

LESSON PLAN

NAME OF FACULTY: SH. ROHIT KUMAR

DISCIPLINE: MECHANICAL ENGINEERING – G.P.

AMBALASEMESTER: IV

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
1 st	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.	
2 nd	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),	
3 rd	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.	
4 th	10	3. 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	
5 th		SESSIONAL TEST-I	4. (a) Study of a metallurgical microscope .
	13		
	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.
6 th	16	Basic process of manufacturing of pig iron and steel-making.	Copy Checking/revision
	17	Cast Iron : Introduction	
	18	Different types of Cast Iron, manufacture and their usage.	
7 th	19	Steels: Plain carbon Steels and alloy 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	Classification of plain carbon steels,	
	21	Properties and application of different types of Plain Carbon Steels, Effect of various alloys on properties of steel	
8 th	22	alloy steels (high speed steel, stainless steel, Uses of spring steel, silicon steel	iii) Grey iv) Malleable
	23	Stainless steel: Definition, importance and criticality (Life cycle cost, Corrosion impact; difference with Steel, Per Capita consumption; growth rate of SS vs other materials, World vs India).	
	24	Various grades of SS and their nomenclature, Effect of alloying elements, Unique characteristics of various grades of SS	
9 th	25	Manufacturing of SS: Process flow, Raw materials for SS manufacturing functions of each processing unit, Downstream facilities, Various finishes of SS,	v)Low carbon steel vi)High carbon steel
	26	Fabrication and testing of SS: Stud welding method, Weldability and effect of welding on various types of SS, Defects like Sensitization and micro-fissure	vii) HSS
	27	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.	6. To anneal a given specimen and find out difference in hardness as a result ofannealing.
10 th	28	Applications of SS : Demand of SS in various segments, Overview of SS applications in Automobile, railway, and	Copy Checking/revision
	29	Non Ferrous Materials: Properties and uses of Copper, Aluminium and their alloys	
	30	Transport. Architectural, building construction applications and Process Industries	
	31	SESSIONAL TEST-II	

11 th	32	4. Theory of Heat Treatment Purpose of heat treatment,	7. To normalize a given specimen and to find out the difference in hardness as a result of normalizing.
	33	Iron Carbon diagram, equilibrium diagram, different microstructures of iron and steel.	
12 th		Formation and decomposition of Austenite, Martensitic Transformation – Simplified Transformation Cooling Curves	8. To harden and temper a specimen and to find out the difference in hardness due to tempering.
	35	various heat treatment processes- hardening, tempering, annealing, normalizing,	
	36	Case hardening and surface hardening	
13 th	37	Types of heat treatment furnaces required for above operations (only basic idea),	9. Demo of welding defects like sensitization and micro fissure in stainless steel.
	38	Measurement of temperature of furnaces. Physical metallurgy of Stainless Steel	
	39	Various phases in SS, Chromium-Nickel diagram, Schaeffler Diagram	
14 th	40	6. Advanced Materials	Copy Checking/revision
		Heat Insulating materials-Asbestos,	Viva-voice
	41	glass wool, thermocole, Refractory materials – Dolomite, porcelain.	
	42	Glass– Sodalime, borosil.	
15 th	43	Materials for bearing metals Materials for Nuclear Energy Materials	Viva-voice
	44	Smart materials- properties and applications.	
	45	SESSIONAL TEST-III	

LESSON PLAN

FACULTY NAME – PARVEEN KUMAR
DISCIPLINE - MECHANICAL ENGINEERING
SEMESTER - 4TH
SUBJECT - WORKSHOP TECHNOLOGY – III
LESSON PLAN DURATION – 16 WEEKS
WORK LOAD/ WEEK - 3 LECTURE

WEEK	THEORY	
	DAY/ LECTURE	TOPIC (INCLUDING ASSIGNMENT/TEST)
1 ST	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;
2 ND	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;
3 RD	7	Standard marking systems: Meaning of letters & numbers sequence of marking,
	8	rades of letters; Truing, dressing, balancing and mounting of wheel.
	9	Selection of grinding wheel. Grinding machines classification: Cylindrical, Surface,
4 TH	10	Tool & Cutter grinding machines;
	11	Construction details; Principle of centreless grinding;
	12	Advantages & limitations of centreless grinding
		SESSIONAL TEST - 1
5 TH	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)
6 TH	16	Process parameters, Output characteristics, applications.
	17	Wire cut EDM: Principle, Description of equipment,
	18	Controlling parameters; applications;
7 TH	19	Abrasive Jet Machining: principle, description of equipment,
	20	application; Laser Beam Machining: principle,
	21	, description of equipment, application;
8 TH	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,
9 TH	25	notching, shaving, gearing, embossing, stamping.
	26	Forging - Open die forging, closed die forging, Press forging,
	27	upset forging, swaging, up setters,
10 TH	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.
11 TH	31	Extrusion and Drawing - Type of extrusion- Hot and Cold,
	32	Direct and indirect. Pipe drawing,
	33	tube drawing, wire drawing
		SESSIONAL TEST - 2
12 TH	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.
13 TH	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	UNIT - VI. Metallic Coating Processes Metal spraying – Wire process, powder coating process
	41	Electroplating: Basic principles
	42	, Plating metals, applications;
15TH	43	Hot dipping: Galvanizing, Tin coating,
	44	Parkerising, Anodizing. Organic coatings:
	45	Oil base Paint, Lacquer base,
16TH	46	Enamels, Bituminous paints,
	47	, rubber base coating; Finishing specifications
	48	SESSIONAL TEST - 3

