

GOVT. POLYTECHNIC UMRI ,KKR				
LESSON PLAN				
NAME OF FACULTY		MR. HARVINDER SINGH SAINI		
DISCIPLINE		MECHANICAL ENGG		
SEMESTER		4TH		
SUBJECT		THERMODYNAMICS II		
LESSON PLAN DURATION :		15 WEEKS		
WORK LOAD (LECTURE/ PRACTICAL) :03 LECTURES/WEEK , PRACTICALS -02 HOURS/TURN/WEEK				
DATE OF START LESSON PLAN		06/03/2023 TO 23/06/2023		
WEEK	THEORY		PRACTICAL	
	LECTURE DAY	TOPIC	PRACTICAL DAY	TOPIC
1st	1st	1. IC Engines-Introduction Working principle of two stroke and four stroke cycle,	1st	Dismantle an IC engine and note down the condition of various parts , removal and fitting of piston , ring , mesuring of bore size , crank shaft ovality and assemble it
	2nd	SI engines & Otto cycle		
	3rd	Diesel cycle and CI engines		
2 nd	4th	Dual Cycle	2nd	Dismantle a carburetor
	5th	Location of various parts of IC engines and materials used		
	6th	Functions of various parts of IC engines and materials used		
3 rd	7th	2. Fuel Supply & Ignition system in Petrol Engine:- Concept of carburetion	3rd	Service of petrol injection system
	8th	Air fuel ratio		
	9th	Simple carburetor and its immitation and application		
4 th	10th	Description of battery coil And electro ignition system	4TH	Valve servicing, grinding , lapping and fitting mechanism and tappet adjustment
	11th	fault finding and remedial action in ignition system		
	12th	description of petrol ignition system		
5th		SESSIONAL TEST		
6th	13th	3. Fuel System of Diesel Engine:- Components of fuel system	6th	Revision of previous practicals
	14th	Description and working of fuel feed pump		
	15th	Fuel injection pump		
7th	16th	common rail direct injection(CRDI)	7th	Inspection of ignition system of a multi cylindercal engine stressing ignition timing setting fixing order, contact breaker , gap adjustment , spark plug cleaning
	17th	Injectors		
	18th	4. Cooling and Lubrication:- Function of cooling system in IC engine		
8th	19th	Air cooling and water cooling system	8th	Service of cooling and lubrication system of IC engine And note down the functioning
	20th	use of thermostat and radiator		

	21th	Function of lubrication		of various components
9th	22th	Types and properties of lubricant	9th	Determination of BHP by dynamometer
	23th	Lubrication system of engine		
	24th	Fault finding in cooling system and lubrication system remedial action		
10th		SESSIONAL TEST		
11th	25th	5. Testing of IC Engines -Engine power - indicated and brake power	11th	Revision of previous practicals
	26th	Efficiency - mechanical, thermal, relative and volumetric		
	27th	Methods of finding indicated and brake power		
12th	28th	Morse test for petrol engine Heat balance sheet , simple numerical problems	12th	Morse test on multi-cylinder petrol engine
	29th	Concept of pollutants in SI and CI engines,		
	30th	Pollution control, norms for two or four wheelers, EURO -1 , EURO-2		
13th	31th	Various methods of reducing pollution in ic engine , IC engines, alternative fuels like	13th	Draw a layout of modern auto mobile workshop and note down the special tool and equipments in each group
	32th	6. Steam Turbine and Steam Condensers- function and use of steam turbine		
	33th	Steam nozzles -type and application , steam turbine impulse and reaction		
14th	34th	Simple and compound steam turbine	14th	Local visit to roadways or private automobile workshops.
	35th	Governing of steam turbine , function of steam condenser , jet and surface condenser		
	36th	Cooling pond and cooling towers 7. Gas turbine and jet propulsion - Classification, open cycle & closed cycle gas turbine		
15th	37th	Comparison of gas turbine with reciprocating IC engine , app. & limit. of gas turbine	15th	Revision of practicals
	38th	Open cycle & closed cycle gas turbine, PV&TS diagram & working of gas turbine		
	39th	Principle of RAM jet & TURBO jet engine application of Jet engine Rocket engine its principle of working and application		
16th		SESSIONAL TEST		

LESSON PLAN

NAME OF FACULTY : MR.
 DISCIPLINE : MECHANICAL ENGG
 SEMESTER : 4TH
 SUBJECT : WORKSHOP TECHNOLOGY-II
 LESSON PLAN DURATION : 16 WEEKS
 WORK LOAD (LECTURE/ PRACTICAL) : LECTURES -04/ Per week

