

LESSON PLAN

Name of Faculty: Sh. Harjit Chawla / Sh. Rohit Kumar **Discipline:**

Mechanical Engg.

Semester: 1st

Subject: Engineering Graphics

Lesson Plan Duration: 15 Weeks (from Aug. 2024 to Nov. 2024)

Teaching Load per week (In Hrs): Practicals – 06

WEEK	TURN	TOPIC	REMARKS
1	1	UNIT I 1. Introduction to Engineering Drawing and Graphics 1.1 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 Conventional lines.	
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 3.1 Necessity of dimensioning, method and principles of dimensioning (mainly theoretical instructions).	
5	9	3.2 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 4.1 Scales –Needs and importance (theoretical instructions), Type of scales, Definition of Representative Fraction (R.F.) and Length of Scale.	
6	11	4.2 To draw/construct plain and diagonal scales.	
	12	1st sessional Test	
UNIT II			

	13	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	
10	19	2.1 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).	
	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 view of a block).	
15	29		
	30	3RD sessional Test	

LESSON PLAN

Name of the faculty = Sh. Hanish Saini

Discipline=Mechncial Engg.

Semester= 1st

Subject = Fundamentals of IT

Lesson Plan Duration =16 Weeks

Work Load = L-2,P-4

Week	Lecture	Topics Covered	Practical Excercises
1	1	Introduction to the Course, Brief history of development of computers, Definition of Computer	Browser features, browsing, using various search engines, writing search queries
	2	Block diagram of a Computer, Hardware and Software	
2	3	Bootting: Cold and Hot Booting, Interaction between the CPU and Memory with Input/Output devices	Visit various e-governance/Digital India portals, understand their features, services offered
	4	Function of CPU and major functional parts of CPU	
3	5	Memory: Bit, Nibble, Byte, KB, MB, GB, TB, PB	Read Wikipedia pages on computer hardware components, look at those components in lab, identify them, recognize various ports/interfaces and related cables, etc.
	6	Functions of memory, Use of storage devices in a Computer, List types of memory used in a Computer	
4	7	Importance of cache memory, CPU speed and CPU word length	Using Administrative Tools/Control Panel Settings of Operating Systems
	8	Understanding browser, Introduction to WWW	
5	9	Efficient use of search engines, Awareness about Digital India portals (state and national portals) and college portals	Connect various peripherals (printer, scanner, etc.) to computer, explore various features of peripheral and their device driver software

	10	Advantages of Email, Various email service providers	
6	11	Creation of email id, sending and receiving emails, Attaching documents with email and drive	Explore features of Open Office tools and MS-Office, create documents, create presentation, create spread sheet, using these features, do it multiple times
	12	Effective use of Gmail, G-Drive, Google Calendar, Google Sites, Google Sheets	
7	13	Online mode of communication using Google Meet & WebEx	Working with Conversion Software like pdfToWord, WordToPPT, etc.
	14	Sessional Test 1	
8	15	Introduction to Programming, Steps involved in problem solving	Working with Mobile Applications – Searching for Authentic Mobile app, Installation and Settings, Govt. of India Mobile Applications
	16	Definition of Algorithm, Definition of Flowchart	
9	17	Steps involved in algorithm development, Differentiate algorithm and flowchart	Creating email id, sending and receiving mails with attachments
	18	Symbols used in flowcharts, Algorithms for simple problems	
10	19	Flowcharts for simple problems, Practice logic building using flowchart/algorithms	Using Google Drive, Google Calendar
	20	Office Tools like LibreOffice/OpenOffice/MSOffice	
11	21	OpenOffice Writer – Typesetting Text and Basic Formatting, Inserting Images, Hyperlinks, Bookmarks	Create Flow chart and Algorithm for the following
	22	Tables and Table Properties in Writer	
12	23	Introducing LibreOffice/OpenOffice Calc, Working with Cells, Sheets, data, tables	Addition of n numbers and display result
	24	Using formulae and functions, using charts and graphics	To convert temperature from Celsius to Fahrenheit

13	25	OpenOffice Impress – Creating and Viewing Presentations, Inserting Pictures and Tables	To find Area and Perimeter of Square
	26	Slide Master and Slide Design, Custom Animation	Swap Two Numbers
14	27	Sessional Test 2	Find the smallest of two numbers
	28	Introduction to Digital Marketing, Why Digital Marketing	Find whether given number is Even or Odd
15	29	Characteristics of Digital Marketing, Tools for Digital Marketing	To print first n even Numbers
	30	Effective use of Social Media like LinkedIn, Google+, Facebook, Twitter, Features of Social media, Advantages and Disadvantages of Social Media	Find sum of series $1+2+3+\dots+N$
16	31	Review and Q&A session	Print multiplication table of a number
	32	Sessional Test 3	Generate first n Fibonacci terms 0,1,1,2,3,5...n (n>2)