LESSON PLAN

FACULTY NAME – PARVEEN KUMAR
DISCIPLINE - MECHANICAL ENGINEERING
SEMESTER - 4TH
SUBJECT - MACHINE DESIGN
LESSON PLAN DURATION – 16 WEEKS
WORK LOAD/ WEEK - 3 LECTURE

WEEK	THEORY	
	DAY/ LECTURE	TOPIC (INCLUDING ASSIGNMENT/TEST)
1 ST	1	UNIT I . Introduction - Design – Definition, Type of design, necessity of design,
	2	Comparison of designed and undesigned work,
	3	Design procedure, Characteristics of a good designer
2 ND	4	Design terminology: stress, strain, factor of safety
	5	factors affecting factor of safety, stress concentration,
	6	, methods to reduce stress concentration, fatigue,
3 RD	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)
4 TH	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 ,
5 TH	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
6 TH	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
7 TH	18	Failure of key (by Shearing and Crushing).
	19	Design of key (Determination of key dimension)
	20	Effect of keyway on shaft strength. (Figures and problems).
8 TH	21	UNIT IV Design of Coupling Necessity of a coupling, advantages of a coupling,
	22	, types of couplings, design of muff coupling,
	23	design of flange coupling. (Both protected type and unprotected type).
9 TH	24	UNIT IV . Design of Joints Design of Temporary Joints: Knuckle Joints – Different parts of the joint, material used for the joint,
	25	type of knuckle Joint, design of the knuckle joint.
	26	Cotter Joint – Different parts of the spigot and socket joints,
10 TH	27	Design of spigot and socket joint.
	28	Design of Permanent Joint: Riveted Joints. : Rivet materials, Rivet heads,
	29	Leak proofing of riveted joint – caulking and fullering.
		SESSIONAL TEST - 2
11 TH	30	Different modes of rivet joint failure.
	31	Design of riveted joint – Lap and butt, single and multi riveted joint.
	32	Welded Joint - Welding symbols. Type of welded joint,
12 TH	33	strength of parallel and transverse fillet welds
	34	Strength of combined parallel and transverse weld.
	35	UNIT VI . Design of Screwed Joints and Springs Design of screw: Introduction, Advantages and Disadvantages of screw joints,
13 TH	36	Location of screw joints. Important terms used in screw threads
	37	designation of screw threads,
	38	Initial stresses due to screw up forces, stresses due to combined forces,
14 TH	39	Design of Screw jack
	40	Design of Spring: Classification and applications of springs
	41	spring terminology, Stresses in springs,
15 TH	42	Wahl’s correction factor,
	43	design of open coil helical spring subjected to uniform applied load under tension and compression.
	44	SESSIONAL TEST - 3
16 TH	45	REVISION
	46	REVISION
	47	REVISION
	48	REVISION

LESSON PLAN

NAME OF FACULTY: SH. BHARAT BHUSHAN

DISCIPLINE: MECHANICAL ENGINEERING – G.P. AMBALA

SEMESTER: VI

SUBJECT: INSPECTION AND QUALITY CONTROL

LESSON PLAN DURATION: 15 WEEKS

WORK LOAD (LECTURE/PRACTICAL) PER WEEK: (3 THEORIES /2 PRACTICAL)

WEEK	THEORY		PRACTICALS
	LECTURE NO.	TOPIC	TOPIC
1 st	1	1. Inspection Introduction, units of measurement,	1 Use of dial indicator for measuring taper.
	2	Standards for measurement and Inspection interchangeability	
	3	International, national and company standard, inspection.	
	4	Line and wavelength standards.	
2 nd	5	Planning of inspection: what to inspect? When to inspect?	2 Use of combination set, bevel protector and sine bar for measuring taper.
	6	Who should inspect? Where to inspect?	
	7	Types of inspection: remedial, preventive	
	8	Operative inspection, incoming, in-process and final inspection	
3 rd	9	Study of factors influencing the quality of manufacture.	Copy Checking / revision
	10	2. Measurement and Gauging Measurement and Gauging: Basic principles used in measurement	
	11	Gauging, mechanical, optical,	
	12	Electrical and electronic.	
4 th	13	Study of various measuring instruments like: calipers, micrometers	3 Measurement of thread characteristic using vernier and gauges.
	14	Dial indicators, surface plate	
	15	Straight edge, try square	
	16	Protectors	
5 th	17	Sine bar, clinometers,	Copy Checking / revision
	18	Comparators – mechanical	
	19	Electrical	
	20	Pneumatic.	
6 th	21	Slip gauges	4 Use of slip gauge in measurement of center distance between two pins.
	22	Tool room microscope	
	23	Profile projector	
	24	Limit gauges: plug, ring, snap, taper	

