

## LESSON PLAN

**FACULTY NAME – HANISH SAINI DISCIPLINE -**

**MECHANICAL ENGINEERING SEMESTER - 4<sup>TH</sup>**

**SUBJECT - Hydraulics and Pneumatics**

**LESSON PLAN DURATION – 16 WEEKS**

**WORK LOAD / WEEK - 3 LECTURES / 2 Practicals**

WEEK	THEORY		Practical
	DAY/ LECT U RE	TOPIC (INCLUDING ASSIGNMENT/TEST)	
1st	1	UNIT I Properties of fluid: Density, Specific gravity, Specific Weight, Specific Volume, Dynamic Viscosity, Kinematic Viscosity,	1. Measurement of pressure head using i) Piezometer tube ii) Simple U-tube manometer iii) Bourdon.s tube pressure gauge
	2	Surface tension, Capillarity, Vapour Pressure, Compressibility.	
	3	Fluid Pressure & Pressure Measurement: Fluid pressure, of Pascal's law and its applications	
2nd	4	Pressure head, Pressure intensity, Concept of vacuum and gauge pressures, atmospheric pressure, absolute pressure,	2. Verification of Bernoulli's theorem.
	5	Piezometer, Simple U- tube Manometer and differential manometers,	
	6	Bourdan's pressure gauge, Concept of Total pressure on immersed bodies,	
3rd	7	center of pressure, Simple problems on fluid properties and Manometers	2. Verification of Bernoulli's theorem.
	8	Revision	
	9	Revision	
4th	10	UNIT II Fluid Flow: Types of fluid flows, Path line and Stream line,	3. Determination of Coefficient of Discharge of venturimeter.
	11	Continuity equation, Bernoulli's theorem,	
	12	Principle of operation of Venturimeter,	

5th	13	Orifice meter and Pitot tube,	4. Determination of Coefficient of Discharge, coefficient of contraction and coefficient of velocity of Orifice meter.
	14	Derivations for discharge, coefficient of discharge and numerical problems.	
	15	Sessional Test No. 1	
6th	16	Flow Through Pipes: Laminar and turbulent flows;	4. Determination of Coefficient of Discharge, coefficient of contraction and coefficient of velocity of Orifice meter.
	17	Darcy's equation and Chezy's equation for frictional losses,	
	18	Minor losses in pipes, wetted perimeter,	
7th	19	Hydraulic gradient and total gradient line,	5. Determination of coefficient of friction off low through pipes((Darcy's equation)
	20	Reynold's number and its effect on pipe friction;	
	21	Water hammer. Simple numerical problems to estimate major and minor losses.	
8th	22	UNIT III Hydraulic Turbines: Impact of jet on fixed vertical and moving vertical flat plates,	6. Determination of minor losses of flow through pipes. (Chezy's Equation)
	23	Hydraulic Turbines: Classification of hydraulic turbines,	
	24	Selection of turbine on the basis of head and discharge available,	
9th	25	Construction and working principle of Pelton wheel, Francis and Kaplan turbines.	7. To determine overall efficiency of a single stage centrifugal pump.
	26	other Machines working construction and applications of hydraulic press, hydraulic jack,	
	27	hydraulic accumulator and hydraulic ram.	
10th	28	Sessional Test No. 2	8. Demo of working of Pelton wheel, Francis and Kaplan turbine with the help of working model.
	29	Revision	
	30	Revision	
11th	31	UNIT IV Pumps: Centrifugal Pumps: Principle of working and applications,	8. Demo of working of Pelton wheel, Francis and Kaplan turbine with the help of working model.
	32	Types of casings and impellers, Concept of multistage,	
	33	Priming and its methods, Cavitation, Manometric head, Work done, Manometric efficiency, Overall efficiency.	
12th	34	Reciprocating Pumps: Construction, working principle and applications of single and double acting reciprocating pumps,	9. Draw hydraulic circuit of any available machine or working model
	35	Concept of Slip, Negative slip, Cavitation and separation.	
	36	Revision	
	37	UNIT V	9. Draw hydraulic circuit of any available