LESSON PLAN

FACULTY NAME – PARVEEN KUMAR

DISCIPLINE - MECHANICAL ENGINEERING

SEMESTER - 3rd

SUBJECT - BEEE

LESSON PLAN DURATION – 16 WEEKS

WORK LOAD / WEEK - 2 LECTURE

WEEK	THEORY	
	DAY/ LECTURE	TOPIC (INCLUDING ASSIGNMENT/TEST)
1 ST	1	UNIT -1- Basic Electrical Quantities - Definition of voltage, current, power and energy with their units, name of instruments used for measuring above quantities,
	2	connection of these instruments in an electric circuit. Difference Between ac and dc. Various applications of electricity.
2 ND	3	UNIT II - AC Fundamentals - Electromagnetic induction-Faraday's Laws, Lenz's Law ,
	4	Principles of a.c. Circuits; Alternating emf,
3 RD	5	Definition of cycle, frequency, amplitude and time period.
	6	Concept of electrical power, Concept of phase and phase difference.
4 TH	7	Concept of resistance, inductance and capacitance in simple a.c. circuit.
	8	Concept of three phase system; star and delta connections ;voltage and current relationship
		SESSIONAL TEST - 1
5 TH	9	UNIT III - Transformer - Working principle and construction of single phase transformer,
	10	transformer ratio, emf equation, tapping of transformer,
6 TH	11	Brief idea and difference between them),
	12	cooling of transformer, applications of various types of transformers.
7 TH	13	UNIT IV - Difference between high and low voltage distribution system,
	14	identification of three-phase wires,
8 TH	15	neutral wire and earth wire in a low voltage distribution system.
	16	Identification of voltages between phases and between one phase and neutral.
9 TH	17	Difference between three-phase and single-phase supply
	18	UNIT V - Electric Motor - Description and applications of single-phase and three-phase motors.
10 TH	19	Introduction to DC motor and its applications,
	20	Difference between ac and dc motor,
11 TH	21	Connection and starting of three-phase induction motors by DOL and star-delta starter.
	22	Changing direction of rotation of a given 3 phase induction motor.
		SESSIONAL TEST - 2
12 TH	23	Motors used for driving pump
	24	compressor and e vehicles.
13 TH	25	UNIT - VI - Domestic Installation - Distinction between light-fan circuit and single phase power circuit,
	26	sub-circuits, various accessories and parts of domestic electrical installation.
14 TH	27	Different types of wires and there is specification, Identification of wiring systems.

	28	Colour coding of electrical wires.
15TH	29	UNIT – VII - Electrical shock and precautions against shock, treatment of electric shock, concept of fuses and their classification,
	30	concept of earthing and various types of earthing, brief description of range of protective devices like MCB, ELCB, and RCB
16TH	31	UNIT – VIII -Concept of semi conductor, types- P and N type. Diodes and their applications, Transistor – PNP and NPN. Their characteristics and uses.
	32	Introduction to integrated circuit (IC), Different types of ICs used in electric drives and their control circuit.
		SESSIONAL TEST - 3

LESSON PLAN

NAME OF FACULTY: SH. ROHIT KUMAR

DISCIPLINE: MECHANICAL ENGINEERING
GOVT. POLYTECHNIC, AMBALA CITY

SEMESTER: III

SUBJECT - STRENGTH OF MATERIAL

LESSON PLAN DURATION: 16 WEEKS

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

WEEK	LECTURE NO.	THEORY	PRACTICALS
I	1	UNIT -1 STRESS AND STRAINS Basic concept of load, stress and strain Tensile, compressive and shear stresses	1. Tensile test on bars of Mild steel and Aluminum.
	2	Linear strain, Lateral strain, Shear strain, Volumetric strain. Concept of Elasticity, Elastic limit and limit of proportionality Hook's Law and Elastic Constants	
	3	Stress-strain curve for ductile and brittle materials Nominal stress, Yield point, plastic stage	
II	4	Ultimate stress and breaking stress Percentage elongations Proof stress and working stress Factor of safety	
	5	Poisson's Ratio Thermal stress and strain	2. Bending tests on a steel bar or a wooden beam.

