


LESSON PLAN FOR DESIGN OF MACHINE ELEMENTS

ACADEMIC YEAR: 2023-24		
Mechanical Engineering	5 th semester	ER. KALIA SETHI
DESIGN OF MACHINE ELEMENTS	Lecture: 04/week	Semester :5 th
WEEK	CLASS DAY	THEORY TOPICS
1	1ST (CH1)	Introduction to Machine Design , course outcomes.
	2nd	Classification of machine design, Stresses related to machine design, Stress concentration
	3rd	Engineering materials used in design, properties of material.
	4th	Stress- strain curve for ductile and brittle material(Mild steel & Cast iron)
2	1st	Working stress, yield stress, ultimate stress. Factor of safety for ductile and brittle material.
	2nd	Modes of failure(elastic deflection, yielding & fracture)
	3rd	Factors governing the design of machine elements
3	4th	General procedure in machine design
	1ST (CH2)	Fastening elements and types of fastening
	2nd	Welding and types of welded joints.
	3rd	Advantages and disadvantages of welded joints over other joints
4	4th	Strength of transverse and parallel fillet welded joint
	1st	Simple numericals on welding joint
	2nd	Design of welded joints for eccentric loads
	3rd	Different cases of eccentric load and derivations
5	4th	Numericals on eccentric loaded welding joint.
	1st	Riveted joint, types of riveted joint.
	2nd	Failures of riveted joint.
	3rd	Determination of strength and efficiency of riveted joint.
6	4th	Design of riveted joint for pressure vessel(boiler)
	1st	Numericals on design of riveted joints.
	2nd	Numericals on design of riveted joints.
	3rd	Class test.
7	4TH (CH3)	Introduction to shaft, functions, materials of shaft
	1st	Design of shaft on basis of strength
	2nd	Design of shaft on basis of strength
	3rd	Design of shaft on basis of rigidity
8	4th	Design of shaft on basis of rigidity
	1st	Numericals on design of shafts
	2nd	Numericals on design of shafts
	3rd	function of keys, types of keys
9	4th	Material of keys, Failures of key, causes, effect of key way
	1st	Design rectangular sunk key and solving numericals
	2nd	Design rectangular sunk key and solving numericals
	3rd	Numericals on empirical relation of rectangular sunk key
9	4th	Specifications of parallel, gibhead, taper key

10	1st	Class work on key and shaft
	2nd (CH4)	Introduction to coupling, design of shaft coupling
	3rd	Requirements of a good shaft coupling. Types of coupling.
	4th	Design of sleeve coupling
11	1st	Design of clamp or compression coupling
	2nd	Numerical on design of coupling.
	3rd	Numerical on design of coupling.
	4th (CH5)	Introduction to spring and types(open and closed)
12	1st	Materials used and application of spring
	2nd	SWG ,specifications of spring.
	3rd	Spring terms for compression type
	4th	Different stresses in helical spring(circular)
13	1st	Different stresses in helical spring(circular)
	2nd	Deflection of helical spring of circular wire
	3rd	Numerical on deflection of helical spring
	4th	Surge in spring and how to avoid it
14	1st	Design of closed coil helical compression spring
	2nd	Design of closed coil helical compression spring
	3rd	Numericals on design of spring
	4th	Numericals on design of spring
15	1st	Doubt clearing of all topics of subject
	2nd	Model question paper practice
	3rd	Model question paper practice
	4th	Closing of subject, course outcomes

TOTAL PERIODS: 60
NO. OF WEEKS : 15


27/07/2023
(Kalita Sethi
Lecturer, Mechanical)

LESSON PLAN:

LESSON PLAN OF ENTREPRENEURSHIP and MANAGEMENT & SMART TECHNOLOGY		
COURSE LOAD: 4 PERIODS/ WEEK		
DATE OF COMMENCEMENT OF CLASS:01-08-2023		
NAME OF THE FACULTY: HADU BANDHU DAKUA		
S. No.	Topic	Teaching Process Learning
CHAPTER-1		
1	1. Introduction, Course outcomes, Reference books for subject.	Chalk and talk
2	Concept/Meaning of Entrepreneurship	Chalk and talk
4	Need of Entrepreneurship	Chalk and talk
4	Characteristics , Qualities and Types of entrepreneur, Functions	PPT
5	Barriers in entrepreneurship	PPT
6	Entrepreneurs Vrs Manger	Chalk and talk
7	Forms of Business Ownership: Solo proprietorship, partnership forms and others	Chalk and talk
8	Types of Industries, concept of Start-ups	Chalk and talk
9	Entrepreunial support agencies at National, Staste, District Level(Sources): DIC, NSIC, OSIC, SIDBI, NABARD, Commercial Banks, KVIC etc.	Chalk and talk
10	Technology Business Incubators(TBI) and Science and Technology Entrepreneur Parks.	Chalk and talk
LMS	ASSIGNEMENT-1	
CHAPTER-2		
1	2. Business Planning	Chalk and talk
2	SSI, Ancillary Units	Chalk and talk
3	Tiny Units, Servier sector Units	Chalk and talk
4	Time schedule plan, Agencies to be contacted for project implementation	Chalk and talk