13th		Hydraulic and Pneumatic systems:	machine or working model
	38	Introduction to oil power hydraulic and pneumatic system. Relative Merits and Demerits of oil power hydraulic and pneumatic system.	
	39	Basic components of hydraulic system, function of each component in a hydraulic circuit such as Oil reservoirs, connectors, pipes, motors and pumps(power pack), Filters, etc.	
14th	40	Components of Pneumatic Systems : Basic components – function of each component such as Air compressors,	10. Draw pneumatic circuit of any available machine or working model
	41	Air cylinder and their types (single acting, double acting, piston type, diaphragm type, tandem cylinder, double ended cylinder).	
	42	Revision	
15th	43	Air filter, regulator and lubricator – their necessity in pneumatic circuit.	
	44	common faults in hydraulic system and pneumatic systems and remedial action	10. Draw pneumatic circuit of any available machine or working model
	45	Sessional Test No.3	
16th	46	Revision	Revision
	47	Revision	
	48	Revision	

## LESSON PLAN

**FACULTY NAME – SH. SANJIV KUMAR**

**DISCIPLINE - MECHANICAL ENGINEERING**

**SEMESTER - 4<sup>TH</sup>**

**SUBJECT - MACHINE DESIGN**

**LESSON PLAN DURATION – 16 WEEKS**

WEEK	THEORY	
	DAY/ LECTURE	TOPIC (INCLUDING ASSIGNMENT/TEST)
1ST	1	UNIT I . Introduction - Design – Definition, Type of design, necessity of design,
	2	Comparison of designed and undersigned work,
	3	Design procedure, Characteristics of a good designer
2ND	4	Design terminology: stress, strain, factor of safety
	5	factors affecting factor of safety, stress concentration,
	6	, methods to reduce stress concentration, fatigue,
3RD	7	creep and tenacity, endurance limit. SN Curve and its significance
	8	General design consideration, Selection of materials,
	9	criteria of material selection, Codes and Standards (BIS standards)
4TH	10	Various design failures- maximum normal stress theory, maximum stress theory, maximum strain theory
	11	UNIT II . Design of Shaft - Type of shaft, shaft materials, Type of loading on shaft,
	12	standard sizes of shaft available ,
5TH	13	Shaft subjected to torsion only, determination of shaft diameter (hollow and solid shaft)
	14	on the basis of : - Strength criterion - Rigidity criterion
	15	2.3 Determination of shaft diameter (hollow and solid shaft) subjected to bending
6TH	16	Determination of shaft diameter (hollow and solid shaft) subjected to combined torsion and bending.
		SESSIONAL TEST - 1
	17	UNIT III . Design of Key - Types of key, materials of key, functions of key
	18	Failure of key (by Shearing and Crushing).
7TH	19	Design of key (Determination of key dimension)
	20	Effect of keyway on shaft strength. (Figures and problems).
	21	UNIT IV Design of Coupling Necessity of a coupling, advantages of a coupling,
8TH	22	, types of couplings, design of muff coupling,
	23	design of flange coupling. (Both protected type and unprotected type).
	24	UNIT IV . Design of Joints Design of Temporary Joints: Knuckle Joints – Different parts of the joint, material used for the joint,
9TH	25	type of knuckle Joint, design of the knuckle joint.
	26	Cotter Joint – Different parts of the spigot and socket joints,
	27	Design of spigot and socket joint.
10TH	28	Design of Permanent Joint: Riveted Joints. : Rivet materials, Rivet heads,
	29	Leak proofing of riveted joint – caulking and fullering.
	30	Different modes of rivet joint failure.
		SESSIONAL TEST - 2
11TH	31	Design of riveted joint – Lap and butt, single and multi riveted joint.
	32	Welded Joint - Welding symbols. Type of welded joint,
	33	strength of parallel and transverse fillet welds
12TH	34	Strength of combined parallel and transverse weld.
	35	UNIT V . Design of Screwed Joints and Springs Design of screw: Introduction, Advantages and Disadvantages of screw joints,
	36	Location of screw joints. Important terms used in screw threads
13TH	37	designation of screw threads,
	38	Initial stresses due to screw up forces, stresses due to combined forces,