7 th	25	Thread, height, depth, form,	Copy Checking / revision
	26	Feeler, wire and their applications for linear, angular, surface, thread and gear measurements.	
	27	Gauge tolerances	
	28	SESSIONAL TEST -I	
8 th	29	Geometrical parameters and errors. Errors & their effect on quality, concept of errors	5 Use of tool maker's microscope and comparator.
	30	Measurement of geometrical parameter such as straightness, flatness and parallelism.	
	31	Study of procedure for alignment tests on lathes, drilling and milling machines.	
	32	Testing and maintenance of measuring instruments.	
9 th	33	3. Statistical Quality Control Statistical Quality Control Basic statistical concepts	Copy Checking / revision
	34	Empirical distribution and histograms	
	35	Frequency, mean, mode	
	36	Standard deviation, normal distribution	
10 th	37	Binomial and Poisson, Simple- examples.	6 Plot frequency distribution for 50 turned
	38	Introduction to control charts, namely X, R	
	39	P and C charts and their applications.	
	40	Sampling plans, selection of sample size.	
11 th	41	Method of taking samples	Copy Checking / revision
	42	Frequency of samples.	
	43	Inspection plan format and test reports	
	44	SESSIONAL TEST -II	
12 th	45	4. Modern Quality Concepts: Modern Quality Concepts	7 With the help of given data, plot X, R, P and C charts
	46	Concept of total quality management (TQM)	
	47	National and International Codes.	
	48	National and International Codes.	
13 th	49	ISO-9000, concept and its evolution	7 With the help of given data, plot X, R, P and C charts
	50	ISO-9000, concept and its evolution	
	51	QC tools	
	52	QC tools	
14 th	53	(Introduction to Kaizen, 5S	Viva-voice,
	54	(Introduction to Kaizen, 5S	
	55	5. Instrumentation: Measurement of mechanical quantities such as displacement	
	56	Vibration, frequency	
15 th	57	Pressure	Viva-voice
	58	Temperature	
	59	By electro mechanical transducers of resistance, capacitance & inductance type.	

LESSON PLAN

NAME OF FACULTY:HANISH SAINI / PARVEEN KUMAR

DISCIPLINE: MECHANICAL ENGINEERING - G.P. AMBALA

SEMESTER: VI

SUBJECT: ESTIMATING AND COSTING

LESSON PLAN DURATION: 16 WEEKS

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

Week	Theory	
	Lecture day	Topic (including assignment/ test)
1st (15 to 18)	1	Unit-1 Introduction Definition of estimation, Importance, aims and functions of estimating
	2	cost accounting, purposes of cost accounting, Comparison of estimating and costing, estimating procedure
	3	cost estimators and their qualifications
	4	types of estimates, constituents of job estimates
2nd (21 to 25)	5	cost of production, selling price,
	6	capital investment,
	7	rate of return(ROR) on investment
	8	Unit-2 Elements of Costing-
3rd (28 to 01)	9	Definitions, objectives
	10	elements of costs, components of costs,
	11	overhead expenses , ,
	12	factory expenses
4th (04 to 08)	13	depreciation-causes;
	14	methods of calculation of depreciation, obsolescence
	15	interest on capital,
	16	idleness costs
5th (11 to 15)	17	repairs and maintenance cost
	18	selling and distribution overheads ,
	19	methods of allocation of overhead charges, procedure for costing
	20	1st Sessional Test
6th (18 to 22)	21	Unit-3 Cost Accounting Objectives of cost accounting

	22	difference between financial accounting and cost accounting
	23	advantages of cost accounting,
	24	methods of costing; unit costing
7th (25 to29)	25	batch costing, departmental costing, process costing,
	26	multiple and composite costing
	27	Unit-4 Fundamentals of Estimating
	28	Objectives of cost estimating
8th (02 to 06)	29	functions of cost estimating, organization of estimating department, ,
	30	principal factors in estimating, miscellaneous allowances
	31	Estimating procedures,.
	32	qualities of estimator
9th (09 to 13)	33	2nd Sessional Test
	34	Unit-5 Estimation of Material Cost, Estimation of volumes
	35	weights and cost of material for items like pulley, ,
	36	spindle
10th (16 to 20)	37	lathe centre, fly wheel, crank shaft and similar items
	38	Simple numerical on the above,
	39	Budgets and.
	40	types of budgets
11th (23 to 27)	41	Unit-6 Estimation of Machine Shop, Set up time,
	42	operation time, handling time, machining time, tear down time
	43	allowances; personal, fatigue,
	44	tool checking/sharpening/changing, unit operation time
12th (30 to 03)	45	cycle time and total time, full depth of cut,
	46	cutting speeds for various operations for different tool materials and product materials
	47	Estimation of time for various machining operations
	48	turning, drilling, boring, tapping,.
13th (06 to 10)	49	shaping, planning, milling and grinding
	50	Unit-7 Estimation of Other Shops - ,
	51	Estimation of cost of different products produced in welding
	52	Class test