	6	Longitudinal and circumferential stresses in seamless thin walled cylindrical shells. Introduction to Principal stresses	
III	7	UNIT – 2 RESILIENCE Strain Energy, Resilience, proof resilience and modulus of resilience	
	8	Strain energy due to direct stresses and Shear Stress	
	9	Stresses due to gradual, sudden and falling load.	
		SESSIONAL TEST - I	
IV	10	UNIT -3 MOMENT OF INERTIA Concept of moment of inertia and second moment of area Radius of gyration	
	11	Theorem of perpendicular axis and parallel axis (with derivation)	
	12	Second moment of area of common geometrical sections : Rectangle, Triangle, Circle (without derivation); Second moment of area for L,T and I section Section modulus	3. Impact test on metals a) Izod test b) Charpy test
V	13	UNIT- 4 BENDING MOMENT AND SHEARING FORCES Concept of various types of beams and form of loading Concept of end supports-Roller, hinged and fixed	
	14	Concept of bending moment and shearing force	.
	15	B.M. and S.F. Diagram for cantilever and simply supported beams with and without overhang subjected to concentrated and U.D.L	
VI	16	UNIT – 5 BENDING STRESSES Concept of Bending stresses Theory of simple bending, Derivation of Bending Equation	4. Torsion test of solid specimen of circular section of different metals for determining modulus of rigidity.
	17	Use of the equation Concept of moment of resistance Bending stress diagram	
	18	Section modulus for rectangular, circular and symmetrical I section. Calculation of maximum bending stress in beams of rectangular, circular, and T	

		section.	
VII	19	UNIT -6 COLOUMNS Concept of column, modes of failure Types of columns, modes of failure of columns	
	20	Buckling load, crushing load Slenderness ratio	
	21	Effective length End restraints	
VIII	22	Factors effecting strength of a column	
	23	Revision	
	24	SESSIONAL TEST - II	
IX	25	Analysis and Revision of Test and student's sessional test discussion.	
	26	Strength of column by Euler Formula without derivation	
	27	(Same continue) Strength of column by Euler Formula without derivation	
X	28	Rankine Gourdan formula (without derivation)	5. To plot a graph between load and extension and to determine the stiffness of a helical spring
	29	Continue same with revision	
	30	Continuous same with revision previous	
XI	31	UNIT -7 TORSION Concept of torsion, difference between torque and torsion.	
	32	Continue same as above	
	33	Derivation of Torsion Equation, use of torsion equation for circular shaft, (solid and hollow	
XII	34	Continue same as above	
	35	Comparison between solid and hollow shaft with regard to their strength and weight	
	36	Continue same as above	
XIII	37	Power transmitted by shaft Concept of mean and maximum torque	
	38	Continues previous lecturer as above	
	39	UNIT -8 SPRINGS Closed coil helical springs subjected to axial load	
XIV	40	calculation of	
	41	Stress deformation - Stiffness and angle of twist and strain energy	
	42	(Same as above) Stress deformation - Stiffness and angle of twist and strain energy	6. Hardness test on different metals.

XV	43	Strain energy and proof resilience	
	44	Determination of number of plates of laminated spring (semi elliptical type only)	
	45	Revision	
XVI	46	SESSIONAL TEST - III	
	47	Revision	
	48	Revision	

LESSON PLAN

FACULTY NAME – SH., PARVEEN KUMAR

DISCIPLINE - MECHANICAL ENGINEERING

SEMESTER - 3RD

SUBJECT - MECHANICAL ENGINEERING DRAWING -II

LESSON PLAN DURATION – 8 WEEKS

WORK LOAD / WEEK - 6 PRACTICAL

WEEK	THEORY	
	DAY/ LECTURE	TOPIC (INCLUDING ASSIGNMENT/TEST)
1ST	1	1. Limit, fits and tolerance
	2	Need of limit, fits and tolerance, Maximum limit of size, minimum limit of size,
	3	tolerance, allowance, deviation, upper deviation, lower deviation, fundamental deviation, clearance, maximum clearance, minimum clearance.
	4	Fits – clearance fit, interference fit and transition fit. Hole basis system, shaft basis system, tolerance grades,
	5	calculating values of clearance, interference, hole tolerance, shaft tolerance with given basic size for common assemblies like H7/g6, H7/m6, H8/p6.
	6	Basic terminology and symbols of geometrical dimensioning and tolerances. Surface finish representation
2ND	7	2 . Drawing of the following with complete dimensions, tolerances, bill of material and surface finish representation.

	8	Universal coupling and Oldham coupling (Assembly)
	9	Bearings
	10	Bushed Bearing (Assembly Drawing)
	11	Ball Bearing and Roller Bearing (Assembled Drawing)
	12	Plummer Block (Detail and Assembly Drawing)
3RD	13	Foot step Bearing (Assembled Drawing)
	14	Pipe Joints , Types of pipe Joints, Symbol and line layout of pipe lines
		SESSIONAL - 1
	15	Expansion pipe joint (Assembly drawing)
	16	Flanged pipe and right angled bend joint (Assembly Drawing)
	17	Reading and interpretation of mechanical components and assembly drawings
	18	Sketching practice of wall bracket.
	19	3 .Drilling Jig (Assembly Drawing)
4TH	20	4.Machine vices (Assembly Drawing)
	21	Lathe Tool Holder (Assembly Drawing)
	22	Lathe tail stock (assembly drawing)
	23	Locking by spring washers, Locking plates.
	24	5. I.C. Engine Parts
	25	Piston
5TH	26	Connecting rod (Assembly Drawing)
	27	Crankshaft and flywheel (Assembly Drawing)
	28	SESSIONAL – II
	29	6. Boiler Parts
	30	Steam Stop Valve (Assembly Drawing)
	31	Blow off cock. (Assembly Drawing)
6TH	32	7. Mechanical Screw Jack (Assembled Drawing)
	33	8. Gears
	34	Gear, Types of gears, Nomenclature of gears and conventional representation