5	Assessment of Demand and Supply	Chalk and talk
6	Pontential areas of Growth	Chalk and talk
7	Identifying Business Opportunity	Chalk and talk
8	Final Product Selection.	Chalk and talk
LMS	ASSIGNEMENT-2	
CHAPTER-3		
1	3. Preliminary project report	Chalk and talk
2	Detailed project report	PPT & Chalk and talk
3	Techno economic Feasibility	PPT & Chalk and talk
4	Project Viability	PPT & Chalk and talk
LMS	ASSIGNEMENT-3	
CHAPTER-4		
1	4. Definitions of management	Chalk and talk
2	Principles of management	Chalk and talk
3	Functions of management (planning, organising, staffing)	Chalk and talk
4	Functions of management(directing and controlling etc.)	Chalk and talk
5	Level of Management in an Organisation	Chalk and talk
LMS	ASSIGNEMENT-4	
CHAPTER-5		
1	5. Production management • Functions • Activities	Chalk and talk
2	Production management • Quality control • Production Planning and control	Chalk and talk
3	Inventory Management • Need for Inventory management	Chalk and talk
4	Inventory Management • Models/Techniques of Inventory management	Chalk and talk
5	Comparision of Nuclear and Thermal power plant.	PPT
6	Financial Management • Functions of Financial management	PPT

	<ul style="list-style-type: none"> • Management of Working capital • Costing (only concept) 	
7	<ul style="list-style-type: none"> • Break even Analysis • Brief idea about Accounting Terminologies: Book Keeping, Journal entry, Petty Cash book, P&L Accounts, Balance Sheets(only Concepts) 	PPT
8	Marketing Management <ul style="list-style-type: none"> • Concept of Marketing and Marketing Management • Marketing Techniques (only concepts) 	Chalk and talk
9	Concept of 4P s (Price, Place, Product, Promotion)	Chalk and talk
10	Human Resource Management <ul style="list-style-type: none"> • Functions of Personnel Management 	Chalk and talk

CHAPTER 6

1	6 • Manpower Planning, Recruitment, Sources of manpower, Selection process, Method of Testing, Methods of Training & Development, Payment of Wages	Chalk and talk
2	Leadership <ul style="list-style-type: none"> • Definition and Need/Importance 	Chalk and talk
3	<ul style="list-style-type: none"> • Qualities and functions of a leader Manager Vs Leader	Chalk and talk
4	Style of Leadership (Autocratic Democratic, Participative)	Chalk and talk
5	Motivation <ul style="list-style-type: none"> • Definition and characteristics • Importance of motivation • Factors affecting motivation • Theories of motivation (Maslow) 	Chalk and talk
6	Motivation <ul style="list-style-type: none"> • Methods of Improving Motivation • Importance of Communication in Business • Types and Barriers of Communicatio 	Chalk and talk
LMS	ASSIGNMENT-6	

CHAPTER 7

1	7. Work Culture, TQM & Safety <ul style="list-style-type: none"> • Human relationship and Performance in Organization 	Chalk and talk
2	Relations with Peers, Superiors and Subordinates	Chalk and talk
3	TQM concepts: Quality Policy, Quality Management, Quality system	Chalk and talk
4	Accidents and Safety, Cause, preventive measures,	Chalk and talk
5	General Safety Rules , Personal Protection Equipment(PPE)	Chalk and talk