WEEK	THEORY	
	LECTURE DAY	TOPIC
1st	1st	1. Cutting Tools and Cutting Materials
	2nd	Cutting Tools - Various types of single point cutting tools and their uses, Single point cutting tool geometry, tool signature and its effect
	3rd	Heat produced during cutting and its effect, Cutting speed, feed and depth of cut and their effect
	4th	Cutting Tool Materials - Properties of cutting tool material,
2 nd	5th	Study of various cutting tool materials viz
	6th	High-speed steel, tungsten carbide, cobalt steel cemented carbides,
	7th	stellite, ceramics and diamond.
	8th	properties of cutting tool materials
3 rd	9th	2. Drilling -Principle of drilling. Classification of drilling machines and their description
	10th	Various operation performed on drilling machine – drilling, spot facing,
	11th	reaming, boring, counter boring,
	12th	counter sinking, hole milling, tapping
4 th	13th	Speeds and feeds during drilling,
	14th	impact of these parameters on drilling, machining time
	15th	Types of drills and their features,
	13th	TEST-1
	16th	nomenclature of a drill
5th	17th	Drill holding devices, types reamers
	18th	3. Lathe - Principle of turning
	19th	, Function of various parts of a lathe,
	20th	. Classification and specification of various types of lathe Work holding devices,Drives and transmission
6th	21th	Lathe Tools: Parameter/Nomenclature and Application
	22th	. Cutting parameters – Speed, feed and depth of cut for various materials and
	23th	lathe operations : Plain and steps turning, facing , parting off , taper turning , eccentric turning, drilling , reaming , boring , threading and Knurling, form turning, spinning
	24th	Speed ratio, preferred numbers of speed selection. Introduction to capstan and turret lathe
7 th	25th	Lathe accessories:- Centers, dogs, different types of chucks, collets, face plate, angle plate, mandrel, steady rest, follower rest,
	26th	Quick change device for tools.
	27th	4.Boring: Principle of boring
8 th	28th	Classification of boring machines
	29th	Boring tools,
	30th	boring bars and boring heads
	31th	description of jig boring machine
9 th	32th	5. shaping and planing ; Working principle of shaper,
	33th	planer and slotter
	34th	Type of shapers ,
	35th	Type of planers
10 th	36th	Quick return mechanism applied to shaper and planer machine
	37th	Work holding devices used on shaper and planer
	38th	Types of tools used , their geometry
	39th	Speeds and feeds in above processes.shaper and planer
11 th	40th	6.BROACHING - Introduction
	41th	Types of broaching machines
	42th	Single ram and duplex ram horizontal type
	43th	vertical type pull up, pull down, push down.
	44th	Elements of broach tool
12 th	45th	broach tooth details, nomenclature,
	46th	Types, and tool material
	47th	Revision
13 th	48th	7. Jigs and Fixtures - importance, use of jigs and fixture
	49th	Principle of location, Locating devices , Clamping devices
	50th	Types of Jigs - Drilling jigs , bushes , template jig , plate jig , channel jig , leaf jig .
	51th	Fixture for milling , turning , welding , grinding
	52th	Advantages of jigs and fixtures,
14 th	53th	8. Cutting fluids and lubricants
	54th	function of cutting fluid
	55th	type of cutting fluids
	56th	difference b/w cutting fluid and lubricants
15th	57th	selection of cutting fluid for different material and operation

	58th	common methods lubrication of machine tools
	59th	Revision
	60th	Revision
16TH		TEST-III