	35	Draw the actual profile of involute teeth of spur gear by approximate method and base circle method.
	36	REVISION
	37	REVISION
7TH	38	REVISION
	39	REVISION
	40	SESSIONAL - III
	41	REVISION
	42	REVISION
	43	REVISION
8TH	44	REVISION
	45	REVISION
	46	REVISION
	47	REVISION
	48	REVISION
	49	REVISION

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	Fundamental Concepts Thermodynamic state and system, boundary, surrounding, universe, thermodynamic systems – closed, open, isolated, adiabatic, homogeneous and heterogeneous, macroscopic and microscopic	
1		properties of system – intensive and extensive, thermodynamic equilibrium, quasi – static process,	Determination of

	2	reversible and irreversible processes	temperature by thermocouple
	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 heat at 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 accessories of 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 transfer for the above process.	Study the working of Lancashire boiler and Nestler boiler.
	14	1 st Class test	
	15	1 st sessional test	
6	16	Laws of Thermodynamics Laws of conservation of 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, Constant pressure, 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, Clausius statement, equivalency of statements	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 specific heat 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- S diagrams, Mollier diagram (H – S Chart)	
10	28	Expansion of steam, Hyperbolic, reversible adiabatic and throttling processes, determination of quality of steam (dryness fraction)	VIVA
	29	2 nd class test	
	30	2 nd sessional test	
11	31	Uses of steam, classification of boilers, function of various boiler mounting and accessories	Determination of Dryness fraction of 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 fraction of 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	3 rd class test	VIVA
	44	Rotary compressors – types, working and construction of centrifugal compressor, axial flow compressor, vane type compressor	
	45	3 rd sessional test	

Lesson Plan

Name of the Faculty:	ROHIT KUMAR
Discipline:	MECHANICAL
Semester:	3 RD

Subject:	WORKSHOP TECHNOLOGY-II
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Lesson Plan Duration: 15 weeks (from Aug, 2024 to Nov 2024)

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

Week	Theory	
	Lecture day	Topic(including assignment/test)
1st	1st	UNIT-1 Resistance welding: Principle, advantages, limitations, Working and applications of spot welding and seam welding.
	2nd	Other welding processes: principle, advantages, limitations, working and applications of Shield metal arc welding, Submerged arc welding.
	3rd	Welding defects, methods of controlling welding defects and inspection of welded joints.
2nd	1st	Modern welding Methods: Methods, Principle of operation, advantages, disadvantages
	2nd	and applications of TIG welding, MIG welding, Thermit Welding, Electro slag welding,
	3rd	Electron Beam welding, ultrasonic welding, Laser Beam welding, Robotic welding.
3rd	1st	2. Foundary Techniques: 2.1 Pattern Making: Types of Patterns, Pattern material, Pattern allowances, Pattern codes as per B.I.S.
	2nd	Introduction to cores, core boxes and core materials, core making procedure, core prints, positioning of cores
	3rd	2.2 Molding and casting: Molding sand: properties of molding sand, their impact and control of properties
4th	1st	viz. permeability, refractoriness, adhesiveness, cohesiveness, strength, followability, collapsibility. Various types of molding sand, Testing of molding sand.
	2nd	Mold making: Types of molds, step involved in making a mold and Molding boxes.
	3rd	Hand tools used for mold making, Molding processes; Bench molding, floor molding, pit molding and machine molding.
5th	1st	Casting Processes: charging a furnace, melting and pouring both ferrous and non ferrous metals, cleaning of castings.
	2nd	Principle, working and applications of Die casting: hot chamber and cold chamber, centrifugal casting.
	3rd	Gating and Riser system: Elements of gating system, Pouring basin, sprue, runner, gates
6th	1st	Sessional Test-1
	2nd	Types of risers, location of risers, Directional solidification.
	3rd	Melting Furnaces: Construction and working of Pit furnace, cupola furnace