LMS	ASSIGNEMENT-7	Chalk and talk
CHAPTER 8		
1	8. Legislation a) Intellectual Property Rights(IPR),	Chalk and talk
2	b) Features of Factories Act 1948 with Amendment (only salient points)	Chalk and talk
3	b) Features of Factories Act 1948 with Amendment (only salient points)	Chalk and talk
4	c) Features of Payment of Wages Act 1936 (only salient points)	Chalk and talk
5	c) Features of Payment of Wages Act 1936 (only salient points)	Chalk and talk
6	c) Features of Payment of Wages Act 1936 (only salient points)	Chalk and talk
LMS	ASSIGNEMENT-8	
CHAPTER 9		
1	9. Smart Technology	Chalk and talk
2	• Concept of IOT, How IOT works	Chalk and talk
3	• Components of IOT, Characteristics of IOT	Chalk and talk
4	Categories of IOT	Chalk and talk
5	• Applications of IOT- Smart Cities, Smart Transportation, Smart Home	Chalk and talk
6	Smart Healthcare, Smart Industry, Smart Agriculture, Smart Energy Management etc.	Chalk and talk
LMS	ASSIGNEMENT-9	

24/07/23

LESSON PLAN:

LESSON PLAN OF ENGINEERING MATERIAL		
COURSE LOAD: 4 PERIODS/ WEEK		
DATE OF COMMENCEMENT OF CLASS:01-08-2023		
NAME OF THE FACULTY: HADU BANDHU DAKUA		
S. No.	Topic	Teaching Learning Process
CHAPTER-1		
1	1.1 Material classification into ferrous and non ferrous category and alloys	Chalk and talk
2	1.2 Properties of Materials: Physical and Chemical ,Mechanical, Thermal properties.	Chalk and talk
4	1.3 Performance requirements.	Chalk and talk
4	1.4 Material reliability and safety	PPT
5	1.4 Material reliability and safety	PPT
LMS	ASSIGNEMENT-1	
CHAPTER-2		
1	2.1 Characteristics and application of ferrous materials	Chalk and talk
2	2.2 Classification, composition and application of low carbon steel, medium carbon steel and High carbon steel	Chalk and talk
3	2.3 Alloy steel: Low alloy steel,	Chalk and talk
4	2.3 high alloy steel, tool steel and stainless steel.	Chalk and talk
5	2.4 Tool steel: Effect of various alloying elements such as Cr, Mn , Ni, V, Mo,	Chalk and talk
LMS	ASSIGNEMENT-2	
CHAPTER-3		
1	3.1 Concept of phase diagram	Chalk and talk
2	3.1 Concept of phase diagram	PPT & Chalk and talk
3	and cooling curves	PPT & Chalk and talk
4	3.2 Features of Iron-Carbon diagram	PPT & Chalk and talk
5	3.2 Features of Iron-Carbon diagram	PPT & Chalk and talk

6	3.2 with salient micro-constituents of Iron	Chalk and talk
7	3.2 with salient micro-constituents of steel.	Chalk and talk
8	3.2 with salient micro-constituents of steel.	Chalk and talk
LMS	ASSIGNEMENT-3	
CHAPTER-4		
1	4.1 Crystal defines, classification of crystals,	Chalk and talk
2	4.1 ideal crystal and crystal imperfection.	Chalk and talk
3	4.2 Classification of imperfection: Point defects,	Chalk and talk
4	4.2 line defects, surface defects	Chalk and talk
5	4.2 volume defects	Chalk and talk
6	4.3 Types and causes of point defects: Vacancies, Interstitials and impurities	Chalk and talk
7	4.4 Types and causes of line defects: Edge dislocation and screw dislocation	Chalk and talk
8	4.5 Effect of imperfection on material properties	Chalk and talk
9	4.6 Deformation by slip and twinning	Chalk and talk
10	4.7 Effect of deformation on material properties	Chalk and talk
LMS	ASSIGNEMENT-4	
CHAPTER-5		
1	5.1 Purpose of Heat treatment	Chalk and talk
2	5.2 Process of heat treatment: Annealing, normalizing	Chalk and talk
3	5.2 hardening, tempering,	Chalk and talk
4	5.2 stress relieving measures	Chalk and talk
5	5.3 Surface hardening: Carburizing	PPT
6	5.3 Surface hardening: Nitriding	PPT
7	5.4 Effect of heat treatment on properties of steel	PPT
8	5.4 Effect of heat treatment on properties of steel	Chalk and talk
9	5.5 Hardenability of steel	Chalk and talk
10	5.5 Hardenability of steel	Chalk and talk
CHAPTER 6		
1	6.1 Aluminum alloys: Composition, property and usage of Duralumin.	Chalk and talk

