

SYNERGY SCHOOL OF ENGINEERING, DHENKANAL

Academic Lesson Plan for Design of Machine Element (Winter-2026)

Discipline: Mechanical Engineering	Semester: 5th	Name of Faculty: SOMANATH SETHY
Subject: Design of Machine Element.	No. of days/per week Class Allotted: 3	Semester from: 01/07/26 End date:05/11/26
		No. of weeks:15
Week	Class Day	Theory Topics
1st	1st	Introduction: Introduction to Machine Design and Classify it.
	2nd	Different mechanical engineering material design with their uses and their mechanical and physical properties.
	3rd	Define working stress yield stress ,ultimate stress & factor of safety and stress-strain curve for M.S & C.I.
2nd	1st	Ultimate stress & factor of safety
	2nd	Stress-strain curve for M.S&C.I.
	3rd	Modes of Failure (By elastic deflection,) General yielding & fracture.
3rd	1st	State the factors governing the design of machine elements.
	2nd	State the factors governing the design of machine elements.
	3rd	Describe design procedure.
4th	1st	Design of fastening elements :Joints and their classification. State types of welded joints.
	2nd	State advantages of welded joints over other joints.
	3rd	Design of welded joints for eccentric loads.
	1st	State types of riveted joints and types of rivets.

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5th	2nd	Describe failure of riveted joint
	3rd	Design riveted joints for pressure vessel.
6th	1st	Solve numerical on Welded Joint and Riveted Joints.
	2nd	Solve numerical on Welded Joint and Riveted Joints.
	3rd	Solve numerical on Welded Joint and Riveted Joints.
7th	1st	Design of shafts and Keys: State function of shafts.
	2nd	State materials for shafts. Design solid & hollow shafts to transmit a given power at given rpm based on a) Strength:(i) Shear stress, (ii)Combined bending tension.
	3rd	b) Rigidity: (i)Angle of twist, (ii)Deflection, (iii)Modulus of rigidity.
	1st	State standard size of shaft as per I.S.

8th	2nd	State function of keys, types of keys & material of keys.
	3rd	Describe failure of key, effect of key way. Design rectangular sunk key considering its failure against shear & crushing.
9th	1st	Design rectangular sunk key by using empirical relation for given diameter of shaft.
	2nd	State specification of parallel key.
	3rd	Gib-head key, taper key as per I.S. Solve numerical on Design of Shaft and keys.
10th	1st	Design of Coupling; -Design of Shaft Coupling
	2nd	Requirements of a good shaft coupling
	3rd	Types of Coupling and explain Design of Sleeve

Car

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11th	1st	Design of Sleeve
	2nd	Design of Muff-Coupling
	3rd	Design of Clamp
12th	1st	Compression Coupling
	2nd	Compression Coupling
	3rd	Solve simple numerical on above

13th	1st	Design a closed coil helical spring: - Materials used for helical spring
	2nd	Materials used for helical spring
	3rd	Standard size spring wire.(SWG). Terms used in compression spring.
14th	1st	Stress in helical spring of a circular wire
	2nd	Stress in helical spring of a circular wire
	3rd	Deflection of helical spring of circular wire.
15th	1st	Surge in spring
	2nd	Solve numerical on design of closed coil helical compression spring
	3rd	Numerical solving

VERIFIED BY HOD.

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