	39	Design of Screw jack
14TH	40	Design of Spring: Classification and applications of springs
	41	spring terminology, Stresses in springs,
	42	Wahl's correction factor,
15TH	43	design of open coil helical spring subjected to uniform applied load under tension and compression.
	44	SESSIONAL TEST - 3
	45	REVISION
16TH	46	REVISION
	47	REVISION
	48	REVISION

## **LESSON PLAN**

**NAME OF FACULTY:** SH. HARJIT CHAWLA/ SH. ROHIT KUMAR

**DISCIPLINE:** MECHANICAL ENGINEERING – G.P. AMBALA

**SEMESTER:** 4th

**SUBJECT:** MATERIAL AND METALLURGY

**LESSON PLAN DURATION:** 15 WEEKS

**WORK LOAD (LECTURE/PRACTICAL) PER WEEK: THEORY-** (3 PERIODS/ 2PERIODS)

WEEK	THEORY		PRACTICALS
	LECTURE NO.	TOPIC	TOPIC
1st	1	1. Introduction Material, History of Material Origin, Scope of Material Science.	1. Classification of about 25 specimens of materials/machine parts into (i) Metals and non-metals (ii) Metals and alloys (iii) Ferrous and non-ferrous metals (iv) Ferrous and non Ferrous alloys.
	2	Overview of different engineering materials and applications.	
	3	Difference between metals and non-metals, Overview of Biomaterials and semi- conducting materials.	
2nd	4	2.Crystallography Fundamentals of Crystal, Unit Cell, Space Lattice,	2. Given a set of specimen of metals and alloys (copper, brass, aluminum, cast iron, HSS, Gun metal); identify and indicate the Various properties possessed by them.
	5	Arrangement of atoms in Simple Cubic Crystals, BCC, FCC and HCP Crystals	
	6	Number of atoms per unit Cell, Atomic Packing Factor, coordination number (without derivation),	
3rd	7	Defects/ Imperfections, types and effects in Solid materials,	Copy Checking/revision
	8	Deformation: Overview of deformation behavior And its mechanisms, Elastic and Plastic deformation.	
	9	Behavior of material under load and stress-strain, Failure Mechanisms: Overview of failure modes, Fracture, fatigue and creep.	
4th	10	Metallurgy- Introduction, Cooling curves of pure metals, dendritic solidification of metals,	3. Study of heat treatment furnace.
	11	effect of grain size on mechanical properties, Binary alloys, Thermal equilibrium diagrams	
	12	Lever rule, Solid Solution alloys	

5th	13	SESSIONAL TEST-I	4. (a) Study of a metallurgical microscope .
	14	3. Metals And Alloys Ferrous Metals: Different iron ores, Flow diagram for production of iron,	

	15	Steel and stainless steel, allotropic forms of iron- Alpha, Delta, Gamma.	4. (b) Study of a specimen polishing machine.
6th	16	Basic process of manufacturing of pig iron and steel-making.	Copy Checking/revision
	17	Cast Iron: Introduction. Different types of Cast Iron, manufacture and their usage.	
	18	Steels: Plain carbon Steels and alloy steel, Classification of plain carbon steels,	
7th	19	Properties and application of different types of Plain Carbon Steels, Effect of various alloys on properties of steel	5. To prepare specimens of following materials for microscopic examination and to Examine the microstructure of the specimens of following materials: i) Brass ii)Copper
	20	alloy steels (high speed steel, stainless steel, Uses of spring steel, silicon steel	
	21	Stainless steel: Definition, importance and criticality (Life cycle cost, Corrosion impact; difference with Steel, Per Capita consumption; growth rate of SS v/s other materials, World v/s India).	
8th	22	Various grades of SS and their nomenclature, Effect of alloying elements, Unique characteristics of various grades of SS. Manufacturing of SS: Process flow, Raw materials for SS manufacturing functions of each processing unit, Downstream facilities, Various finishes of SS,	iii) Grey iv)Malleable
	23	Fabrication and testing of SS: Stud welding method, Weld ability and effect of welding on various types of SS, Defects like Sensitization and micro-fissure	
	24	Relative observations and precautions while performing the processes: cutting, Buffing, Bending, Roll forming, Embossing, Polishing of Stainless steel. Chemical treatment like pickling and passivation for SS.	

