

GATEWAY INSTITUTE OF ENGINEERING & TECHNOLOGY, SONEPAT

LESSON PLAN

Name of the Faculty : Mr. Abhishek anand (Theory + Practical)

Discipline : Mechanical engineering

Semester : 4th

Subject : Hydraulics and Hydraulic Machine

Lesson Plan Duration: 16 WEEKS(JANUARY TO APRIL)

Work Load (L/P) per Week (in hours): L-03, P-02

WEEK	THEORY		PRACTICAL	
	LECTURE DAY	TOPIC (INCLUDING ASSIGNMENT, TEST)	PRACTICAL DAY	TOPIC
1st	1	Introduction	1st	Introduction to various lab
	2	Fluid, types of fluid; properties of fluid viz mass density, weight density (specific weight), specific volume, specific gravity		
	3	capillarity, viscosity, compressibility		
2nd	4	surface tension, kinematic viscosity and dynamic viscosity and their units.	2nd	Machine intro.
	5	Pressure and its Measurement-Concept of pressure (Atmospheric Pressure, gauge pressure, absolute pressure)		
	6			
3rd	7	Pascal's Law, Static Pressure	3rd	Measurement of pressure head by employing. i) Piezometer tube ii) Single and double column manometer
	8	Pressure measuring devices: piezometer tube manometers - simple U-tube		
	9	differential single column, inverted U-tube, micro manometer including, numericals		
4th	10	Bourdon pressure gauge, Diaphragm pressure gauge, dead weight pressure gauge.	4th	Revision of last lab
	11	assignments of unit 1 & 2 test		
	12	Types of fluid flow – steady and unsteady, uniform and non-uniform, laminar and turbulent.		
5th	13	rate of flow and their units; continuity equation of flow.	5th	Verification of Bernoulli's theorem.
	14	Potential Energy of a flowing fluid; total head;		
	15	Bernoulli's theorem (statement and proof) and its applications.		
6th	16	Discharge measurement with the help of venturimeter, orifice meter,	6th	To find out the value of coefficient of discharge for a venturimeter
	17	pitot-tube, limitations of Bernoulli's theorem		
	18	problems and doubt clearance.		
7th	19	Definition of pipe flow, wetted perimeter	7th	Measurement of flow by using venturimeter
	20	hydraulic mean depth, hydraulic gradient		
	21	loss of head due to friction; Chezy's equation and Darcy's equation of head loss (without proof)		
	22	Reynold's number and its effect on pipe friction		

8th	23	siphon, Nozzle - definition, velocity of liquid flowing through the nozzle, power developed	8th	To find coefficient of friction for a pipe (Darcy's friction).
	24	Water hammer, anchor block, syphon, surge tank.		
9th	25	Loss of head in pipes due to sudden enlargement, sudden contraction, obstruction on flow path, change of direction and pipe fittings	9th	Revision of last lab
	26	numerical		
	27	Assignments of unit 3rd and 4th , Class Test		
10th	28	introduction to Flow through Orifices	10th	Revision of last lab
	29	various coefficient of discharge Cc, Cv, Cd		
	30	flow through drowned, partially drowned orifices		
11th	31	time for emptying a tank through a circular orifice	11th	Revision of last lab
	32	problems and doubt clearance.		
	33	Hydraulic Machines - introduction		
12th	34	Description, operation and application of hydraulic systems – hydraulic ram, hydraulic jack	12th	To study hydraulic circuit of an automobile brake and hydraulic ram
	35	Description, operation and application of hydraulic brake, hydraulic accumulator.		
	36	Description, operation and application of hydraulic door closer,hydraulic press		
13th	37	Selection of specification of above systems for different applications.	13th	Revision of last lab
	38	Concept of a turbine		
	39	Types of turbines –impulse and reaction type. difference between them		
14th	40	Construction and working of pelton wheel	14th	Study the working of a Pelton wheel and Francis turbine.
	41	Construction and working of Francis turbine		
	42	Construction and working of Propeller and Kaplan turbines		
15th	43	Unit speed, unit power, unit discharge	15th	Revision of last lab
	44	specific speed of turbines, selection of turbines based on specific speed.		
	45	Concept of hydraulic pump		
16th	46	single acting reciprocating pump (construction & Operation)	16th	To study a single stage centrifugal pump for constructional details and its operation to find out its normal head and discharge.
	47	vane, screw and gear pumps,Construction, working and operation of centrifugal pump.		
	48	Performance,efficiencies and specifications of a centrifugal pump		
17th	49	Trouble shooting and problems in centrifugal pumps and remedial measures	17th	Final yr paper discussion
	50	pitting, cavitation, priming		
	51	revision		

