GOVT. POLYTECHNIC, NAYAGARH
LESSON PLAN

DISCIPLINE: MECHANICAL ENGINEERING	SEMESTER:5th(2025-26)	NAME OF THE FACULTY: SANTOSH KUMAR PATRA LECTURE STAGE-1
SUBJECT: DESIGN OF MACHINE ELEMENTS(TH-2)	NO. OF DAYS/WEEK CLASS ALLOTED: 4P/WEEK	SEMESTER FROM 14/07/2025 TO 15/11/2025 NO. OF WEEKS: 15

Sl No.	week	Day	Topics to be covered
1	1st	1st day	Introduction to Machine Design and Classification.
		2nd day	Different mechanical engineering materials used in design.
		3rd day	mechanical and physical properties of materials.
		4th day	Definition of working stress, yield stress.
2	2nd	1st day	Ultimate stress & factor of safety of materials.
		2nd day	stress –strain curve for M.S & C.I
		3rd day	Modes of failure during design consideration.
		4th day	Failure caused by elastic deflection, general yielding & fracture
3	3rd	1st day	Factors governing the design of machine elements.
		2nd day	Precautions to be taken before design.
		3rd day	Describe design procedure.
		4th day	Design procedures.
4	4th	1st day	Joints and their classification.
		2nd day	State types of welded joints.
		3rd day	Arc welding, gas welding and resistance welding.
		4th day	State advantages of welded joints over other joints.
5	5th	1st day	Design of welded joints for eccentric loads.
		2nd day	State types of Rivets

		3rd day	State types of riveted joints.
		4th day	Describe failure of riveted joints.
6	6th	1st day	Determine strength & efficiency of riveted joints.
		2nd day	Design riveted joints for pressure vessel.
		3rd day	Solve numerical on Welded Joints.
		4th day	Numerical on riveted joints.
7	7th	1st day	State function of shafts and materials for shafts.
		2nd day	Design solid shafts to transmit a given power at given rpm based on a) Strength: (i) Shear stress, (ii) Combined bending tension; b) Rigidity: (i) Angle of twist, (ii) Deflection, (iii) Modulus of rigidity.
		3rd day	Design of hollow shafts to transmit a given power at given rpm based on a) Strength: (i) Shear stress, (ii) Combined bending tension; b) Rigidity: (i) Angle of twist, (ii) Deflection, (iii) Modulus of rigidity.
		4th day	State standard size of shaft as per I.S.
8	8th	1st day	State function of keys, types of keys.
		2nd day	Materials used for making of key.
		3rd day	Describe failure of key, effect of key way.
		4th day	Design rectangular sunk key considering its failure against shear & crushing.
9	9th	1st day	Design rectangular sunk key by using empirical relation for given diameter of shaft.
		2nd day	State specification of parallel key, Gib head key, taper key as per I.S.
		3rd day	Solve numerical on Design of Shaft.
		4th day	Solve numerical on Design of keys.
10	10th	1st day	Design of Shaft Coupling
		2nd day	Design of Shaft Coupling
		3rd day	Requirements of a good shaft coupling.
		4th day	Types of Coupling.
11	11th	1st day	Sleeve, muff and flange coupling.
		2nd day	Design of Sleeve or Muff-Coupling.

		3rd day	Problems on Sleeve or Muff-Coupling.
		4th day	Design of Clamp or Compression Coupling.
12	12th	1st day	Factors affecting the design of coupling
		2nd day	Problems on Clamp or Compression Coupling.
		3rd day	Problems on hollow shaft coupling.
		4th day	Problems on solid shaft coupling.
13	13th	1st day	Introduction to closed coil helical spring.
		2nd day	Materials used for helical spring.
		3rd day	Standard size spring wire. (SWG).
		4th day	Terms used in compression spring.
14	14th	1st day	Spring strength and stiffness.
		2nd day	Stress in helical spring of a circular wire
		3rd day	Design of helical springs.
		4th day	Deflection of helical spring of circular wire.
15	15th	1st day	Effect of deflection in spring.
		2nd day	Surge in spring.
		3rd day	Effect of surge in springs.
		4th day	Solve numerical on design of closed coil helical compression spring.

LEARNING RESOURCES

SL NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER
1	R.S.KHURMI &J.K.GUPTA	A TEXT BOOK OF MACHINE DESIGN	S.CHAND
2	V.B.BHANDARI	DESIGNOF MACHINE ELEMENTS	TMH
3	S.MD.JALAUDEEN	DESIGN DATA BOOK	ANURADHA PUBLICATION
4	P.C.SHARMA &D.K AGRAWA	A TEXT BOOK OF MACHINE DESIGN	S.K KATARIYA
5	PANDYA AND SHAH	MACHINE DESIGN	CHAROTARPP

SANTOSH KUMAR PATRA
LECTURER STAGE-1
MECHANICAL ENGINEERING DEPARTMENT