9th	25	Applications of SS : Demand of SS in Various segments, Overview of SS applications in Automobile, railway.	v) Low carbon steel vi) High carbon steel s
	26	Non Ferrous Materials: Properties and uses of Copper, Aluminum and their alloys	vii) HSS
	27	Transport. Architectural, building construction applications and Process Industries	6. To anneal a given specimen and find out difference in hardness as a result of annealing.
10th	28	SESSIONAL TEST-II	Copy Checking/revision
	29	4. Theory of Heat Treatment Purpose of heat treatment,	
	30	Iron Carbon diagram, equilibrium diagram, different microstructures of iron and steel	
11th	31	Formation and decomposition of Austenite, Martensitic Transformation – Simplified Transformation Cooling Curves	7. To normalize a given specimen and to find out the difference in hardness as a result of normalizing.
	32	Various heat treatment processes- hardening, tempering, annealing, normalizing	
	33	Case hardening and surface hardening	
12th	34	Types of heat treatment furnaces required for above operations (only basic idea),	8. To harden and temper a specimen and to find out the difference in hardness due to Tempering.
	35	Measurement of temperature of furnaces. Physical metallurgy of Stainless Steel	
	36	Various phases in SS, Chromium-Nickel diagram, Schaeffler Diagram	
13th	37	5. Advanced Materials	9. Demo of welding defects like sensitization and micro fissure in stainless steel.
	38	Heat Insulating materials-Asbestos,	
	39	Glass wool, thermocol, Refractory materials – Dolomite, porcelain.	
14th	40	Glass– Soda lime, borosil.	Copy Checking/revision
	41	Materials for bearing metals Materials for Nuclear Energy Materials	Viva-voice
	42	Smart materials- properties and applications	
15th	43	SESSIONAL TEST-III	Viva-voice
	44	REVISION	
	45	REVISION	



## LESSON PLAN

**FACULTY NAME – PREETI KATARIA**

**DISCIPLINE - MECHANICAL ENGINEERING**

**SEMESTER - 4<sup>TH</sup>**

**SUBJECT - WORKSHOP TECHNOLOGY – III**

**LESSON PLAN DURATION – 16 WEEKS**

WEEK	THEORY	
	DAY/ LECTURE	TOPIC (INCLUDING ASSIGNMENT/TEST)
1st	1	UNIT -1 GEAR MANUFACTURING - Gear materials and specifications, Gear manufacturing by Casting, Moulding, Stamping, Machining
	2	Gear generating methods: Gear Shaping with pinion cutter & rack cutter; Gear hobbing
	3	Description of gear hob; Operation of gear hobbing machine; Gear finishing processes;
2nd	4	UNIT II - Grinding - Principles of metal removal by Grinding; Abrasives – Natural & Artificial; Bonds and binding processes:
	5	Vitrified, silicate, shellac, rubber, bakelite; Factors affecting the selection of grind wheels:
	6	size and shape of wheel, kind of abrasive, grain size, grade and strength of bond, structure of grain, spacing, kinds of bind material;
3rd	7	Standard marking systems: Meaning of letters & numbers sequence of marking,
	8	Grades of letters; Truing, dressing, balancing and mounting of wheel.
	9	Selection of grinding wheel. Grinding machines classification: Cylindrical, Surface,
4th	10	Tool & Cutter grinding machines;
	11	Construction details; Principle of centreless grinding;
	12	Advantages & limitations of centreless grinding
		SESSIONAL TEST - 1
5th	13	UNIT III - Modern Machining Processes - Introduction – comparison with traditional machining; Ultrasonic Machining: principle,
	14	Description of equipment, applications; Electric Discharge Machining (EDM): Principle,
	15	Description of equipment, Dielectric fluid, tools (electrodes)
6th	16	Process parameters, Output characteristics, applications.
	17	Wire cut EDM: Principle, Description of equipment,
	18	Controlling parameters; applications;
7th	19	Abrasive Jet Machining: principle, description of equipment,
	20	Application; Laser Beam Machining: principle,
	21	Description of equipment, application;
8th	22	Electro Chemical Machining: description of equipment, application.
	23	UNIT IV Metal Forming Processes - Press Working - Types of presses, type of dies and punches, selection of press die, die material.
	24	Press Operations-Shearing, piercing, trimming, punching,
9th	25	Notching, shaving, gearing, embossing, stamping.
	26	Forging - Open die forging, closed die forging, Press forging,
	27	upset forging, swaging, up setters,
		SESSIONAL TEST - 2
10th	28	Roll forging, Cold and hot forging.
	29	Rolling - Elementary theory of rolling, Types of rolling mills,
	30	Thread rolling, roll passes, Rolling defects and remedies.