14th (13 to 17)	53	gas and electric welding
	54	forging and foundry shops
	55	Revision
	56	Class test
15th (20 to 24)	57	3rd Sessional Test
	58	Revision
	59	Revision
	60	Revision
16th (25 to 01)	61	Revision
	62	Revision
	63	Revision
	64	Revision

LESSON PLAN

NAME OF FACULTY: SH.J. S.NARANG / HANISH SAINI

DISCIPLINE: MECHANICAL ENGINEERING – G.P. AMBALA

SEMESTER: VI

SUBJECT: EDM

LESSON PLAN DURATION: 15 WEEKS

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

WEEK	THEORY	
	LECTURE NO.	TOPIC
1 st (15 to 18)	1	UNIT-1. Introduction to EDM
	2	Concept /Meaning and its need
	3	Qualities and functions of entrepreneur and barriers in entrepreneurship
2 nd (21 to 25)	4	Sole proprietorship and partnership forms of business organizations
	5	Schemes of assistance by entrepreneurial support agencies atnational state
	6	SFC's TCO, KVIB, DIC, Technology Business Incubator (TBI)
3 rd (28 to 01)	7	Science and Technology Entrepreneur Parks (STEP).
	8	District level: NSIC, NRDC, DC:MSME, SIDBI
	9	NABARD, Commercial Banks
4 th (04 to 08)	10	Assessment of demand and supply in potential areas of growth
	11	UNIT-2. Market Survey and Opportunity Identification
	12	Scanning of business environment
5 th (11 to 15)	13	Salient features of National and State industrial policies and resultant business opportunities
	14	Considerations in product selection Types and conduct of market survey
	15	Identifying business opportunity
6 th (18 to 22)	16	Types of market survey
	17	Conduct of market survey
	18	SESSIONAL TEST -I

7th (25 to 29)	19	UNIT-3. Preliminary project report
	20	Project report Preparation
	21	Detailed project report including technical, economic and market feasibility
8th (02 to 06)	22	Common errors in project report preparations
	23	Exercises on preparation of project report
	24	UNIT-4. Introduction to Management Definitions and importance of management.

9 th (09 to 13)	25	Functions of management: Importance and Process of planning, organising, staffing, directing and controlling
	26	Types of industrial organizations: Line organization, Line and staff organization, Functional Organisation
	27	Principles of management (Henri Fayol, F.W. Taylor) Concept and structure of an organisation
10 th (16 to 20)	28	UNIT-5: Leadership and Motivation Leadership: Definition and Need
	29	Qualities and functions of a leader, Motivation: Definitions and characteristics
	30	Factors affecting motivation
11 th (23 to 27)	31	Manager Vs leader
	32	Types of leadership
	33	Theories of motivation (Maslow, Herzberg, McGregor)
12 th (30 to 03)	34	SESSIONAL TEST -II
	35	UNIT-6: Management Scope in Different Areas Human Resource Management : Introduction and objective, Introduction to Man power planning, recruitment and selection Introduction to performance appraisal methods
	36	Material and Store Management: Introduction functions, and objectives,
13 th	37	ABC Analysis and EOQ
	38	Marketing and sales: Introduction, importance, and its functions
	39	Physical distribution, Introduction to promotion mix, Sales promotion
14 th	40	Financial Management :Introductions, importance and its functions
	41	Elementary knowledge of income tax, sales tax, excise duty, custom duty and VAT
	42	UNIT-7: Miscellaneous Topics Customer Relation Management (CRM), Definition and need,Types of CRM
15 th	43	Total Quality Management (TQM) :Statistical process control, Total employees Involvement, Just in time (JIT)
	44	Intellectual Property Right (IPR) :Introductions, definition and its importance, Infringement related to patents, copy right, trade mark
	45	SESSIONAL TEST -III