LESSON PLAN

NAME OF FACULTY : MR. VIJAY SINGH
DISCIPLINE : MECHANICAL ENGG
SEMESTER : 4TH
SUBJECT : INDUSTRIAL ENGINEERING

LESSON PLAN DURATION : 16 WEEKS

WORK LOAD (LECTURE/ PRACTICAL) : LECTURES -04

WEEK	THEORY	
	LECTURE DAY	TOPIC
1st	1st	1. Productivity, Introduction to productivity
	2nd	factors affecting productivity
	3rd	, Practical Measurement of productivity
2 nd	4th	Difference b/w production and productivity, causes of low productivity
	5th	methods to improve productivity
	6th	contribution of standardization in improving productivity
3 rd	7th	2. Work Study, Definition ,scope of work study
	8th	factors for selection of work study job use and limitation of work study
	9th	Inter-relation between method study and work measurement
4 th	10th	Human aspects of work study, Role of work study in improving productivity.
	11th	3. Method Study, Definition , Objectives
	12th	procedure for Method analysis
5 th	13th	Information collection
	14th	recording techniques through various diagram
	15th	4. Motion Analysis
6 th	16th	Principles of Motion analysis
	17th	Therbligs
	18th	SIMO chart
7 th	19th	Normal work area
	20th	design and arrangements of work places
	21th	ergonomics, design of tools and equipments
8 th	22th	5. Work Measurement: Objectives
	23th	work measurement techniques
	24th	stop watch time study;
9 th	25th	principle, equipment used and procedure
	26th	systems of performance rating; Standard element of time ,
	27th	calculation of basic times; various allowances;
10 th	28th	guide for rest allowance in indian condition ,calculation of standard time
	29th	work sampling, standard data and its usage.
	30th	6. Wages and Incentive Schemes : Introduction to wages
11 th	31th	Wage payment for direct and indirect labour, wage payment plans and incentives,
	32th	various incentive plans, incentives for indirect labour.
	33th	7. PPC: Introduction, objectives and components (functions) of P.P.C,
12 th	34th	Advantages of P.P.C, stages of P.P.C, process planning, routing, scheduling,
	35th	dispatching and follow up, routing purpose, route sheets,
	36th	scheduling – purpose, machine loading chart
13 th	37th	dispatching – purpose, and procedure, follow up –purpose and procedure
	38th	Gantt chart ,CPM/PERT technique, drawing of simple networks
	39th	critical time calculation, Production Control in job order
14 th	40th	batch type and continuous type of productions, Difference between these control
	41th	8. STORES MANAGEMENT : Different layout and structures of stores ,
	42th	inventory control ,
15th	43th	calculation of EOQ
	44th	bin cards and various forms required in stores for documentation .
	45th	purchase procedure
16th	TEST-III	

GOVT. POLYTECHNIC UMRI ,KKR				
LESSON PLAN				
NAME OF FACULTY		MR. MANISH KUMAR		
DISCIPLINE		MECHANICAL ENGG		
SEMESTER		4TH		
SUBJECT		MATERIALS AND METALLURGY		
LESSON PLAN DURATION :		15 WEEKS		
WORK LOAD (LECTURE/ PRACTICAL) :04 LECTURES/WEEK , PRACTICALS -02 HOURS/TURN/WEEK				
DATE OF START LESSON		06/03/2023 TO 23/06/2023		
WEEK	THEORY		PRACTICAL	
	LECTURE DAY	TOPIC	PRACTICAL DAY	TOPIC
1st	1st	UNIT-1.Introduction:- Material,Engineering materials,History/Timeline of Material Origin,Scope of Material Science.	1st	Classification of about 25 specimens of materials/machine parts
	2nd	Overview of different engineering materials and applications,Importance.		(i)Metals and nonmetals(ii)Metals and alloys
	3rd	Classification of materials,Difference between metals and non-metals.		iii) Ferrous and nonferrous metals
	4th	Physical and Mechanical properties of various materials.		iv) Ferrous and nonferrous alloys
2 nd	5th	Present and future needs of materials.	2nd	Given a set of specimen of metals and alloys (copper, brass, aluminium, cast iron HSS, Gun metal); identify and indicate the various properties possessed by them
	6th	Various issues of Material Usage-Economical,Environment and Social.		
	7th	Overview of Biomaterials and semi-conducting materials.		
	8th	Revision		
3 rd	9th	UNIT-2.CRYSTALLOGRAPHY_ Fundamentals:Crystalline solid and amorphous solid, Unit Cell, Space Lattice	3rd	a) Study of heat treatment furnace.
	10th	Arrangement of atoms in Simple Cubic Crystals,BCC,FCC and HCP Crystals		
	11th	Number of atoms per unit Cell, Atomic Packing Factor, coordination number (without derivation).		
	12th	Defects/Imperfections, types and effects in Solid materials.		
4 th	13th	Deformation: Overview of deformation behavior and its mechanisms, Elastic and	4TH	b) Study of a thermocouple/pyrometer.
	14th	Failure Mechanisms: Overview of failure modes, fracture, fatigue and creep		
	15th			
	16th	Revision		
5th	SESSIONAL TEST			
6 th	17th	UNIT-3.METALLURGY: Introduction, Cooling curve of pure metals,	6th	Study of a metallurgical microscope and a specimen polishing machine
	18th	dendritic solidification of metals, effect of grain size on mechanical properties,		
	19th	Binary alloys, Thermal equilibrium diagrams,		
	20th	Lever rule, Solid Solution alloys		
7 th	21st	UNIT-4.METALS AND ALLOYS: Ferrous Metals: Different iron ores	7th	To prepare specimens of following materials for microscopic examination and to Examine the microstructure of the specimens of following materials• At least
	22nd	Flow diagram for production of iron and steel		
	23rd	Allotropic forms of iron- Alpha, Delta, and Gamma.		
	24th	Basic process of manufacturing of pig iron		
8 th	25th	Basic process of steel-making	8th	Revision of previous practical
	26th	Cast Iron: Properties, types of Cast Iron, manufacture and their use.		
	27th	Manufacture of Cast Iron		
	28th	Steels: Plain carbon Steels and alloy steel		
9 th	29th	Classification of plain carbon steels	9th	To anneal a given specimen and find out difference in hardness as a result of annealing.
	30th	Properties and application of different types of Plain Carbon Steels		
	31st	Effect of various alloying elements on properties of steel, uses of alloy steel		