11th	31	Extrusion and Drawing - Type of extrusion- Hot and Cold,
	32	Direct and indirect. Pipe drawing,
	33	tube drawing, wire drawing
12th	34	UNIT V . Metal Finishing Processes Purpose of finishing surfaces. Surface roughness-Definition and units,
	35	Honing Process, its applications,
	36	Description of hones. Brief idea of honing machines.
13th	37	Lapping process, its applications.
	38	Description of lapping compounds and tools. Brief idea of lapping machines.
	39	Polishing, Buffing, Burnishing and super finishing
14th	40	Metallic Coating Processes Metal spraying – Wire process, powder coating process
	41	Electroplating: Basic principles
	42	Plating metals, applications; Hot dipping: Galvanizing, Tin coating,
15th	43	Parkerising, Anodizing. Organic coatings:
	44	Oil base Paint, Lacquer base, Enamels, Bituminous paints,
	45	Rubber base coating; Finishing specifications
		SESSIONAL TEST - 3
16th	46	REVISION
	47	REVISION
	48	REVISION

# LESSON PLAN

**FACULTY NAME – PARVEEN KUMAR/ ROHIT KUMAR**

**DISCIPLINE - MECHANICAL ENGINEERING**

**SEMESTER - 4<sup>TH</sup>**

**SUBJECT - CAD /CAM**

**LESSON PLAN DURATION – 8 WEEKS**

**WORK LOAD / WEEK - 4 LECTURE**

WEEK	PRACTICALS	
	DAY/ LECTURE	TOPIC (INCLUDING ASSIGNMENT/TEST)
1st	1	UNIT I . Introduction - Computer Aided Design (CAD)
	2	Introduction to Computer Aided Drafting (2D)
2nd	3	commands of any one software (Auto CAD, ProE, Solid works, Unigraphics etc.)
	4	Introduction to CAD Software,
	5	Installing CAD Software,
	6	Familiarization with software
3rd	7	coordinate system (Absolute, Relative and Polar),
	8	grid, and ortho mode and setting of units and layout.
	9	Exercises on preparing drawings of some machine elements using:
	10	Drawing commands – point, line, arc, circle, ellipse, Editing commands
4th	11	scale, erase, copy, stretch, lengthen and explode.
	12	Dimensioning and placing text in drawing area,
	13	sectioning and hatching,
5th	14	Inquiry for different parameters of drawing entity,
	15	Create layers within a drawing,
	16	Some exercise on simple drawings.
6th	17	UNIT II . Prepare assembly drawing of the following using Drafting Software (2D)
	18	Plummer Block
	19	Stepped pulley, V-belt pulley
7th	20	Machine tool Holder
	21	Wall Bracket
	22	UNIT III Isometric Drawing by CAD using any part modeling Software (3D)
	23	Introduction: Part modelling:
	24	Datum Plane; constraint; sketch; dimensioning; extrude; revolve;
	25	sweep; blend; protrusion; extrusion; rib; shell; hole;
	26	round; chamfer; copy; mirror; assembly;
	27	align; orient. Exercises for 3D Drawings:
	28	Flanged coupling
	29	Bearing Block
	30	Bushed bearing

8th	31	UNIT IV Computer Aided Manufacturing (CAM)
	32	Introduction to CAM software, steps in using CAM software
	33	Generate part program using CAM software (MasterCAM/EdgeCAM or any other CAM software) for turning jobs
	34	Generate part program using CAM software
	35	MasterCAM/EdgeCAM or any other CAM software) for milling jobs
	36	any other CAM software) for turning jobs

