
	15	UNIT 3: Flywheel, Principle and applications offlywheel	

6th	**16**	Turning - moment diagram of flywheel for different engines	Repeat Practical 1 to 4
	17	Fluctuation of speed and fluctuation of energy -Concept only	
	18	**SESSIONAL TEST -I**	
7th	**19**	Coefficient of fluctuation of speed and coefficient of fluctuation of energy.	Repeat Practical 1 to 4
	20	Simple numerical on above topics	
	21	**Unit-4-** Governor Function of a governor, comparison of flywheel and governor	
8th	**22**	Simple description and working of Watt, Porter	Practical-5: To construct cam profile for uniform velocity, SHM and uniform acceleration and retardation on drawing sheet.
	23	Hartnel governor (simple numerical based on watt and porter governor)	
	24	Terminology used in governors: Height, equilibrium speed,	
9th	**25**	Hunting, iso-chronisms, stability, sensitiveness of a governor	Practical-**6.**: To perform the experiment of Balancing of rotating parts and find the unbalanced couple and forces.
	26	**Unit-5-** Definition and function of cam. Description of different types of cams and	
	27	followers with simple line diagram	
10th	**28**	Terminology of cam profile,	Repeat Practical 5 to 6
	29	**SESSIONAL TEST -II**	
	30	Displacement diagram for uniform velocity	
11th	**31**	S.H.M. and uniform acceleration and De-acceleration.	Quiz on Practical
	32	S.H.M. and uniform acceleration and deceleration	
	33	**Unit-6-** Balancing, Need of balancing,	
12th	**34**	Introduction to balancing of rotating masses in the same plane	Repeat Practical 5 to 6
	35	Balancing of rotating masses in the different Plane	
	36	Simple Numerical	

13th	**37**	Simple Numerical	Repeat Practical 1 to 6
	38	UNIT 7:Vibrations, Causes of vibrations in machines, their harmful effects and remedies.	
	39	Types-longitudinal, transverse and torsional vibrations. Damping of vibrations	
14th	**40**	**Revised Sessional Test -1**	Repeat Practical
	41	**Revised Sessional Test -2**	
	42	**Revised Sessional Test -3**	
15th	**43**	Seminar	Important viva questions
	44	Seminar	
	45	**SESSIONAL TEST –III**	

LESSON PLAN

DISCIPLINE: MECHANICAL ENGINEERING **SEMESTER:** V

SUBJECT: WORKSHOP TECHNOLOGY – III

LESSON PLAN DURATION: 15 WEEKS

FACULTY NAME:-SH.BHARAT BHUSHAN / RAM NIWAS WORK

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

WEEK	THEORY	
	LECTURE NOS	**TOPIC**
1st	1	**Unit-1-** Milling, Specification and working principle of millingmachine Classification, brief description and applications of milling machine
	2	Details parts of column and knee type milling machine,
	3	Milling machine accessories and attachment – Arbors, adaptors,collets,vices, circular table,
2nd	4	indexing head and tail stock, vertical milling attachment, rotary table.
	5	, Milling methods - up milling and down milling, Identification ofdifferent milling cutters and work mandrels
	6	Work holding devices,
3rd	7	Milling operations – face milling, angular milling, form milling,straddle milling and gang milling,
	8	Cutting speed and feed, Simple numerical problems.
	9	Thread Miling
4th	10	Gear hobbing
	11	Gear shaping
	12	**Gear finishing process**
5th	13	**Sessional Test-I**
	14	**Purpose of grinding** Various elements of grinding wheel – Abrasive, Grade, structure,Bond
	15	Common wheel shapes and types of wheel – built up wheels,mounted wheels and Diamond wheels Specificationof grinding wheels as per BIS
6th	16	Truing, dressing, balancing and mounting of wheel.
	17	Grinding methods – Surface grinding, cylindrical grinding andcentreb less grinding.
	18	Grinding machine – Cylindrical grinder, surface grinder, internal grinder, Centreless grinder, tool and cutter grinder.

7th	19	Selection of grinding wheel, Thread grinding.
	20	Modern Machining Processes- Mechanical Process - Ultrasonic machining (USM): Introduction, principle, process, advantages and limitations, applications
	21	Electro Chemical Processes - Electro chemical machining (ECM) – Fundamental principle, process, applications
8th	22	Electrical Discharge Machining(EDM) - Introduction, basic EDM circuit, Principle, metal removing rate, dielectric fluid, applications
	23	Laser beam machining (LBM) – Introduction, machining processand applications
	24	Plasma are machine (PAM) and welding-introduction, principle process and applications
9th	25	**SESSIONAL TEST -II**
	26	Metal spraying – Wire process,powder coating process, applications
	27	Electro plating, anodizing and galvantizing
10th	28	**Organic Coating-Oil base paint, rubber base coating**
	29	**Purpose of finishing surfaces.**
	30	Surface roughness-Definition and units,
11th	31	Honing Process, its applications
	32	Description of hones,
	33	Brief idea of honing machines.
12th	34	Lapping process, its applications.
	35	Description of lapping compounds and tools
	36	Brief idea of lapping machines, Polishing
13th	37	Buffing
	38	Burnishing
	39	**SESSIONAL TEST -III**
14th	40	**Revision of Sessional Test -1 Syllabus**
	41	**Revision of Sessional Test -2 Syllabus**
	42	**Revision of Sessional Test -3 Syllabus**