	32nd	Non Ferrous Materials : properties and Uses of Copper, Aluminum and their alloys		
10th		SESSIONAL TEST		
11th	33th	Revision	11th	Revision of previous practical
	34th	UNIT-5.HEAT TREATMENT: Definition and objectives of heat treatment		
	33th	Iron carbon equilibrium diagram different microstructures of iron and steel		
	35th	Formation and decomposition of Austenite, Martensitic Transformation.		
12th	33th	Various heat treatment processes- hardening, tempering	12th	To normalize a given specimen and to find out the difference in hardness as a result of normalizing
	36th	Annealing, normalizing.		
	33th	Surface hardening, carburizing,		
	37th	nitriding, cyaniding, hardenability of steels		
13th	33th	Types of heat treatment furnaces (only basic idea)	13th	Revision of previous practical
	38th	Measurement of temperature of furnaces.		
	33th	UNIT-6.PLASTICS: Importance of plastics, Classification		
	39th	Thermoplastic and thermoset, plastic and their uses		
14th	33th	Various trade names of plastics, Plastic coatings	14th	To harden and temper a specimen and to find out the difference in hardness due to tempering.
	40th	Food grade plastics. Applications of plastics in automobile and domestic use.		
	33th	Rubber classification- Natural and synthetic. Selection of rubber		
	41st	wool, thermocole Ceramics- Classification, properties, applications.		
15th	33th	Refractory materials- Dolomite, porcelain. Glass- Sodalime, borosil. Abrasive materials, Joining materials / Adhesives- Classification, properties and applications	15th	Revision of practicals
	42nd	Composites- Classification, properties, applications		
	33th	Materials for bearing metals,		
	43rd	Materials for Nuclear, Energy, Smart materials- properties and applications		
16th		SESSIONAL TEST		

LESSON PLAN : Hydraulics and Pneumatics				
Name of Faculty			Balbir Singh	
Discipline			Mechanical Engineering	
Semester			4th	
Subject			Hydraulic and Pneumatic	
Duration of Lesson Plan			15 Weeks (From 06-03-2023 to 15 -06-2023)	
Week	Theory		Practical	
	Lecture Day	Topic (including assignments /tests) Practical	Practical Day	Practical
1st	1st	1.Introduction:- Introduction to Hydraulics and Pneumatics. Fluid, types of fluid.	1st	Overview of the subject,Importance & its Industrial Applications.
	2nd	Properties of fluid viz mass density, weight density (specific weight), specific volume, capillarity, specific gravity, viscosity	2nd	
	3rd	Compressibility, surface tension, kinematic viscosity and dynamic viscosity and their units. Simple numeric problems related to properties of fluids.	3rd	
2nd	1st	2. Pressure & its Measurement:- 2.1 Concept of pressure, Intensity of pressure, static pressure and pressure head. Types of Pressure (Atmospheric Pressure, Gauge Pressure, Absolute Pr.)	1st	1. Measurement of pressure head by employing. i) Piezometer tube ii) Simple U-tube manometer iii) Bourdon's tube pressure gauge
	2nd	2.2 Pressure measuring devices: Manometers and Mechanical Gauges Manometers: Piezometer, Simple U- tube Manometer	2nd	
	3rd	Micromanometer, Differential U-tube Manometer	3rd	
3rd	1st	Inverted U-tube, Manometers Construction, working and application , including simple numerical problems	1st	2.Verification of Bernoulli's theorem
	2nd	Mechanical Gauges: Bourdon Tube pressure gauge Diaphragm Pressure Gauge, Dead weight pressure gauge. Construction, working and application.	2nd	
	3rd	2.3 Statement of Pascal's law and its applications. Assignment based on Chapter 1 &2.	3rd	
4th	1st	3. Flow of Fluids:- Types of fluid flow – Steady and Unsteady, Uniform and Non-uniform, Laminar and Turbulent;	1st	3. Measurement of flow by using venturimeter.
	2nd	Rate of flow (Discharge) and its units; Continuity Equation of Flow	2nd	
	3rd	Hydraulic Energy of a flowing fluid ; Total head ;Bernoulli's Theorem statement (without proof) and its applications	3rd	
5th	1st	Sessional Test -1	1st	Sessional Test -1
	2nd	Sessional Test -1	2nd	
	3rd	Sessional Test -1	3rd	
6th	1st	Discharge measurement with the help of Venturimeter, Orifice meter, Pitot-tube,	1st	4.To find out the value of coefficient of discharge for a