LESSON PLAN

NAME OF FACULTY: HITESH CHAWLA

DISCIPLINE: MECHANICAL ENGINEERING - G.P. AMBALA

SEMESTER: VI

SUBJECT: PLANT MAINTENANCE AND MATERIAL HANDLING

LESSON PLAN DURATION: 15 WEEKS

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

Week	Theory	
	Lecture day	Topic (including assignment/ test)
1st (15 to 18)	1	Unit-1 Introduction Necessity and advantages of testing
	2	repair and maintenance, common instruments required for testing
	3 & 4	significance of B-T curve in life span of machine tool
2nd (21 to 25)	5	Acceptance test for machine tools, Economic aspects
	6	Fits and tolerances – common fits and tolerances used for various machine parts manpower planning and materials management
	7 & 8	Unit-2 Plant Layout, Erection and Commissioning of Machines (Installation)
3rd (28 to 01)	9	Location, layout of machines in Plant Layout
	10	Principles of Plant layout
	11 & 12	types of plant layout and positioning of machines, grouping of machines
4th (04 to 08)	13	Foundation – types of foundation, various considerations for machine foundations
	14	foundation plan, types of foundation bolts, ,
	15 & 16	erection and leveling
5th (11 to 15)	17	grouting Vibration, damping, vibration isolation
	18	methods of isolation, anti vibration mounts.
	19 & 20	1st Sessional Test
6th (18 to 22)	21	Unit-3 Testing of Machines , Testing equipment – dial gauge, mandrel, spirit level, straight edge, auto collimator
	22	Recalibration of measuring instruments like vernier calliper
	23 & 29	Testing methods – geometrical/alignment test, performance test, testing under load, run test, vibrations, noise

7th (25 to 29)	30	Unit-4 Maintenance , Definition, advantages, limitations, functions and types of maintenance organisation
	31	Types of maintenance viz. emergency, preventive, breakdown/corrective, predictive, Introduction to computerized maintenance record like facility register, maintenance request
	32 & 33	ISO standards for maintenance documentation Introduction to machine history card – purpose and advantages
8th (02 to 06)	34	Preparation of scheduled yearly plan for preventive maintenance, difference of work content of servicing, repairs and overhauling
	35	MTBF and MTTR. Maintainability Spare parts- Need of frequently, Spare parts- Need of frequently needed spare parts inventory
	36 & 37	Make provision of spares for parts not available in market
9th (09 to 13)	38	2nd Sessional Test
	39	Unit-5 Repairing
	40 & 41	Common parts which are prone to failure, reasons of failure
10th (16 to 20)	42	Repair schedule Parts that commonly need repair such as belts,
	43	couplings, nuts, and bolts repairing the engines,.
	44 & 45	compressors and boilers
11th (23 to 27)	46	Unit-6 Lubrication Systems
	47	Lubrication methods and periodical lubrication chart for various machines (daily, weekly, monthly)
	48 & 49	Handling and storage of lubricants
12th (30 to 03)	50	Lubricants conditioning and disposal
	51	Lubricant and their grades needed for specific components such as gears, bearings, and chains
	52 & 53	Purpose and procedure of changing oil periodically (like gear box oil)
13th (06 to 10)	54	Unit-7 Material Handling Systems
	55	Basic principles of material handling
	56	Basic types of material handling equipments and its characteristic
14th (13 to 17)	57	Uses and limitations, forklift trucks, Selection of material handling equipment
	58	Unit load: pallet sizing and loading. Conveyor models, AGV Systems
	59 & 60	Automated Storage & Retrieval System (ASRS), Carousels,

15th (20 to 24)	61	3rd Sessional Test
	62	Revision
		Revision

LESSON PLAN		
Name of faculty member	MANISH PATIDAR	
Discipline	MECHANICAL ENGINEERING	
Semester	4 TH	
Subject	MACHINE DESIGN	
Lesson plan duration	15 week	
Work Load (Lecturer/Practical) per week (In hours)	Lectures-03	
Week	Theory	
	Lecturer day	Topic (including assignment/test)
1 st	1 st	UNIT I 1. Introduction Design – Definition, Type of design, necessity of design, Comparison of designed and undesigned work, Design procedure, Characteristics of a good designer
	2 nd	Design terminology: stress, strain, factor of safety, factors affecting factor of safety, stress concentration, methods to reduce stress concentration, fatigue, creep and tenacity, endurance limit. SN Curve and its significance
	3 rd	
2 nd	4 th	General design consideration, Selection of materials, criteria of material selection, Codes and Standards (BIS standards)
	5 th	Various design failures-maximum normal stress theory, maximum stress theory, maximum strain theory
	6 th	UNIT II 2. Design of Shaft
3 rd	7 th	Type of shaft, shaft materials, Type of loading on shaft, standard sizes of shaft available Shaft subjected to torsion only, determination of shaft diameter (hollow and solid shaft) on the basis of : i. Strength criterion ii. Rigidity criterion
	8 th	
	9 th	
4 th	10 th	Determination of shaft diameter (hollow and solid shaft) subjected to bending
	11 th	Determination of shaft diameter (hollow and solid shaft) subjected to combined torsion and bending.
	12 th	
5 th	13 th	UNIT III 3. Design of Key
	14 th	Types of key, materials of key, functions of key
	15 th	
6 th	16 th	Failure of key (by Shearing and Crushing).
	17 th	Design of key (Determination of key dimension)
	18 th	Effect of keyway on shaft strength. (Figures and problems).
7 th	19 th	4. Design of Coupling <u>Necessity of a coupling, advantages of a coupling, types of couplings.</u>
	20 th	