7 th	1 st	Crucible furnace-tilting types, Electric Furnace.
	2 nd	Casting Defects: Different types of casting defects, Nondestructive testing (NDT) of castings
	3 rd	Die penetration test, radiography, magnetic particle inspection and ultrasonic inspection.
8 th	1 st	UNIT-III Shaping, Slotting and Planing 3.1 Working principle and construction of shaper, slotter and planer
	2 nd	3.2 Type of shapers and slotters , 3.3 Type of planers
	3 rd	3.4 Quick return mechanism applied to shaper and planer machine,
9 th	1 st	3.5 work holding devices used on shaper and planer, 3.6 Types of tools used and their geometry,
	2 nd	3.7 Specification of shaper and planer, 3.8 Speeds and feeds in above processes.
	3 rd	4. Broaching: 4.1 Introduction to broaching, 4.2 Nomenclature of broach tools, types and material.
10 th	1 st	4.3 Types of broaching machines- single ram and duplex ram horizontal type, Vertical type pull up, pull down and push down.
	2 nd	Sessional Test-2
	3 rd	5. Milling: 5.1 Milling methods-up milling and down milling,
11 th	1 st	5.2 specification and working principle of milling machine.
	2 nd	5.3 Classification, brief description and application of milling machines,
	3 rd	Details of column and knee type milling machine,
12 th	1 st	5.4 Milling machine accessories and attachment- Arbors, adaptors, collets, vices,
	2 nd	Circular table, indexing head and tail stock, vertical milling attachment, rotary table.
	3 rd	5.5 Identification of different milling cutters and work mandrels.
13 th	1 st	5.6 Work holding devices.
	2 nd	5.7 Milling operations- Face milling, angular milling, form milling, straddle milling and gang milling. 5.8 cutting parameters.
	3 rd	6. JIGS and FIXTURES: 6.1 Importance and use of jigs and fixtures, difference between jig and fixture.
14 th	1 st	6.2 Principal of location, 6.3 Locating and clamping devices.
	2 nd	6.4 Types of jigs- drilling jig, template jig and plate jig
	3 rd	6.5 Types of fixtures- Milling and welding fixture
15 th	1 st	Sessional Test-3
	2 nd	Revision
	3 rd	Revision

LESSON PLAN

FACULTY NAME – SH. RAM NIWAS

DISCIPLINE - MECHANICAL ENGINEERING

SEMESTER- 5TH

SUBJECT - INDUSTRIAL ENGINEERING

LESSON PLAN DURATION – 8 WEEKS

WORK LOAD / WEEK - 6 PRACTICAL

WEEK	THEORY	
	DAY/ LECTURE	TOPIC (INCLUDING ASSIGNMENT/TEST)
1 ST	1	UNIT-I Productivity Introduction to productivity, Standard of living, factors affecting productivity,
	2	, practical measurement of productivity, difference between production and productivity,
	3	causes of low productivity and methods
	4	to improve productivity, contribution of standardization in improving productivity. Importance of good working conditions.
	5	Work Study Definition and scope of work study; factors for selection of work study job, uses and limitations of work study,
	6	Inter-relation between method study and work measurement; Human aspects of work study; Role of work study in improving productivity. Method Study - Objectives and procedure for Method study analysis
2 ND	7	UNIT-II Motion Analysis Principles of Motion analysis; Therbligs and SIMO charts; Normal work area (Principle of motion economy),
	8	Arrangement of work place with motion economy. Ergonomics, ergonomic aspect in design of machine tools and equipment.
	9	Work measurement Objectives; work measurement techniques, Time study, Basic procedure in making a time study; Employees rating factor;

	10	Application of time allowances: Rest, Personal, Process, Special and Policy allowances; Calculation of standard time;
	11	Simple Numerical Problems; Techniques of Work Measurement; standard data and its usage.; Pre determined Motion Time System (PMTS)., work sampling,
	12	REVISION
3RD	13	REVISION
	14	REVISION
		SESSIONAL - 1
	15	UNIT III Wages and Incentive Schemes Introduction to wages, Wage payment for direct and indirect labour,
	16	wage payment plans. Incentives, types of incentives, various incentive plans,
	17	incentives for indirect labour
	18	Plant Layout Location, layout of machines in Plant Layout,
	19	Principles of Plant layout, types of plant layout and positioning of machines
4TH	20	UNIT IV Production Planning and Control Production and its types- job order
	21	, batch type and continuous type of productions. Objectives and components (functions) of P.P.C
	22	REVISION
	23	REVISION
	24	Advantages of production planning and Production Control
	25	stages of P.P.C, process planning, routing, scheduling,
5TH	26	dispatching and follow up, routing
	27	purpose, route sheets, scheduling – purpose, machine loading chart,
	28	SESSIONAL – II
	29	, dispatching – purpose, and procedure, follow up – purpose and procedure
	30	. GANTT charts-types. CPM/PERT technique. Stores Management Different Layout and structures of stores