2	6.1 Aluminium alloys. Composition, property and usage of V alloy	Chalk and talk
3	6.2 Copper alloys. Composition, property and usage of Copper aluminium	Chalk and talk
4	6.2 Composition, property and usage of Copper tin	Chalk and talk
5	6.2 Composition, property and usage of Babbitt	Chalk and talk
6	6.2 Composition, property and usage of Phosphorous bronze	Chalk and talk
7	6.2 Composition, property and usage of brass, copper nickel.	Chalk and talk
8	6.3 Predominating elements of lead alloys, Zinc alloys and Nickel alloys	Chalk and talk
9	6.4 Low alloy materials like P-91, P-22 for power plants	Chalk and talk
10	6.4 High temperature services. High alloy materials like stainless steel grades of duplex, super duplex materials etc.	Chalk and talk
LMS	ASSIGNEMENT-6	
CHAPTER 7		
1	7.1 Classification, composition properties and uses of Copper base Bearing material.	Chalk and talk
2	7.1 Classification, composition properties and uses of Tin base bearing material.	Chalk and talk
3	7.1 Classification, composition properties and uses of Lead and Cadmium base bearing material.	Chalk and talk
LMS	ASSIGNEMENT-7	
CHAPTER 8		
1	8.1 Classification, composition properties of Iron base spring material.	Chalk and talk
2	8.1 Use of iron base spring material	Chalk and talk
3	8.1 Copper base spring material	Chalk and talk
LMS	ASSIGNEMENT-8	
CHAPTER 9		
1	9.1 Properties and application of thermosetting	Chalk and talk
2	9.1 thermoplastic polymers	Chalk and talk
3	9.2 Properties of elastomer.	Chalk and talk
LMS	ASSIGNEMENT-9	
CHAPTER 10		
1	10.1 Classification, composition and properties of Composites	Chalk and talk

2	10.1 Uses of particulate based and fibre reinforced composites	Chalk and talk
3	10.2 Classification and uses of ceramics	Chalk and talk
LMS	ASSIGNMENT-10	

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1/8/23

LESSON PLAN:

LESSON PLAN OF REFRIGERATION AND AIR CONDITIONING		
COURSE LOAD: 4 PERIODS/ WEEK		
DATE OF COMMENCEMENT OF CLASS:01/08/2023		
NAME OF THE FACULTY: HADU BANDHU DAKUA		
S. No.	Topic	Teaching Learning Process
CHAPTER-1		
1	1.1 Definition of refrigeration and unit of refrigeration.	Chalk and talk
2	1.2 Definition of COP, Refrigerating effect (R.E)	Chalk and talk
4	1.3 Principle of working of open and closed air system of refrigeration.	Chalk and talk
4	1.3.1 Calculation of COP of Bell-Coleman cycle.	PPT
5	1.3.1 Numerical on Bell-Coleman cycle.	PPT
LMS	ASSIGNEMENT-1	
CHAPTER-2		
1	2.1 Layout of steam power stations	Chalk and talk
2	2.2.1 Cycle with dry saturated vapors after compression	Chalk and talk
3	2.2.2 Cycle with wet vapors after compression	Chalk and talk
4	2.2.3 Cycle with superheated vapors after compression.	Chalk and talk
5	2.2.4 Cycle with superheated vapors before compression	Chalk and talk
6	2.2.5 Cycle with sub cooling of refrigerant	Chalk and talk
7	Representation of above cycle on temperature entropy	Chalk and talk
8	2.2.6 Representation of above cycle on pressure enthalpy diagram	Chalk and talk
9	2.2.7 Numerical on Cycle with dry saturated and wet vapors.	Chalk and talk
10	2.2.7 Numerical on Cycle with superheated vapors after compression & Cycle with sub cooling	Chalk and talk
LMS	ASSIGNEMENT-2	
CHAPTER-3		
1	3.1 Simple vapor absorption refrigeration system	Chalk and talk

2	3.2 Practical vapor absorption refrigeration system	PPT & Chalk and talk
3	3.2 Practical vapor absorption refrigeration system	PPT & Chalk and talk
4	3.3 COP of an ideal vapor absorption refrigeration system	PPT & Chalk and talk
5	3.3 COP of an ideal vapor absorption refrigeration system.	PPT & Chalk and talk
6	3.4 Numerical on COP of vapors absorption system.	Chalk and talk
7	3.4 Numerical on COP Practical vapor absorption .	Chalk and talk
LMS	ASSIGNEMENT-3	