## **LESSON PLAN**

**NAME OF FACULTY:** SH. RAM NIWAS

**DISCIPLINE:** MECHANICAL ENGINEERING – G.P. AMBALA

**SEMESTER:** 6th

**SUBJECT:** AUTOMOBILE ENGINEERING

**LESSON PLAN DURATION:** 15 WEEKS

**WORK LOAD (LECTURE/PRACTICAL)PER WEEK - (3 PERIODS/ 2PERIODS)**

WEEK	THEORY		PRACTICALS
	LECTURE NO.	TOPIC	TOPIC
1st	1	1. Introduction Automobile and its development	1 Fault and their remedies in Battery Ignition system
	2	Various types of automobiles manufactured in India	
	3	,Layout of chassis	
2nd	4	Types of drives-front wheel, rear wheel, four wheels	2 Adjustment of Head Light Beam (ii) Wiper and Indicators.
	5	Electric and Other Modern Vehicles: Introduction; History of Hybrid and Electric Vehicles	
	6	Social and Environmental importance of Hybrid and Electric Vehicles Components	
3rd	7	Vehicle mechanics: Roadway fundamentals	Copy Checking/revision
	8	Vehicle kinetics, Dynamics of vehicle motion	
	9	Propulsion System Design, Motor sizing	
4th	10	Introduction of CNG/PNG in Automobiles, Introduction to self-driven cars	3 Dismantling and inspection of (i) AC Pump (ii) SU Pump
	11	UNIT-II Transmission System Clutch - Functions, Constructional details of single plate	
	12	Multi plate friction clutches, Cone clutch, Hydraulic clutch	

5th	13	SESSIONAL TEST-I	. 4 Dismantle (i) rear axle (ii) differential and find out the gear ratio of crown wheel
	14	Gear Box - Functions, Working of sliding mesh, constant mesh and synchromesh gear box	

	15	Torque converter and overdrive	Copy Checking/revision
6th	16	Introduction to Automated Manual Transmission Automatic transmission and Continuously Variable Transmission (CVT) Propeller shaft and rear axle - Functions	
	17	Wheels and Tyres-Types of wheels Types and specifications of tyres used in Indian vehicles, Toe in, Toe out	
	18	camber, caster, kingpin inclination, Wheel balancing and alignment, Factors affecting tyre life	
7th	19	UNIT III Steering System Function and principle of steering system, steering geometry	5 Fault finding practices on an automobile - four wheelers (petrol/ diesel vehicles).
	20	Types of steering mechanism-Ackerman ,Davis Steering Mechanism	
	21	Types of steering gears - worm and wheel, rack and pinion	
8th	22	Power steering-Hydraulic and Electrical	6 Servicing/ Tuning of a 2-wheeler/4 wheeler
	23	Braking System Function of braking system	
	24	Constructional details and working of mechanical brake	

9th	25	Hydraulic, air and vacuum brake, Power brake	7 Servicing of hydraulic brakes: a) adjustment of brakes
	26	Relative merits and demerits. Details of master cylinder wheel cylinder	
	27	Concept of brake drum, brake lining/pad and Brake adjustment Introduction to Anti-lock Brake System (ABS)	
10th	28	Electronic Brake-force Distribution (EBD) and its working, Regenerative braking	Copy Checking/revision
	29	SESSIONAL TEST-II	
	30	UNIT IV Suspension System Function of suspension system and types of Coil Spring	
11th	31	Leaf spring, Air suspension, Shock Absorber (Telescopic type) –Function, construction and working	8. Learning Driving Practice.
	32	Battery Functions and types, Constructional details of Lithium-ion batteries	
	33	selection of battery for particular use, Battery charging	
12th	34	chemical reactions during charge and discharge, Maintenance of batteries	9 Testing and Charging of an automobile battery and measuring cell voltage and specific gravity of electrolyte.
	35	Checking of batteries for voltage and specific gravity	
	36	Batteries for electric and hybrid vehicles.	
13th	37	Battery pack Design, Properties of Batteries	. 10. Rotation of tyres inflation of tyres and balancing of wheel
	38	UNIT V Dynamo and Alternator Dynamo- Function and details, Regulators - voltage current and compensated type	
	39	Cutout- construction, working and their adjustment	
14th	40	Alternator- Construction and working, charging of battery by alternator. Introduction to Integrated starter-alternator wiring Diagram of an Automobile	Copy Checking/revision
	41	Safety Measures Road safety symbols & rules. Various safety star rating systems tests of vehicles. Air bags and other safety equipment such as bull guard, cameras, sensors	Viva-voice
	42	Advance Driver Assistance Systems (ADAS)	
15th	43	SESSIONAL TEST-III	Viva-voice
	44	. REVISION	
	45	REVISION	