	31	, Inventory control, Types of inventory, Various terms of inventory like: reorder quantity, etc
6TH	32	ABC Analysis, calculation of EOQ, Bin cards and various forms required in stores for documentation. Purchase procedures.
	33	UNIT V Miscellaneous Value Engg: Value engineering concepts, advantages, applications,
	34	problem recognition, and role in productivity, criteria for comparison,
	35	and element of choice. VE activity, use,
	36	REVISION
	37	esteem and exchange values, basic vs. secondary vs. unnecessary functions.
7TH	38	Approach of function, Evaluation of function, determining function, classifying function, evaluation of costs, Monte Carlo method for make or buy. Break –Even Analysis.
	39	REVISION
	40	SESSIONAL - III
	41	REVISION
	42	REVISION
	43	REVISION
8TH	44	REVISION
	45	REVISION
	46	REVISION
	47	REVISION
	48	REVISION
	49	REVISION

LESSON PLAN

NAME OF FACULTY: SH. JAGJIT SINGH NARANG (HOD)

DISCIPLINE: MECHANICAL ENGINEERING - G.P. AMBALA

SEMESTER: V

SUBJECT: CNC MACHINES AND AUTOMATION

LESSON PLAN DURATION: 15 WEEKS

WORK LOAD (LECTURE/PRACTICAL) PER WEEK: (3 lectures, 2 Practical)

WEEK	THEORY		PRACTICALS
	LECTURE NOS	TOPIC	TOPIC

1 st	1	Unit-1- Introduction, Introduction to NC, CNC & DNC,	Practical-1 Study of constructional detail of CNC lathe.
	2	Advantages, disadvantages and its Applications.	
	3	Basic components of CNC machines, Machine Control Unit,	
2 nd	4	Input devices, selection of components to be machined on CNC machines,	Practical-2 Study of constructional detail of CNC milling machine.
	5	PLC Control and its purpose, types and applications.	
	6	Classification Of NC Systems According to Feedback, motion, positioning.	
	7	Unit-4- Part programming and basic procedure of part programming, Rules for Axis identification, NC words, Blocks, part programming formats,	
	8	simple programming for rational components (Point to point, Straight line, curved surface), tool off sets, cutter radius compensation and wear compensation. Comparative study of Fanuc Controller and Sinumerik codes.	
3 rd	9	Advanced Structures in Part Programming Advantages of using advanced structures, part programming using canned cycles,	Repeat Practical 1 to 2
	10	subroutines and do loops, mirror image	
4 th	11	Construction and Tooling Need of Special mechanical design features for CNC, specification Chart of CNC machines, types of slideways, balls, rollers,	Practical-3 Study the constructional details and working of Automatic tool changer and Multiple pallets
	12	motor- servo/stepper , recirculating ball screw and nut assembly,	
	13	swarf removal, safety and guarding devices,	
5 th	14	Various cutting tools for CNC machines, overview of tool holder, different pallet systems and	Practical-4 Develop a part programme for following lathe operations and make the job on CNC lathe. - Plain turning and facing operation - Taper turning operation - Circular interpolation.
	15	automatic tool changer-ATC system, tool change cycle,	
	16	types of tool magazines, specialized work done in CNC tool room	
6 th	17	SESSIONAL TEST –I	Repeat Practical 1 to 4
	18	Unit-3- System Devices- Control System; Open Loop and Closed Loop System,	
	19	Concept of Actuators, Transducers and Sensors, Tachometer, LVDT,	
	20	Interrupters, potentiometers for linear	Repeat Practical 1 to 4

7 th		and angular position	
	21	Encoder and decoder and axis drives	
	18	Unit-4- Part Programming, Introduction to Part programming, Basic concepts of part programming,	
8 th	19	NC words, part programming formats, simple programming for rational components, part programming using canned cycles,	Repeat Practical 1 to 4
	20	subroutines and do loops, tool off sets, cutter radius compensation and tool wear compensation	
	21	Unit-5 - Problems in CNC Machines, Common problems in CNC machines related to mechanical,	
9 th	22	electrical and pneumatic, electronic components.	Practical-5 Develop a part programme for the following milling operation and make the job on CNC milling - Plain milling - Slot milling - Contouring - Pocket milling
	23	Study of common problems and remedies,	
	24	use of on-time fault finding diagnosis tools in CNC machines	
10 th	25	SESSIONAL TEST -II	Practical-6- Calculate coordinate points for a zig zag job by considering sign convention for milling
	26	Unit-6- Automation and NC system	
	27	Automation, suitability of production system to automation , types,	
11 th	28	automatic assembly, manufacture of printed circuit boards(PCB),	Practical-7 Using canned cycle - Create a part program for drilling, tapping, counter sinking and produce component in the Machine
	29	manufacture of integrated Circuits, Overview of FMS,	
	30	AGV-types, ASRS,	
12 th	31	Group technology, CAD/CAM and CIM,	Practical-8 Demonstration through industrial visit for awareness of actual working of FMS in production.
	32	Automated Identification system	
	33	Unit-7- Automated inspection: Off-line, On-line, Contact, Non-contact;	
13 th	34	Coordinate Measuring machines; Machine vision,	Practical 9 Use of software for any one of turning or milling operations on CNC turning center. Program writing Turning simulator for generation of tool path.
	35	concept of AI and its applications in manufacturing	
	36	Robotics, nomenclature of joints, motion	