CHAPTER-4

1	4.1.1 REFRIGERANT COMPRESSORS: Principle of working and constructional details of reciprocating and rotary compressor.	Chalk and talk
2	4.1.2 Centrifugal compressor only theory	Chalk and talk
	4.1.3 Important terms	
3	4.1.4 Hermetically and semi hermetically sealed compressor	Chalk and talk
4	4.2.1 CONDENSERS : Principle of working and constructional details of air cooled and water cooled condenser.	Chalk and talk
5	4.2.2 Heat rejection ratio.	Chalk and talk
	4.2.3 Cooling tower and spray pond	
6	4.3.1 EVAPORATORS : Principle of working and constructional details of evaporator.	Chalk and talk
7	4.3.2 Types of evaporator. Bare tube coil evaporator	Chalk and talk
8	4.3.3 Finned evaporator, shell and tube evaporator.	Chalk and talk
LMS	ASSIGNEMENT-4	

CHAPTER-5

1	5.1.1 EXPANSION VALVES: Capillary tube.	Chalk and talk
2	5.1.2 Automatic expansion valve.	Chalk and talk
3	5.1.3 Thermostatic expansion valve	Chalk and talk
4	5.2.1 REFRIGERANTS: Classification of refrigerants	Chalk and talk
	5.2.2 Desirable properties of an ideal refrigerant.	
5	5.2.3 Designation of refrigerant.	PPT
6	5.2.4 Thermodynamic Properties of Refrigerants. Chemical properties of refrigerants.	PPT
7	5.2.6 Commonly used refrigerants, R-11, R-12, R-22, R-134a, R-717, Substitute for CFC	PPT
8	5.3.1 Applications of 5.3.2 refrigeration Cold storage, Dairy refrigeration	Chalk and talk

9	5.3.3 Ice plant 5.3.4 water cooler	Chalk and talk
10	5.3.5 Frost free refrigerator.	Chalk and talk
CHAPTER 6		
1	6.1 Psychometric terms	Chalk and talk
2	6.2 Adiabatic saturation of air by evaporation of water	Chalk and talk
3	6.3 Psychometric chart and uses.	Chalk and talk
4	6.4.1 Psychometric processes Sensible heating and Cooling	Chalk and talk
5	6.4.2 Cooling and Dehumidification	Chalk and talk
6	6.4.3 Heating and Humidification	Chalk and talk
7	6.4.4 Adiabatic cooling with humidification Total heating of a cooling process 6.4.6 SHF, BPF	Chalk and talk
8	6.4.7 Adiabatic mixing	Chalk and talk
9	6.4.8 Problems on above.	Chalk and talk
10	6.5 Effective temperature and Comfort chart.	Chalk and talk
LMS	ASSIGNEMENT-6	
CHAPTER 7		
1	7.1 Factors affecting comfort air conditioning.	Chalk and talk
2	7.1 Factors affecting comfort air conditioning.	Chalk and talk
3	7.2 Equipment used in an air-conditioning.	Chalk and talk
4	7.3 Classification of air-conditioning system.	Chalk and talk
5	7.4 Winter Air Conditioning System	Chalk and talk
6	7.4 Winter Air Conditioning System	Chalk and talk
7	7.5 Summer air-conditioning system	Chalk and talk
8	7.5 Summer air-conditioning system	Chalk and talk
9	7.6 Numerical on Winter Air Conditioning System	Chalk and talk
10	7.6 Numerical on Summer air-conditioning system	Chalk and talk
LMS	ASSIGNEMENT-7	

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LESSON PLAN:

