PNS SCHOOL OF ENGG. & TECH., MARSHAGHAI

DEPARTMENT OFMECHANICAL ENGINEERING SUBJECT: DESIGN OF MACHINE ELEMENTS (5TH SEM)

NAME OF THE LECTURER: Er. RAMESH CHANDRA PRADHAN DATE : 14.07.2025 TO 15.11.2025

LESSON PLAN

Nos. of Weeks : 15 Total No. of Periods : 60

CHAPTER	WEEK	TOPIC TO BE COVERED
INTRODUCTION	1ST	INTRODUCTION TO MACHINE DESIGN AND ITS CLASSIFICATION.
		DIFFERENT MECHANICAL ENGINEERING MATERIALS USED IN DESIGN WITH THEIR USES
		PHYSICAL AND MECHANICAL PROPERTIES OF ENGINEERING MATERIALS
		WORKING STRESS, YIELD STRESS, ULTIMATE STRESS & FACTOR OF SAFETY
	2ND	NUMERICALS ON WORKING , YIELD AND ULTIMATE STRESS.
		STRESS –STRAIN CURVE FOR M.S & C.I AND SALIENT POINTS
		MODES OF FAILURE BY ELASTIC DEFLECTION
		MODES OF FAILURE BY GENERAL YIELDING
	3RD	MODES OF FAILURE BY FRACTURE
		FAILURE OF MACHINE ELEMENTS DUE TO FATIGUE AND CREEP.
		FACTORS GOVERNING THE DESIGN OF MACHINE ELEMENTS.
		DESIGN PROCEDURE
DESIGN OF FASTENING ELEMENTS	4TH	JOINTS AND THEIR CLASSIFICATION.
		TYPES OF WELDED JOINTS .
		ADVANTAGES OF WELDED JOINTS OVER OTHER JOINTS.
		DESIGN OF WELDED JOINTS FOR NORMAL LOADS.
	5TH	DESIGN OF WELDED JOINTS FOR ECCENTRIC LOADS.
		NUMERICALS ON DESIGN OF WELDED JOINTS
		TYPES OF RIVETED JOINTS AND TYPES OF RIVETS.
		FAILURE OF RIVETED JOINTS
	6TH	STRENGTH & EFFICIENCY OF RIVETED JOINTS.
		NUMERICALS ON DESIGN OF RIVETED JOINTS
		DESIGN OF RIVETED JOINTS FOR PRESSURE VESSEL.
		NUMERICALS ON DESIGN OF RIVETED JOINTS
	7TH	NUMERICALS ON DESIGN OF RIVETED JOINTS
		NUMERICALS ON DESIGN OF PRESSURE VESSEL
		FUNCTION OF SHAFTS.
		MATERIALS OF SHAFTS
DESIGN OF SHAFTS & KEYS	8TH	DESIGN SOLID & HOLLOW SHAFTS TO TRANSMIT A GIVEN POWER AT GIVEN RPM BASED ON STRENGTH
		NUMERICALS ON DESIGN OF SOLID SHAFTS AND HOLLOW SHAFTS BASED ON STRENGTH
		DESIGN SOLID & HOLLOW SHAFTS TO TRANSMIT A GIVEN POWER AT GIVEN RPM BASED ON RIGIDITY
		NUMERICALS ON DESIGN OF SOLID SHAFTS AND HOLLOW SHAFTS BASED ON RIGIDITY, STANDARD SIZE OF SHAFT AS PER I.S.
	9TH	NUMERICAL ON DESIGN OF SHAFTS
		FUNCTION OF KEYS, TYPES OF KEYS & MATERIAL OF KEYS.
		FAILURE OF KEY, EFFECT OF KEY WAY
		DESIGN OF RECTANGULAR SUNK KEY CONSIDERING ITS FAILURE AGAINST SHEAR & CRUSHING AND NUMERICALS
	10TH	DESIGN RECTANGULAR SUNK KEY BY USING EMPIRICAL RELATION FOR GIVEN DIAMETER OF SHAFT AND NUMERICALS
		SPECIFICATION OF PARALLEL KEY, GIB-HEAD KEY, TAPER KEY AS PER I.S.
		NUMERICAL ON KEYS

DESIGN OF COUPLING		SHAFT COUPLING, DIFFERENCE BETWEEN CLUTCH AND COUPLING
	11TH	REQUIREMENTS OF A GOOD SHAFT COUPLING
		ADVANTAGES OF USING SHAFT COUPLINGS
		TYPES OF COUPLING.
		DESIGN OF SLEEVE OR MUFF-COUPLING.
	12TH	NUMERICALS ON DESIGN OF SLEEVE COUPLING
		NUMERICALS ON DESIGN OF SLEEVE COUPLING
		DESIGN OF CLAMP OR COMPRESSION COUPLING
		NUMERICALS ON CLAMP COUPLING
DESIGN A CLOSED COIL HELICAL SPRING	13TH	MATERIALS USED FOR HELICAL SPRING.
		STANDARD SIZE SPRING WIRE. (SWG).
		TERMS USED IN COMPRESSION SPRING
		STRESS IN HELICAL SPRING OF A CIRCULAR WIRE.
	14TH	NUMERICALS OF STRESS ON HELICAL SPRINGS OF CIRCULAR WIRE.
		NUMERICALS OF STRESS ON HELICAL SPRINGS OF CIRCULAR WIRE.
		DEFLECTION OF HELICAL SPRING OF CIRCULAR WIRE.
		NUMERICALS ON DEFLECTION OF SPRINGS
	15TH	NUMERICALS ON DEFLECTION OF SPRINGS
		SURGE IN SPRING.
		NUMERICAL ON DESIGN OF HELICAL SPRING
		NUMERICAL ON DESIGN OF HELICAL SPRING

10.07.25

SIGNATURE OF LECTURER

10.07.25

SIGNATURE OF H.O.D.

SIGNATURE OF PRINCIPAL