14th	37	SESSIONAL TEST -III	Repeat Practical 5 to 8
	38	Revision/doubt clearing Sessional Test -1	
	39	Revision/doubt clearing Test -2	
15th	40	Revision/doubt clearing Test -3	Practical 10- Demo of 3-D Printing.
	41	Programming- PTP, Lathe	
	42	Canned Cycle	
16th	43	Any Other Query	Repeat Practical 9- 10

LESSON PLAN

NAME OF FACULTY: SH. SANJEEV KUMAR

DISCIPLINE: MECHANICAL ENGINEERING - G.P. AMBALA

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	Introduction to air refrigerator working on reversed carnot cycle.	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	Refrigerants, Functions,	
5th	13	SESSIONAL TEST -I	Repeat Practical 1 to 4
	14	Unit-3 Refrigerants, Functions, classification of refrigerants, properties of R - 717	
	15	R – 22, R–134 (a) and CO ₂	
	16	Properties of ideal refrigerant, selection of refrigerant	Repeat Practical 1 to 4
	17	Unit-4- Vapour Absorption System	

6 th	18	Introduction, principle and working of simple absorption system and domestic electrolux refrigeration systems	
7 th	19	Solar power refrigeration system, advantages and disadvantages of solar power refrigeration system over vapour compression system	Repeat Practical 1 to 4
	20	Unit-5-Refrigeration Equipment, Compressor - Function, various types of compressors	
	21	Condenser - Function, various types of condensers, Evaporator - Function, types of evaporators	
8 th	22	Expansion Valve - Function, various types such as capillary tube, thermostatic	Practical-5 To detect trouble / faults in a refrigerator/window type air conditioner
	23	expansion valve, low side and high side float valves, application of various expansion valves	
	24	Safety Devices-Thermostat, overload protector LP, HP cut out switch	
9 th	25	SESSIONAL TEST -II	Practical-6 Charging of a refrigerator/window type air conditioner.
	26	Unit-6- Psychrometry Definition, importance,	
	27	specific humidity, relative humidity,	
10 th	28	degree of saturation DBT	Practical-7 Study of cut section of single cylinder compressor
	29	WBT, DPT,	
	30	sensible heat, latent heat	
11 th	31	Total enthalpy of air. Psychrometry chart and various processes of psychrometry	Practical-8 Visit to an ice plant, cold storage plant, central air conditioning plant
	32	by pass factor, room sensible heat factor, effective room sensible heat factor	
	33	grand sensible heat factor, ADP, room DPT.	
12 th	34	Heating and humidification, cooling and dehumidification,	Repeat Practical 5 to 8
	35	Study of window air-conditioning,	
	36	split type air conditioning,	
13 th	37	concept of central air-condition,	Repeat Practical 5 to 8
	38	automobile air-conditioning	
	39	SESSIONAL TEST -III	
14 th	40	Inverter technology, auto-defrosting,	Repeat Practical 5 to 8
	41	blast cooling, star rating.	
	42	Revised Sessional Test -1	
15 th	43	Revised Sessional Test -2	Repeat Practical
	44	Revised Sessional Test -3	
	45	Seminar	
16 th	46	Seminar	
	47	Any Other Query	
	48	Revision	

Lesson Plan

Name of the Faculty:	HARJIT CHAWLA
Discipline:	MECHANICAL
Semester:	5 th
Subject:	Theory of Machines

Lesson Plan Duration: 15 weeks (from Aug, 2024 to Nov 2024)