LESSON PLAN OF THERMAL II			
COURSE LOAD: 4 PERIODS/ WEEK			
DATE OF COMMENCEMENT OF CLASS:02-01-2024			
NAME OF THE FACULTY: HADU BANDHU DAKUA			
S. No.	Topic	Teaching Process	Learning
CHAPTER-1			
1	1.1 Define mechanical efficiency	Chalk and talk	
2	1.1 Indicated thermal efficiency, Relative Efficiency,	Chalk and talk	
3	1.1 Brake thermal efficiency.	Chalk and talk	
4	1.1 Overall efficiency.	Chalk and talk	
5	1.1 Mean effective pressure & specific fuel consumption.	Chalk and talk	
6	1.2 Define air-fuel ratio	Chalk and talk	
7	1.2 Define calorific value of fuel.	Chalk and talk	
8	1.3 Work out problems to determine efficiencies & specific fuel consumption	Chalk and talk	
LMS	ASSIGNEMENT-1		
CHAPTER-2			
1	2.1 Explain functions of compressor & industrial use of air compressor.	Chalk and talk	
2	2.2 Classify air compressor & principle of operation.	Chalk and talk	
3	2.3 Describe the parts of reciprocating Air compressor.	Chalk and talk	
4	2.3 working principle of reciprocating Air compressor.	Chalk and talk	
5	2.4 Explain the terminology of reciprocating compressor such as bore, stroke	PPT , Chalk and talk	
6	2.4 Explain pressure ratio free air delivered & Volumetric efficiency.	PPT , Chalk and talk	
7	2.5 Derive the work done of single stage air compressor.	Chalk and talk	
8	2.5 Derive the work done of two stage compressor with clearance.	Chalk and talk	

9	2.5 Derive the work of two stage compressor without clearance.	Chalk and talk
10	2.6 Solve simple problems (without clearance only)	Chalk and talk
11	2.6 Solve simple problems (without clearance only)	Chalk and talk
12	2.6 Solve simple problems (without clearance only)	Chalk and talk
LMS	ASSIGNEMENT-2	
CHAPTER-3		
1	3.1 Difference between gas & vapours.	Chalk and talk
2	3.2 Formation of steam.	PPT & Chalk and talk
3	3.3 Representation on P-V, T-S,	PPT & Chalk and talk
4	3.3 Representation on H-S & T-S	PPT & Chalk and talk
5	3.4 Definition & Properties of Steam.	PPT & Chalk and talk
6	3.4 Definition & Properties of Steam.	Chalk and talk
7	3.5 Use of steam table	Chalk and talk
8	3.5 Use of mollier chart for finding unknown properties.	Chalk and talk
9	3.6 Non flow & flow process of vapour	Chalk and talk
10	3.7 P-V, T-S	Chalk and talk
11	3.7 H-S, diagram	Chalk and talk
12	3.8 Determine the changes in properties & solve simple numerical.	Chalk and talk
LMS	ASSIGNEMENT-3	
CHAPTER-4		
1	4.1 Classification & types of Boiler.	Chalk and talk
2	4.2 Important terms for Boiler.	Chalk and talk
3	4.2 Important terms for Boiler.	Chalk and talk
4	4.3 Comparison between fire tube & Water tube Boiler.	Chalk and talk
5	4.4 Description & working of common boilers i.e Cochran Boiler	Chalk and talk
6	4.4 Description & working of common boilers i.e Lanchashire Boiler	Chalk and talk
7	4.4 Description & working of common boilers i.e Babcock & Wilcox Boiler.	Chalk and talk
8	4.5 Boiler Draught: Forced.	Chalk and talk

9	4.5 Boiler Draught: Induced.	Chalk and talk
10	4.5 Boiler Draught: Balanced.	Chalk and talk
11	4.6 Boiler mountings	Chalk and talk
12	4.6 Boiler accessories.	Chalk and talk
LMS	ASSIGNEMENT-4	
CHAPTER-5		
1	5.1 Carnot cycle with vapour	Chalk and talk
2	5.2 Derive work	Chalk and talk
3	5.2 & efficiency of the cycle.	Chalk and talk
4	5.3.1 Rankine cycle:Representation in P-V, T-S & h-s diagram.	Chalk and talk
5	5.3.2 Derive Work & Efficiency.	PPT
6	5.3.3 Effect of Various end conditions in Rankine cycle.	PPT
7	5.3.4 Reheat cycle & regenerative Cycle.	PPT
8	5.4 Solve simple numerical on Carnot vapour Cycle & Rankine Cycle	Chalk and talk
CHAPTER 6		
1	6.1 Modes of Heat Transfer: conduction.	Chalk and talk
2	6.1 Modes of Heat Transfer: convection.	Chalk and talk
3	6.1 Modes of Heat Transfer: radiation.	Chalk and talk
4	6.2 Fourier law of heat conduction and thermal conductivity (k).	Chalk and talk
5	6.3 Newton's laws of cooling.	Chalk and talk
6	6.4 Radiation heat transfer (Stefan, Boltzmann).	Chalk and talk
7	6.4 Kirchhoff's law only statement, no derivation & no numerical problem.	Chalk and talk
8	6.5 Black body Radiation, Definition of Emissivity, absorptivity, & transmissibility.	Chalk and talk
LMS	ASSIGNEMENT-6	