	21st	
8th	22nd	design of muff coupling
	23rd	design of flange coupling. (Both protected type and unprotected type).
	24th	<u>design of flange coupling. (Both protected type and unprotected type).</u>
9th	25th	UNIT IV 5. Design of Joints <u>Types of joints-Temporary and permanent joints, utility of various joints</u>
	26th	Design of Temporary Joints
	27th	
10th	28th	
	29th	Knuckle Joints – Different parts of the joint, material used for the joint
	30th	<u>types of knuckle joint, design of the knuckle joint. (Figures and problems).</u>
11th	31st	<u>Cotter Joint – Different parts of the spigot and socket joints, Design of spigot and socket joint.</u>
	32nd	Design of Permanent Joint: Riveted Joints. : Rivet materials, Rivet heads,
	33rd	<u>leak proofing of riveted joint – caulking and fullering.</u>
12th	34 th	
	35 th	<u>Different modes of rivet joint failure.</u> <u>Design of riveted joint – Lap and butt, single and multi riveted joint.</u>
	36th	<u>Welded Joint- Welding symbols. Type of welded joint, strength of parallel and transverse fillet welds.</u>
13th	37th	UNIT V 6. Design of Screwed Joints and Springs Design of screw: Introduction, Advantages and Disadvantages of screw joints, location of screw joints
	38th	
	39th	Important terms used in screw threads, designation of screw threads,
14th	40th	Initial stresses due to screw up forces, stresses due to combined forces, Design of Screw jack
	41st	Design of Spring: Classification and applications of springs, spring terminology, Stresses in springs, Wahl's correction factor
	42nd	
15th	43rd	
	44th	
	45th	design of open coil helical spring subjected to uniform applied load under tension and compression.

LESSON PLAN		
Name of faculty member	MANISH PATIDAR	
Discipline	MECHANICAL ENGINEERING	
Semester	2 ND	
Subject	WORKSHOP TECHNOLOGY - I	
Lesson plan duration	15 week	
Work Load (Lecturer/Practical) per week (In hours)	Lectures-03	
Week	Theory	
	Lecturer day	Topic (including assignment/test)
1 st	1 st	Unit 1- 1. Hand Tools Chisels – Types and uses of chisels, wood working chisels, metal working chisels – cold chisel, hard chisel, stone chisel, masonry chisel.
	2 nd	Hammers – Types, Basic design and variations, Physics of hammering, Hammer as force multiplier, effect of head's mass, effect of handle.
	3 rd	
2 nd	4 th	Saw – Saw terminology, types of saws, types of saw blades, material used for saw, Hacksaw frame and its types. Pliers – Function and types.
	5 th	Wrenches/ Spanners – Common General wrenches/spanners, Specialized wrenches/spanners, Surface plate, V block, files, Surface Gauge.
	6 th	2. Measuring Instruments Calipers – Types – Inside, outside, divider, Odd leg caliper. Vernier Caliper- Parts, uses, checking error, least count, working principle.
3 rd	7 th	Outside micrometer - Introduction, parts, Principle, Least count, Checking zero error. UNIT II 3. Cutting Tools and Cutting Materials Cutting Tools - Various types of single point cutting tools and their uses
	8 th	
	9 th	
4 th	10 th	<u>Single point cutting tool geometry, tool signature and its effect, Heat produced during cutting and its effect, Cutting speed, feed and depth of cut and their effect.</u>
	11 th	Cutting Tool Materials - Properties of cutting tool material, Study of various cutting tool materials viz. High-speed steel, tungsten carbide, cobalt steel cemented carbides, stellite, ceramics and diamond.
	12 th	
5 th	13 th	
	14 th	
	15 th	
6 th	16 th	UNIT III 4. Welding Welding Process - Principle of welding, Classification of welding processes