	2nd	limitations of Bernoulli's theorem ,simple numerical problems on above topics. 3.2 Pipe and pipe flow, wetted perimeter, hydraulic mean depth, hydraulic gradient	2nd	venturimeter
	3rd	loss of head due to friction; Chezy's equation and Darcy's equation of head loss (without proof) Reynold's number and its effect on pipe friction; Water hammer. Simple numerical problems on pipe friction	3rd	
7th	1st	3.3 Nozzle - definition, velocity of liquid flowing through the nozzle, power developed.	1st	5.To find coefficient of friction for a pipe (Darcy's equation).
	2nd	4.Hydraulic Machines :-Description, operation and application of – hydraulic press, hydraulic jack	2nd	
	3rd	hydraulic accumulator, hydraulic brake	3rd	

8th	1st	hydraulic ram, hydraulic door closer Assignment -2 based on chapter 3rd &4th	1st	6.To study a single stage centrifugal pump and reciprocating pump for constructional details with the help of cut section models.
	2nd	5.Pumps and Water Turbines :- 5.1 Concept of hydraulic pump. Classification of pumps.	2nd	
	3rd	5.2 Construction, operation and application of Single acting reciprocating pump ,vane, screw and gear pumps.	3rd	
9th	1st	Sessional Test -2	1st	Sessional Test -2
	2nd	Sessional Test -2	2nd	
	3rd	Sessional Test -2	3rd	
10th	1st	5.3 Construction, operation and application of centrifugal pump. Trouble shooting and problems in centrifugal pumps and remedial measures, pitting, cavitation,priming.	1st	7.Study the working of Pelton wheel, Francis and Kaplan turbine with the help of working model.
	2nd	5.4 Concept of a turbine, classification of turbines, types of turbines - impulse and reaction type (concept only), difference between them	2nd	
	3rd	5.5 Construction and working of pelton wheel, Francis turbine and Kaplan turbines.	3rd	
11th	1st	6. Oil power Hydraulic and Pneumatic systems :- 6.1 Introduction to oil power hydraulics and pneumatic system. Relative Merits and Demerits as oil power hydraulic and pneumatic system.	1st	7.Study the working of Pelton wheel, Francis and Kaplan turbine with the help of working model.

	2nd	6.2 Industrial applications of oil power hydraulic and pneumatic system	2nd	
	3rd	6.3 Basic components of hydraulic system, definition and functions of each component in a hydraulic circuit. Hydraulic oils- Classification and their properties. Seals and packing- classification of seals, sealing materials.	3rd	
12th	1st	6.4 Maintenance of hydraulic system: common faults in hydraulic system, simple visual checks of oil, causes of contamination, preventive measures.	1st	8. Study of hydraulic circuit of any available machine or working model
	2nd	6.5 Basic Components of Pneumatic Systems , definition and functions of each component in a Pneumatic circuit. Necessity of Filter, Regulator and Regulator (FLR).	2nd	
	3rd	6.6 Common problems in pneumatic systems. Maintenance schedule of pneumatic systems. Assignment based on Chapter: 5th & 6th	3rd	
13th	1st	Sessional Test -3	1st	Sessional Test -3
	2nd	Sessional Test -3	2nd	Sessional Test -3
	3rd	Sessional Test -3	3rd	Sessional Test -3
14th	1st	Revision	1st	9. Study of pneumatic circuit of any available machine or working model
	2nd	Revision	2nd	
	3rd	Revision	3rd	
15th	1st	Revision	1st	ViVa Voce
	2nd	Revision	2nd	ViVa Voce
	3rd	Revision	3rd	ViVa Voce