# LESSON PLAN

**FACULTY NAME – Sh. J S Narang**

**DISCIPLINE - MECHANICAL ENGINEERING**

**SEMESTER - 6<sup>TH</sup>**

**SUBJECT - EDM**

**LESSON PLAN DURATION – 16 WEEKS**

WEEK	THEORY	
	DAY/ LECTURE	TOPIC (INCLUDING ASSIGNMENT/TEST)
1st	1	UNIT -1 - Entrepreneurship: Concept and definitions, classification and types of entrepreneurs, entrepreneurial competencies,
	2	Traits / Qualities of entrepreneurs, manager v/s entrepreneur, role of Entrepreneur,
	3	role Entrepreneur, barriers in entrepreneurship of
2nd	4	Sole proprietorship and partnership forms of business organizations,
	5	Small business vs startup, critical components for establishing a start-up,
	6	Leadership: Definition and Need, Manager Vs leader, Types of leadership
3rd	7	UNIT II - Definition of MSME (micro, small and medium enterprises),
	8	significant provisions of MSME Act, importance of feasibility studies,
	9	marketing and finance related problems faced by new enterprises,
4th	10	major labor issues in MSMEs and its related laws,
	11	Obtaining financial assistance through various government schemes
	12	Prime Minister Employment Generation Program (PMEGP)
		SESSIONAL TEST - 1
5th	13	Pradhan Mantri Mudra YoJna (PMMY)
	14	Make in India, Start up India, Stand up India
	15	National Urban Livelihood Mission (NULM); Schemes of assistance by entrepreneurial support agencies at National,
6th	16	Schemes of assistance by entrepreneurial support agencies at National,
	17	, State, District level: NSIC, NRDC, DC:MSME, SIDBI, NABARD,
	18	Commercial Banks, SFC's TCO,
7th	19	, KVIB, DIC, Technology Business Incubator (TBI)
	20	Science and Technology Entrepreneur Parks (STEP).
	21	UNIT III - NATURE AND FUNCTIONS OF MANAGEMENT: Definition, Nature of Management,
8th	22	Management as a Process, Management as Science and Art,
	23	Management Functions, Management and Administration, Managerial Skills, Levels of Management; Leadership.
	24	PLANNING AND DECISION MAKING: Planning and Forecasting
9th	25	Meaning and definition, Features, Steps in Planning Process,
	26	Approaches, Principles, Importance, Advantages and Disadvantages of Planning,
	27	Types of Plans, Types of Planning, Management by Objective.
10th	28	Decision Making-Meaning, Characteristics.
	29	UNIT IV- ORGANISING AND ORGANISATION STRUCTURE:
	30	Organizing Process - Meaning and Definition, Characteristics Process,
11th	31	Need and Importance, Principles, Span of Management,
	32	Organizational Chart - Types, Contents, Uses, Limitations, Factors Affecting Organizational Chart.
	33	STAFFING: Meaning, Nature, Importance, Staffing process.
		SESSIONAL TEST - 2
12th	34	Manpower Planning, Recruitment, Selection
	35	Orientation and Placement, Training, Remuneration.
	36	CONTROLLING AND CO-ORDINATION Controlling.
13th	37	Meaning, Features, Importance, Control Process,.
	38	Characteristics of an effective control system,
	39	Types of Control. Co-ordination - characteristics, essentials.
14th	40	UNIT – V Market Survey and Opportunity Identification,
	41	Scanning of business environment, Assessment of demand
	42	supply in potential areas of growth,
15th	43	Project report Preparation, Detailed project report
	44	including technical, economic and market feasibility,
	45	Common errors in project report preparations,
16th	46	Exercises on preparation of project report.
	47	RIVISION
	48	SESSIONAL TEST - 3