GATEWAY INSTITUTE OF ENGINEERING & TECHNOLOGY, SONEPAT

LESSON PLAN

Name of the Faculty : Mr. Kuldeep Dahiya (Theory+Practicals)

Discipline : Mechanical engineering

Semester : 4th

Subject : Materials And Metallurgy

Lesson Plan Duration: 16 WEEKS (JANUARY TO APRIL)

Work Load (L/P) per Week (in hours): L-03, P-02

WEEK	THEORY		PRACTICAL	
	LECTURE DAY	TOPIC (INCLUDING ASSIGNMENT, TEST)	PRACTICAL DAY	TOPIC
1st	1	Material, History of Material Origin	1st	Classification of about 25 specimens of materials/machine parts into (i) Metals and non metals (ii) Metals and alloys
	2	Scope of Material Science, Overview of different engineering materials and applications		
	3	Classification of materials, Thermal, Chemical, Electrical		
2nd	4	Mechanical properties of various materials, Present and future needs of materials	2nd	Classification of about 25 specimens of materials/machine parts into (iii) Ferrous and non ferrous metals (iv) Ferrous and non ferrous
	5	Overview of Biomaterials and semiconducting materials		
	6	Various issues of Material Usage-Economical, Environment and social		
3rd	7	Test of Unit 1	3rd	Given a set of specimen of metals and alloys (copper, brass, aluminium, cast iron,
	8	Crystal, Unit Cell, Space Lattice		
	9	Arrangement of atoms in simple cubic crystals		
4th	10	BCC, FCC and HCP Crystals, Number of atoms per unit cell	4th	Revision
	11	Atomic Packing Factor		
	12	Overview of deformation behaviour and its mechanisms, behaviour of material under load and stress-strain.		
5th	13	Overview of failure modes, fracture, fatigue and creep	5th	Study of heat treatment furnace
	14	Test of Unit 2		
	15	History and development of iron and steel		
6th	16	Different iron ores	6th	Revision
	17	Raw Materials in Production of Iron and Steel		
	18	Basic Process of iron-making and steel-making		
7th	19	Classification of iron and steel	7th	Study of a metallurgical microscope and a specimen polishing machine
	20	Different types of Cast Iron, manufacture and their usage		
	21	Steels and alloy steel, Classification of plain carbon steels		
8th	22	Availability, Properties and usage of different types of plain carbon steel	8th	Revision
	23	Effect of various alloys on properties of steel		
	24	Uses of alloy steels		
9th	25	Properties and uses of Light Metals and their alloys	9th	To prepare specimens of following materials for microscopic examination & to Examine the microstructure of
	26	properties and uses of White Metals and their alloys		
	27	Revision And Assignment		
	28	Test of unit 3		To prepare specimens of

10th	29	Purpose of heat treatment, Solid solutions and its types	10th	following materials for microscopic examination & to Examine the microstructure of
	30	Iron Carbon diagram		
11th	31	Formation and decomposition of Austenite	11th	Revision
	32	Martensitic Transformation – Simplified Transformation Cooling Curves		
	33	various heat treatment processes hardening, tempering, annealing, normalizing,		
12th	34	Case hardening and surface hardening	12th	To anneal a given specimen and find out difference in hardness as a result of
	35	Types of heat treatment furnaces		
	36	Test of unit 4		
13th	37	Important sources of plastics, Classification-thermoplastic and thermo set and their uses	13th	Revision
	38	Various Trade names of engg. Plastic Coatings		
	39	Test of unit 5		
14th	40	Composites-Classification, properties, applications	14th	To normalize a given specimen and to find out the difference in hardness as a result of normalizing
	41	Ceramics-Classification properties, applications		
	42	Heat insulating materials Test of unit 6		
15th	43	Properties and uses of Asbestos, Glass wool, thermocole, cork, mica	15th	To harden and temper a specimen and to find out the difference in hardness due to tempering.
	44	Overview of tool and die materials		
	45	Materials for bearing metals, Spring materials		
16th	46	Materials for Nuclear Energy, Refractory materials	16th	Revision
	47	Revision And Assignment		
	48	Test of unit 7		

GATEWAY INSTITUTE OF ENGINEERING & TECHNOLOGY, SONEPAT

Name of the Faculty : Mr. NAVNEET RAJ (Theory + Practical)

Discipline : MECHANICAL ENGINEERING

Semester : 4TH

Subject : I.C ENGINES

Lesson Plan Duration: 16 WEEKS (JANUARY TO APRIL)