	17th	Advantages and limitations of welding, Industrial applications of welding
	18th	<u>Welding positions and techniques, symbols.</u> <u>Safety precautions in welding.</u>
7th	19th	Gas Welding - Principle of operation, Types of gas welding flames and their applications <u>Gas welding equipment - Gas welding torch, Oxygen cylinder, acetylene cylinder, cutting torch, Blow pipe, Pressure regulators, Filler rods and fluxes and personal safety equipment for welding.</u>
	20th	
	21st	
8th	22nd	Arc Welding - Principle of operation, Arc welding machines and equipment
	23rd	A.C. and D.C. arc welding, Effect of polarity, current regulation and voltage regulation
	24th	<u>Electrodes:</u> <u>Classification, B.I.S. specification and selection, Flux for arc welding.</u>
9th	25th	Requirements of preheating, postheating of electrodes and work piece. Welding defects and their testing methods. UNIT IV 5. Lathe
	26th	
	27th	
10th	28th	Principle of turning, Description and function of various parts of a lathe.
	29th	Classification and specification of various types of lathe, Drives and transmission, Work holding devices.
	30th	Lathe tools: Parameters/Nomenclature and applications.
11th	31st	Lathe operations - Plain and step turning, facing, parting off, taper turning, eccentric turning, drilling, reaming, boring, threading and knurling, form turning, spinning.
	32nd	Cutting parameters – Speed, feed and depth of cut for various materials and for various operations, machining time. Speed ratio, preferred numbers of speed selection.
	33rd	Lathe accessories:- Centers, dogs, different types of chucks, collets, face plate, angle plate, mandrel, steady rest, follower Rest, taper turning attachment, tool post grinder, milling attachment, Quick change device for tools. Brief description of capstan and turret lathe, comparison of capstan/turret lathe, work holding and tool guiding devices in capstan and turret lathe.
12th	34 th	UNIT V 6. Drilling Principle of drilling. Classification of drilling machines and their description. Various
	35 th	

		operation performed on drilling machine – drilling, spot facing, reaming, boring, counter boring, counter sinking, hole milling, tapping.
	36th	
13th	37th	<u>Speeds and feeds during drilling, impact of these parameters on drilling, machining time. Types of drills and their features, nomenclature of a drill. Drill holding devices. Types of reamers.</u>
	38th	
	39th	
14th	40th	7. Boring
	41st	<u>Principle of boring, Classification of boring machines and their brief description.</u>
	42nd	
15th	43rd	<u>Specification of boring machines. Boring tools, boring bars and boring heads. Description of jig boring machine.</u>
	44th	8. Cutting Fluids and Lubricants
		<u>Function of cutting fluid, Types of cutting fluids, Difference between cutting fluid and lubricant, Selection of cutting fluids for different materials and operations,</u>
	45th	<u>Common methods of lubrication of machine tools, Certifying Organizations (such as SAE, ASTM) for rating standards of lubricants.</u>

Lesson Plan				
Name of faculty member		RAM NIWAS		
Discipline		MECHANICAL ENGINEERING		
Semester		6th		
Subject		AUTOMOBILE ENGINEERING		
Lesson plan duration		15 week		
Work Load (Lecturer/ Practical) per week (Inhours)		Lectures-03, Practicals-02 (each group)		
Week	Theory		Practical	
	Lecturer day	Topic (including assignment/test)	Practical day	Topic
1 st	1 st	Unit 1- Introduction Automobile and its development	1 st	Fault and their remedies in (i) Battery Ignition system (ii) magnetic Ignition system(groups- G1,G2, G3)
	2 nd	Various types of automobiles manufactured in India. Layout of chassis		
	3 rd			
2 nd	4 th	revision of layout of chassis	2 nd	Demonstration of (i) Head Light Model (ii) Wiper and Indicators. Demonstration of (i) Head Light Model (ii) Wiper and Indicators.(groups- G1,G2,G3)
	5 th	Unit 2 Power System Fuel systems for petrol and diesel engines including multipoint fuel injection (MPFI)		
	6 th	common rail direct injection (CRDI), Fuel injectors and nozzles. Comparison of MPFI with carburetor system Concept of double overhead cam single overhead cam, Twin cam 16 valve technology		
3 rd	7 th		3 rd	revision of

	8th			1st, and 2nd practicals
	9th			
4th	10th	Unit 3 Transmission System Clutch - Function, Constructional details of single plate and multiplate friction clutch	4th	Demonstration of (i) AC Pump (ii) SU Pump (iii) Master Cylinders (groups- G1, G2, G3)
	11th	Centrifugal and semi centrifugal clutch, Hydraulic clutch		
	12th	Gear Box - Function, Concept of sliding mesh, constant mesh synchromesh gear box, Torque converter and overdrive Types of drives – Front wheel, Rear wheel, Four Wheel. Function of Propeller shaft, Universal joint Differential and types of Rear axles and Front Axles		
5th	13th		5th	Demonstration of (i) rear axle (ii) differential (iii) steering system. (groups- G1, G2, G3)
	14th			
	15th			
6th	16th	Wheels and Tyres - Types of wheels	6th	Fault finding practices on an automobile - four wheelers (petrol/ diesel vehicles). (groups- G1, G2, G3)
	17th	Types and specifications of tyres used in Indian vehicles and wheel balancing		
	18th	Unit 4 Steering System Function and principle of Ackerman and Davis steering mechanism		
7th	19th	types of steering gear boxes – Worm and nut, worm and wheel	7th	revision of 3rd, 4th, 5th practicals
	20th	worm and roller, rack and pinion, Power steering system		
	21st	alignment of wheels		
8th	22nd	Toe in, toe out, camber, caster, kingpin inclination	8th	Tuning of an automobile engine.
	23rd	revision of layout of chassis		
	24th	revision of steering mechanism		
9th	25th	Unit 5 Braking system Constructional details	9th	Driving practice on a 4-wheeler
	26th	working of mechanical, hydraulic brake. Concept of air and vacuum brake		
	27th	brake adjustment		
10th	28th	Introduction to Anti lock brake system and its	10th	Charging of