& Sh. Bharat Bhushan **Discipline: Mechanical Engg.**

Semester: First **Subject: Engineering Graphics**

Lesson Plan Duration: 15 Weeks

Teaching Load: Practical – 2 Turns/week (3 Hrs./ Turn)

WEEK	TURN	TOPIC	Covered on Date
1	1	**UNIT I** **1. Introduction to Engineering Drawing and Graphics** Introduction to use and care of drawing instruments, drawing materials, layout and sizes of drawing sheets and drawing boards.	
	2	1.2 Symbols and conventions a) Conventions of Engineering Materials, Sectional Breaks and Conventionallines.	
2	3	b) Civil Engineering Sanitary fitting symbols c) Electrical fitting symbols for domestic interior installations.	
	4	1.3 Geometrical construction-geometrical figures such as triangles, rectangles, circles, ellipses and curves, hexagons, pentagons bisecting a line and arc, division of line and circle with the help of drawing instruments.	
3	5		
	6	**2. Technical Lettering of Alphabet and Numerals** Definition and classification of lettering, Free hand (of height of 5,8,12 mm) and instrumental lettering (of height 20 to 35 mm) : upper case and lower case, single and double stroke, vertical and inclined (Gothic lettering) at 75 degree to horizontal and with suitable height to width ratio 7:4	
4	7		
	8	**3. Dimensioning** Necessity of dimensioning, method and principles of dimensioning (mainly theoretical instructions).	
5	9	Dimensioning of overall sizes, circles, threaded holes, chamfered surfaces, angles, tapered surfaces, holes, equally spaced on P.C.D., countersunk holes, counter bored holes, cylindrical parts, narrow spaces and gaps, radii, curves and arches.	
	10	**4. Scales** Scales –Needs and importance (theoretical instructions), Type of scales, Definition of Representative Fraction (R.F.) and Length of Scale.	
6	11	To draw/construct plain and diagonal scales.	
	12	**1st sessional Test**	

	13	**UNIT II** **1. Orthographic Projections** 1.1 Theory of orthographic projections	
7	**14**	1.2 Three views of orthographic projections of different objects of given pictorial view of a block in 1st and 3rd angle. 1.3 Projection of Points in different quadrant .	
8	**15**	1.4 Projection of Straight Line (1st angle) i. Line parallel to both the planes. ii. Line perpendicular to any one of the reference plane and parallel to others iii. Line inclined to any one of the references and parallel to another plane.	
	16	1.5 Projection of Plane – Different lamina like square rectangular, triangular, circle and Hexagonal pentagon. Trace of planes (HT and VT).	
9	**17**	1.6 Identification of surfaces.	
	18	**2. Sectioning** Importance and salient features 2.2 Drawing of full section, half section, partial or broken out sections, Offset sections, revolved sections and removed sections (theoretical only).	
10	**19**		
	20	2.3 Orthographic sectional views of different objects.	
11	**21**	**2ND sessional Test**	
	22	**UNIT III** **1. Introduction of projection of right solids** such as prism & pyramid (square, Pentagon, Hexagonal) cube, cone & cylinder (Axes perpendicular to H.P and parallel to V.P.)	
12	**23**	**2. Introduction of sections of right solids** - Section planes, Sections of Hexagonal prism, pentagon pyramid, cylinder and cone (Section plane parallel to anyone reference planes and perpendicular to V.P. and inclined to H.P.)	
	24	**3. Development of Surfaces** – Development of lateral surfaces of right solids like cone, cylinder, pentagonal prism, pyramid and hexagonal pyramid (Simple problems)	
13	**25**	**UNIT IV** **1. Fundamentals of isometric projections and isometric scale. 2. Isometric views of different laminas** like circle, pentagon and hexagon.	
	26	**3. Isometric views of different regular solids** like cylinder, cone, cube, cuboid, pyramid and prism. **4. Isometric views from given different orthographic projections(front, side and top view)**	
14	**27**	**UNIT V** **Introduction to AutoCAD** Basic introduction and operational instructions of various commands in AutoCAD.	
	28	**Drawing of different objects on AutoCAD** (given pictorial/isometric viewof a block).	
15	**29**		
	30	**3RD sessional Test**	