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

Week	Theory		Practical
	Lecture day	Topic(including assignment/test)	Topic
1st	1st	UNIT-1 SIMPLE MECHANISMS 1.1 Introduction to Machines and Theory of Machines	1. To study inversion of Four Bar Mechanism, Single Slider Crank Chain and Double Slider Crank Chain Mechanism with the help of working models
	2nd	1.2 Kinematics of Machines: - Definition of Kinematics, Dynamics, Statics, Kinetics, Kinematic link, Kinematic Pair and its types, constrained motion and its types.	
	3rd	Kinematic chain and its types, Mechanism, inversion, machine and structure.	
2nd	1st	1.2 Inversions of Kinematic Chain: Inversion of four bar chain.	Checking of practical copy/ viva/Revision.
	2nd	Coupled wheels of Locomotive & Pantograph.	
	3rd	Inversion of Single Slider Crank chain- Rotary I.C. Engines mechanism.	
3rd	1st	Crank and Slotted lever quick return mechanism.	2. To construct radial cam profile for uniform velocity with knife edge and roller follower on drawing sheet
	2nd	Inversion of Double Slider Crank Chain- Scotch Yoke Mechanism & Oldham's coupling.	
	3rd	Revision.	
4th	1st	UNIT-II CAMS & FOLLOWERS 2.1 Definition and function of cam.	Checking of practical copy/ viva/ Revision.
	2nd	Different types of cams and followers and their specific applications	
	3rd	2.2 Terminology of cam profile.	
5th	1st	2.3 Displacement diagram for uniform velocity, S.H.M. and uniform acceleration and	3. To construct radial cam profile for SHM with knife edge and roller follower on drawing sheet.

		deceleration.	
	2 nd	2.4 Drawing of profile of radial cam with knife-edge and roller follower with and without offset with reciprocating motion.	
	3 rd	Revision	
6 th	1 st	Sessional Test-1	Checking of practical copy/ viva/Revision.
	2 nd	UNIT-III FLYWHEEL 3.1 Flywheel - Concept, function and applications of flywheel.	
	3 rd	Types of flywheel: (i) Disc type (ii) Rim type (Specific application of these two).	
7 th	1 st	3.2 Turning moment diagram for single cylinder 4-Stroke I.C. Engine and Steam Engine (Single Acting & Double Acting).	4. To construct radial cam profile for uniform acceleration and retardation with knife edge and roller follower on drawing.
	2 nd	3.3 Coefficient of fluctuation of energy, Coefficient of fluctuation of speed and its significance. Numerical	
	3 rd	GOVERNORS Concept, function and applications of Governors.	
8 th	1 st	Comparison between Flywheel and Governor Terminology used in Governors.	5. To find the moment of inertia of a flywheel.
	2 nd	Types of centrifugal Governor: Construction and working of Simple Watt governor.	
	3 rd	Porter Governor and Hartnell Governor.	
9 th	1 st	UNIT-IV MECHANICAL POWER TRANSMISSION 4.1 Introduction to Mechanical Power, Need of Power Transmission, Methods of Power Transmission.	6. To Study the different types of centrifugal governors & plot graph between R.P.M & Displacement of sleeve.
	2 nd	4.2 Introduction to belt drives. Flat belt drive and V -belt drive, Relative advantages and disadvantages.	
	3 rd	4.3 Types and application of belt drives- Open belt drive, Closed or crossed belt drive, Fast and loose pulley, Stepped cone pulley, Jockey pulley drive, Quarter turn belt drive, Compound belt drive. Length of belt.	
10 th	1 st	Sessional Test-2	Checking of practical copy/ viva/Revision.
	2 nd	4.4 Concept of velocity ratio, slip and creep; crowning of pulleys.	
	3 rd	4.5 Ratio of driving tensions,	

		power transmitted, centrifugal tension, and condition for maximum horse power (simple numerical)	
11 th	1 st	4.6 Introduction to Chain Drive, Different types of chains and their applications. Advantages disadvantages of chain drive relative to belt drive.	7. To study various types of belts drives and to calculate velocity ratio.
	2 nd	4.7 Gear Drive -Different types of gears and their applications.	
	3 rd	4.8 Gear train, Types and application of different gear trains: Simple, compound, reverted and epi cyclic gear trains.(simple numerical)	
12 th	1 st	4.9 Relative advantages and disadvantages of Gear drive over other belt drives.	8. To study different types of gear trains with the help of working models and to calculate Velocity ratio.
	2 nd	UNIT-V VIBRATIONS & BALANCING 5.1 Concept and terminology used in vibrations.	
	3 rd	Causes of vibrations in machines; their harmful effects and remedies	
13 th	1 st	Types of vibrations-Free, forced and damped. Damping of vibrations. Resonance.	9. To perform the experiment of Balancing of rotating parts and find the unbalanced couple and forces
	2 nd	5.2 Concept of balancing, static and dynamic balancing, Need of balancing of machine parts.	
	3 rd	5.3 Balancing of rotating masses in the same plane and different planes.	
14 th	1 st	Revision	Checking of practical copy/ viva/Revision.
	2 nd	Sessional Test-3	
	3 rd	Revision	
15 th	1 st	Revision	Checking of practical copy/ viva/Revision.
	2 nd	Revision	
	3 rd	Revision	