		working.		an automobile battery and measuring cell voltage and specific gravity of electrolyte.
	29th	revision of hydraulic brake system		
	30th	revision of vacuum brake		
11th	31st	Unit 6 Suspension System Function	11th	Changing of wheels and inflation of tyres, balancing of wheels
	32nd	Types		
	33rd	Working of coil spring leaf spring		
12th	34 th		12th	Checking spark gap and valve clearance
	35 th	Concept of Air suspension Shock absorber		
	36th			
13th	37th	revision of coil spring	13th	Cleaning and adjusting a carburetor
	38th	Unit 7 Auto Electrical System		
	39th	Constructional details of lead acid cell battery Maintenance of batteries		
14th	40th		14th	Revision of 6th, 7th and 8th practicals
	41st	checking of batteries for voltage and specific gravity Magneto and Battery		
	42nd			
15th	43rd	coil ignition system	15th	Revision of 9th, 10th and 11th practicals
	44th	Concept of Dynamo Alternator - Construction and working Charging of battery by Alternator and Regulator		
	45th	revision of 2nd, 3rd, 6th units		

LESSON PLAN

Name of Faculty: Rohit Kumar

Discipline: Mechanical Engg.

Semester: Second

Subject: Mechanical Engineering Drawing-I

Lesson Plan Duration: 16 Weeks

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

WEEK	TURNS	TOPIC	Covered on Date
		UNIT I	
1	1	1. Introduction to Mechanical Engineering Drawing 1.1 Principle and utility of detail and assembly drawings	
	2	<u>1.2 Practical exercise on drawing from detail to assembly or vice versa using different wooden joints as example (lap joint – T joint and corner joint, Mortise and tenon joint, Bridle joint, Mitre faced corner joint).</u>	
2	3	2. Threads 2.1 Nomenclature of threads, types of threads. Single and multiple start threads, right hand and left hand thread, Forms of various external thread sections such as V thread (Metric thread, British associate, American thread,	
	4	2.2 Basic whit worth thread), Square, Acme, Knuckle, and Buttress thread. Simplified conventional representation of V thread.	
3	5	3. Nuts and Bolts <u>3.1 Different views of hexagonal and square headed nuts and bolts.</u>	
	6	3.2 Assembled view of nuts and bolts with washers. Foundation bolt- Rag bolt, Hook bolt. <u>3.3 Lewis bolt, Eye bolt and curved bolt(Free hand)</u>	
4	7	<u>Assessment of sheets and doubts session</u>	
	8	SESSIONAL TEST 1	
5.	9	4. Locking Devices <u>4.1CastleSawnnut and Split pin locknut. Locking by spring washers, Locking plates.</u>	
6	11	5. Screws, Studs and Washers <u>5.1 Drawing of various types of machine and set</u>	

		<u>screws. Drawing of various types' of studs, through bolt, tap bolt and stud bolt.</u>	
	12	6. Keys and Cotters 6.1 Various types of keys and their application.	
7	13	<u>6.2 Preparation of drawings of various keys and cotters.</u>	
	14	<u>6.3 Various types of joints (a) Gib and Cotter joint (b) Knuckle joint (c) Spigot and Socket joint</u>	
8	15	<u>Assessment of sheets and doubts session</u>	
	16	SESSIONAL TEST 2	
9	17	7. Rivets and Riveted Joints 7.1 Types of general purpose rivet heads (Snap Head, Pan Head , Flat and counter sunk). Types of riveted joints – lap (single and double riveted),	
	18	<u>7.2 butt (single cover plate and double cover plate), chain and zig- zag riveting (Double riveted). Caulking and fullering operation of riveted joints.</u>	
10	19	8. Shaft Coupling 8.1 Introduction to coupling, their uses and types, Muff Coupling	
	20	<u>8.2 Protected type flange coupling. Flexible or non-rigid coupling</u>	
11	21	Assessment of sheets and doubts session	
	22	Assessment of sheets and doubts session	
12	23	9. Computer Aided Drafting (CAD) 9.1 Introduction, Various 2 D commands	
	24	9.2 Draw, modify and option commands	
13	25	9.3 Prepare at least 4 sheets using CAD software – one drawing each from wooden joint,	
	26	9.4 Threads, nut and bolts, coupling using CAD software	
14	27	SESSIONAL TEST 3	
	28	Assessment of sheets and doubts session	
15	29	Assessment of sheets and doubts session	
	30	Revision of syllabus	
16	31	Viva	
	32	Viva	