Work Load (L/P) per Week (in hours): L-03, P-02

WEEK	THEORY		PRACTICAL	
	LECTURE DAY	TOPIC (INCLUDING ASSIGNMENT, TEST)	PRACTICAL DAY	TOPIC
1st	1	Introduction.	1st	Study of a two stroke engine using cut section model, note the function and material of each part.
	2	Working principle of two stroke		
	3	Four stroke cycle, SI engines and CI engines,		
2nd	4	Otto cycle, diesel cycle and dual cycle	2nd	Revision
	5	Location and functions of various parts of IC engines		
	6	I.C engine materials used, Concept of IC engine terms		
3rd	7	Bore, stroke, dead centre, Crank throw, compression ratio	3rd	Study of a four stroke engine using cut section model. Note the function of each part.
	8	Concept of carburetion, Air fuel ratio		
	9	Simple carburetor and its application,		
4th	10	Simple carburetor application,	4th	Revision
	11	MPFI, Common rail system,		
	12	Super charging, CRDI, (ASSIGNMENT)		
5th	13	Components of fuel system	5th	Study of cooling of IC engine.
	14	Description of fuel feed pump, Working of fuel feed pump		
	15	Fuel injection pump, Injectors		
6th	16	(TEST)	5th	Revision
	17	Description of battery coil		
	18	Magnet ignition system		
7th	19	Electronic ignition system,	7th	Determination of BHP by dynamometer.
	20	Fault finding in ignition system		
	21	Remedial action		
8th	22	Function of cooling system in IC engine,	8th	Revision
	23	ASSIGNMENT		
	24	Air cooling		
9th	25	Water cooling system,	9th	Study of battery ignition system of a multi-cylinder petrol engine stressing ignition timings, setting, fixing order and contact breaker gap adjustment
	26	Water cooling system use of thermostat,		
	27	Radiator and forced circulation in water cooling (description with line diagram)		
10th	28	Function of lubrication,	10th	Revision
	29	Types and properties of lubricant		
	30	Lubrication system of engine		
11th	31	Lubrication and remedial action	11th	Morse test on multi-cylinder petrol engine.
	32	Fault finding in cooling		
	33	Revision		
12th	34	(TEST)	12th	Revision
	35	Introduction to testing		
	36	Engine power - indicated and brake power		
13th	37	Efficiency - mechanical, thermal.	13th	Study of lubricating system of IC engine
	38	Efficiency - relative and volumetric		
	39	Methods of finding indicated		
14th	40	ASSIGNMENT	14th	Revision
	41	Brake power		
	42	Morse test for petrol engine		
15th	43	Heat balance sheet	15th	Local visit to roadways or private automobile workshops.
	44	Concept of pollutants in SI and CI engines		
	45	Pollution control,		
16th	46	norms for two or four wheelers – BIS – I, II,	16th	Revision
	47	III and IV methods of reducing pollution in IC engines,		
	48	Revision		

GATEWAY INSTITUTE OF ENGINEERING & TECHNOLOGY, SONEPAT**Name of the Faculty :Mr. AJAY KUMAR****Discipline : MECHANICAL****Semester :4TH****Subject : WORKSHOP TECHNOLOGY II****Lesson Plan Duration:13 WEEKS(JANUARY TO APRIL)****Work Load (L/P) per Week (in hours): L-03, P-00**

WEEK	THEORY	
	LECTURE DAY	TOPIC (INCLUDING ASSIGNMENT,TEST)
1st	1	Cutting Tools - Various types of single point cutting tools and their uses,
	2	Single point cutting tool geometry, tool signature and its effect
2nd	3	Heat produced during cutting and its effect,
	4	Cutting speed, feed and depth of cut and their effect
	5	Cutting Tool Materials & its Properties
3rd	6	Revision
	7	Test
	8	Principle of turning & Function of various parts of a lathe
4th	9	Classification of various types of lathe
	10	Work holding devices
	11	Lathe tools
5th	12	Lathe operations
	13	Cutting parameters of lathe
	14	Speed ratio, preferred numbers of speed selection
6th	15	Lathe accessories
	16	Introduction to capstan and turret lathe
	17	Revision
7th	18	Principle of drilling & Classification of drilling machines
	19	Various operation performed on drilling machine
	20	Speeds and feeds during drilling, machining time.
8th	21	Types of drills & nomenclature of a drill
	22	Drill holding devices
	23	Revision
9th	24	Principle of boring & Classification of boring machines
	25	Boring tools, boring bars
	26	boring heads.
10th	27	Working principle of shaper, planer and slotter
	28	Type of shapers
	29	Type of planers
11th	30	Types of tools used and their geometry
	31	Speeds and feeds of all processes
	32	Introduction broaching & types
12th	33	Elements of broach tool & nomenclature
	34	Types and tool material
	35	Importance and use of jigs and fixture
13th	36	Principle of location & Locating devices
	37	Clamping devices & Advantages of jigs and fixtures
	38	Function of cutting fluid
14th	39	Types of cutting fluids
	40	Difference between cutting fluid and lubricant
	41	Selection of cutting fluids
15th	42	Common methods of lubrication of machine tools.
	43	Revision
	44	Test

