LESSON PLAN FOR DESIGN OF MACHINE ELEMENTS

ACADEMIC YEAR: 2024-25		
Mechanical Engineering	5th semester	ER. KALIA SETHI
DESIGN OF MACHINE ELEMENTS	Lecture: 04/week	Semester :5TH
		No. of weeks :15
WEEK	CLASS DAY	THEORY TOPICS
1	1ST (CH1)	Introduction to Machine Design , course outcomes.
	2nd	Classification of machine design, Stresses related to machine design,Stressconcentration
	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
	4th	General procedure in machine design
3	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
	4th	Strength of transeverse and parallel fillet welded joint
4	1st	Simple numericals on welding joint
	2nd	Design of welded joints for eccentric loads
	3rd	Different cases of eccentric load and derivations
	4th	Numericals on eccentric loaded welding joint.
5	1st	Riveted joint,types of riveted joint.
	2nd	Failures of riveted joint.
	3rd	Determination of strength and efficiency of riveted joint.
	4th	Design of riveted joint for pressure vessel(boiler)
6	1st	Numericals on design of riveted joints.
	2nd	Numericals on design of riveted joints.
	3rd	Class test.
	4TH (CH3)	Introduction to shaft,functions,materials of shaft
7	1st	Design of shaft on basis of strength
	2nd	Design of shaft on basis of strength
	3rd	Design of shaft on basis of rigidity
	4th	Design of shaft on basis of rigidity
8	1st	Numericals on design of shafts
	2nd	Numericals on design of shafts
	3rd	function of keys, types of keys
	4th	Material of keys, Failures of key,causes,effect of key way
9	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
	4th	Specifications of parallel,gibhead,taper key

01/07/2024

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

01/07/2024

(Kalia Sethi,
Lecturer, Mechanical)

LESSON PLAN FOR THERMAL ENGINEERING-1

ACADEMIC YEAR: 2024-25		
Mechanical Engineering	**3RD semester**	**Er. Kalia Sethi**
THERMAL ENGINEERING-1	04/week	Semester : 3RD
		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 1st 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.

01/07/2024

(Kalia Sethi)

7	1st	Introduction to perfect gas. Comparision 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	Comparision of two stroke and four stroke engine. Comparision 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

01/07/2024

		workdone and efficiency.
	4th	Workdone and efficiency comparision 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 comparision.
	2nd	Overall discussion.
	3rd	Solving semester questions of previous year.
	4th	Model question paper practice.

TOTAL PERIODS: 60
NO. OF WEEKS : 15

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