Lesson Plan				
Name of faculty member		Sh. PARVEEN KUMAR		
Discipline		MECHANICAL ENGINEERING		
Semester		6th		
Subject		METROLOGY AND QUALITY CONTROL		
Lesson plan duration		15 week		
Work Load (Lecturer/ Practical) per week (In hours)		Lectures-03, Practicals-02 (each group)		
Week	Theory		Practical	
	Lecturer day	Topic ( including assignment/test)	Practical day	Topic
1st	1st	<b>Unit 1- Inspection</b> Introduction, units of measurement	1st	Use of dial indicator for measuring taper (Groups-G1, G2 and G3)
	2nd	standards for measurement and interchangeability		
	3rd	International, national and company standard		
2nd	4th	line and wavelength	2nd	Use of combination set, bevel protector and sine bar for measuring taper(Groups- G1, G2 and G3)
	5th	Planning of inspection: what to inspect? When to inspect? Who should inspect? Where to inspect?		
	6th	Types of inspection: remedial, preventive and operative inspection		
3rd	7th	incoming, in-process and final inspection	3rd	Revision of Ist experiment
	8th	Study of factors influencing the quality of manufacture		
	9th	<b>Unit 2 Measurement and Gauging Metrology:</b> Basic principles used in measurement and gauging, mechanical, optical, electrical and electronic		
4th	10th	Study of various measuring instruments like: calipers, micrometers	4th	Revision of 2nd experiment
	11th	dial indicators, surface plate		
	12th	straight edge, try square, protectors, sine bar		
5th	13th	clinometer, comparators – mechanical	5th	Measurement of thread characteristic using vernier and gauges(Groups-G1, G2 and G3)
	14th	electrical and pneumatic comparators		
	15th	Slip gauges		
6th	16th	tool room microscope, profile projector	6th	Use of slip gauge in measurement of center distance between two pins.(Groups- G1, G2 and G3)
	17th	Limit gauges: plug, ring, snap, taper, thread, height, depth, form, feeler, wire and their applications for linear, angular, surface		
	18th	Measurements, gauge tolerances. Geometrical parameters and errors: Errors & their effect on quality, concept of errors, measurement of geometrical parameter such as straightness, flatness and parallelism.		
7th	19th	Study of procedure for alignment tests on lathes, drilling and milling	7th	Revision of 3rd experiment
	20th	Testing and maintenance of measuring instruments		
	21st	<b>Unit 3</b> Statistical Quality Control Basic statistical concepts		
8th	22nd	empirical distribution and histograms, frequency, mean	8th	Revision of 4th experiment
	23rd	mode, standard deviation		
	24th	normal distribution, binomial		
9th	25th	Poisson, Simple- examples	9th	Use of tool maker's microscope and comparator(Groups-G1, G2 and G3)
	26th	Introduction to control charts		
	27th	X, R, P and C charts and their applications.		
10th	28th	Sampling plans, selection of sample size	10th	Plot frequency distribution for 50 turned components(Groups-G1, G2 and G3)
	29th	method of taking samples, frequency of samples		
	30th	Inspection plan format and test reports		
11th	31st	Revision of X ,R Charts	11th	Revision of 5th experiment
	32nd	Revision of histograms and frequency mean		
	33rd	Assignment of topic standard deviation, normal distribution and poisson ratio.		



12th	34th	<b>Unit 4 Sampling Plans &amp; Modern Quality Concepts</b> Concept of total quality management	12th	Revision of 6th experiment
	35th	National Codes.		
	36th	International Codes.		
13th	37th	ISO-9000, concept and its evolution	13th	With the help of given data, plot X, R, P and C charts(Groups-G1, G2 and G3)
	38th	QC tools		
	39th	Introduction to Kaizen		
14th	40th	5S	14th	Revision of 7th experiment
	41st	<b>Unit 5 Quality Control Tools &amp; Instrumentation</b> Measurement of mechanical quantities such as displacement		
	42nd	vibration, frequency		
15th	43rd	pressure temperature by electro mechanical transducers of resistance	15th	Revision of 3rd and 5th experiment
	44th	capacitance & inductance type		
	45th	Revision of 5s		