GATEWAY INSTITUTE OF ENGINEERING & TECHNOLOGY, SONEPAT

LESSON PLAN

Name of the Faculty : Mr. Abhishek Anand (Theory + Practical)

Discipline : Mechanical Engineering

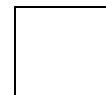
Semester : 4th

Subject : Machine Design & Drawing

Lesson Plan Duration: 16 Weeks (Jan. to April)

Work Load (L/P) per Week (in hours): L-02, P-06

WEEK	LECTURE DAY	THEORY	PRACTICAL DAY	PRACTICAL
		TOPIC (INCLUDING ASSIGNMENT, TEST)		TOPIC
1st	1	Design – Definition, Type of design, necessity of design. Comparison of designed and undesigned work.	1	Designing of any Machine parts without appropriate design work.
	2	Design procedure Characteristics of a good designer.	2	Designing of any Machine parts with appropriate design work.
2nd	3	Design terminology: stress, strain, factor of safety, factors affecting factor of safety.	3	Design Procedure
	4	stress concentration, methods to reduce stress concentration, fatigue, endurance limit.	4	drawing of stress reduction by various methods
3rd	5	General design consideration, Codes and Standards (BIS standards)	5	Codes and Data book intro.
	6	Properties of engineering materials: elasticity, plasticity, malleability, ductility, toughness, hardness and resilience.	6	Stress -Strain Curve
4th	7	Fatigue, creep, tenacity, strength.	7	Drawing of fatigue parts.
	8	Selection of materials, criterion of material selection	8	Revision
5th	9	Various design failures-maximum stress theory, maximum strain theory.	9	Graphical representation of stress & strain theory
	10	Maximum strain energy theory	10	Graphical representation of strain energy theory
6th	11	Classification of loads	11	Revision
	12	Design under tensile, compressive and torsional loads	12	Revision
7th	13	numericals	13	Tutorial classes
	14	Type of shaft, shaft materials, Type of loading on shaft, standard sizes of shaft available	14	Drawing of Shaft
8th	15	Shaft subjected to torsion only, determination of shaft diameter (hollow) on the basis of Strength criterion & Rigidity criterion	15	Shaft design on basis torsion and bending
	16	Shaft subjected to torsion only, determination of shaft diameter (Solid) on the basis of Strength criterion & Rigidity criterion	16	Shaft design on basis torsion and bending
9th	17	Determination of shaft dia (hollow and solid shaft) subjected to bending	17	Design of Axle
	18	Determination of shaft dia (hollow and solid shaft) subjected to combined torsion and bending .	18	Revision
10th	19	Revision and Numericals.	19	Test of unit 1,2 &3
	20	Types of key, materials of key, functions of key	20	Assignment
11th	21	Failure of key (by Shearing and Crushing).	21	Revision
	22	Design of key (Determination of key dimension)	22	Drawing of Sunk Key- Rectangular & square parallel key
12th	23	Effect of keyway on shaft strength. (problems)	23	Drawing of Sunk Key- Rectangular & square taper key
	24	Introduction, Advantages and Disadvantages of screw joints, location of screw joints.	24	drawing of woodruff and Saddle key, Kennedy key
13th	25	Important terms used in screw threads, designation of screw threads	25	Drawing of screw threads



13th	26	Initial stresses due to screw up forces, stresses due to combined forces	26	Revision
14th	27	Design of power screws (Press, screw jack, screw clamp)	27	Drawing of Screw Jack
	28	Types of cams and followers (theoretical)	.	Revision of unit 5 and C.T
15th	29	Profile of cams for imparting Uniform & Simple harmonic motion with knife edge followers.	29	Drawing of CAM Profile
	30	Profile of cams for imparting Uniformity accelerated and retarded motion with knife edge followers.	30	Drawing of CAM Profile
16th	31	Nomenclature of gears and conventional representation	31	Drawing the actual profile of involute teeth gear by different methods
	32	Revision and Numericals.	32	Perivious yr. paper discussion.