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08/01/24

LESSON PLAN FOR THERMAL ENGINEERING-1

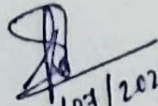
ACADEMIC YEAR: 2023-24		
Mechanical Engineering	3 RD semester	Er. Kalia Sethi
THERMAL ENGINEERING-1	04/week	Semester : 3 RD No. of weeks :15
Week	Class day	Theory topics
1	1st	Introduction, Course outcomes, Reference books for subject.
	2nd	Thermodynamic system and types of thermodynamic system.
	3rd	Thermodynamic properties and classification of properties
	4th	Thermodynamic process,path, cycle,state.
2	1st	Point function and path function and their comparision.
	2nd	Thermodynamic equilibrium ,types and their examples.
	3rd	Quasistatic process and its importance.
	4th	Energy, source of energy and energy conservation.
3	1st	Heat and work as energy.
	2nd	Comparision between heat and work , mechanical equivalent of heat
	3rd	Work and heat transfer, displacement work.
	4th	Revision of thermodynamic concepts assignments of chapter-1.
4	1st	Brief introduction on laws of thermodynamics.
	2nd	Zeroth law of thermodynamics and its importance in thermal equilibrium.
	3rd	First law of thermodynamics for a closed system undergoing a cycle.
	4th	Internal energy as a system properties.
5	1st	Limitations of first law of thermodynamics.
	2nd	Steady flow energy equation. Application of first law of thermodynamic to turbine , compressor,nozzle and diffuser.
	3rd	Problem solving on 1 st law thermodynamic.
	4th	Second law thermodynamics, statements and application to heat engine, heat pump and refrigerator.
6	1st	C.O.P and efficiency comparision of heat engine, heat pump and refrigerator.
	2nd	Introduction to concept of entropy.
	3rd	Problem solving on efficiency and COP.
	4th	Overall discussion of laws of thermodynamics and assignment work.

7	1st	Introduction to perfect gas. Comparison of real gasses to perfect gas.
	2nd	Boyle's law, Charle's law , Guy-lussac law.
	3rd	Avogaadro's law, Dalton's law f partial pressure.
	4th	General gas equation , gas constant, universal gas constant and their values.
8	1st	Specific heats of gas. C_p, C_v and their relationships.
	2nd	Enthalpy of a gas and workdone calculation for a non-flow process.
	3rd	Application of 1 st law to different thermodynamic processes .
	4th	Application of 1 st law to different thermodynamic processes .
9	1st	Problem solving on non-flow processes.
	2nd	Free expansion, examples of free expansion and throttling process.
	3rd	Overall discussions on processes of perfect gas
	4th	Introduction to engine and its types.
10	1st	Internal combustion engine and its application.
	2nd	Terminologies of I.C engine.
	3rd	Working principle of 2-S and 4-S S.I engine.
	4th	Working principle of 2-S and 4-S C.I engine.
11	1st	Comparison of two stroke and four stroke engine. Comparison of C.I and S.I engine.
	2nd	Overall discussions on I.C engine and assignment.
	3rd	Introduction to air standard cycle and assumptions of air standard cycle.
	4th	Carnot cycle and its drawback
12	1st	Problem solving on carnot cycle workdone and efficiency.
	2nd	Otto cycle workdone and efficiency.
	3rd	Problem solving on otto cycle.
	4th	Calculation of Diesel cycle workdone and efficiency.
13	1st	Problem solving on Diesel cycle workdone and efficiency.
	2nd	Calculation of dual combustion cycle workdone and efficiency.
	3rd	Problem solving on dual combustion cycle

		workdone and efficiency.
	4th	Workdone and efficiency comparison of Otto, Diesel and Dual combustion cycle.
14	1st	Overall discussion on gas power cycle. Assignment work.
	2nd	Fuel and types of fuel.
	3rd	Application of different types of fuel.
	4th	Calorific and heating values of fuel.
15	1st	Octane number, cetane number and their comparison.
	2nd	Overall discussion.
	3rd	Solving semester questions of previous year.
	4th	Model question paper practice

TOTAL PERIODS: 60

NO. OF WEEKS : 15


 27/07/2023
 (Kalia Sachin
 Lecturer, Mechanical)