

GOVT. POLYTECHNIC KANDHAMAL, (PHULBANI)

LESSON PLAN: DESIGN OF MACHINE ELEMENT (DME)

5TH – SEMESTER, 2026 (W)

Discipline: Mechanical Engineering	Semester: Winter - 2026	Name of the teaching faculty: SNEHASISH MUDULI
Subject: DME	No of days/per week class allotted: 03	Semester From Date: 01.07.2026 To Date: 05.11.2026 No of weeks: 16
Week:	Class day:	Theory/practical topics:
1ST	1ST	Unit – 1 (Introduction to Design) Machine Design philosophy and Procedures;
	2ND	General Considerations in Machine Design;
	3RD	Fundamentals: Types of loads, concepts of stress, Strain, Stress – Strain Diagram for Ductile and Brittle Materials, Types of Stresses; Bearing pressure Intensity;
2ND	1ST	Crushing; Bending and Torsion; Principal Stresses; Simple Numericals;
	2ND	Simple Numericals;
	3RD	Creep strain and Creep Curve; Fatigue; S-N curve; Endurance Limit; Factor of Safety, Stress Concentration
3RD	1ST	Properties of Engineering materials; Designation of materials as per IS and introduction to International standards
	2ND	Advantages of standardization; Use of design data book; Use of standards in design and preferred numbers series.
	3RD	Theories of Elastic Failures; Principal normal stress theory; Maximum shear stress theory, Maximum distortion energy theory.
4TH	1ST	Simple Numericals;
	2ND	Simple Numericals;
	3RD	Simple Numericals; Class Test
5TH	1ST	Unit – 2 (Design of simple machine parts) Cotter Joint; Knuckle Joint;
	2ND	Turnbuckle;
	3RD	Design of Levers: Hand/Foot Lever

6 TH	1 ST	Design of Bell Crank Lever;
	2 ND	Design of C-Clamp; Off-set links;
	3 RD	Design of Overhang Crank; Arm of Pulley.
7 TH	1 ST	Antifriction Bearings: Classification of Bearings; Sliding contact & Rolling contact; Terminology of Ball bearings:
	2 ND	Life Load relationship, Basic static load rating and Basic dynamic load rating, limiting speed; Selection of ball bearings using manufacturer's catalogue. Class Test
	3 RD	Unit – 3 (Design of Shafts, Keys, Couplings and Spur Gears) Types of Shafts; Shaft materials; Standard Sizes; Design of Shafts (Hollow and Solid) using strength and rigidity criteria;
8 TH	1 ST	ASME code of design for line shafts supported between bearings with one or two pulleys in between or one overhung pulley;
	2 ND	Design of Sunk Keys; Effect of Key-ways on strength of shaft
	3 RD	Design of Couplings – Muff Coupling, Protected type Flange Coupling,
9 TH	1 ST	Bush-pin type flexible coupling;
	2 ND	Spur gear design considerations; Lewis equation for static beam strength of spur gear teeth; Power transmission capacity of spur gears in bending.
	3 RD	Simple Numericals;
10 TH	1 ST	Simple Numericals;
	2 ND	Unit – 4 (Design of Power Screws) Thread Profiles used for power Screws - Relative merits and demerits of each;
	3 RD	Torque required to overcome thread friction; Self-locking and overhauling property;
11 TH	1 ST	Efficiency of power screws; Types of stresses induced; Design of Screw Jack;
	2 ND	Design of Screw Jack; Toggle Jack.
	3 RD	Simple Numericals;
12 TH	1 ST	Design of springs: Classification and Applications of Springs; Spring terminology; Materials and Specifications;
	2 ND	Stresses in springs; Wahl's correction factor; Deflection of springs; Energy stored in springs;

	3RD	Stresses in springs; Wahl's correction factor; Deflection of springs; Energy stored in springs;
13TH	1ST	Design of Helical, Tension and Compression springs subjected to uniform applied loads like I.C. engine valves, Weighing balance, Railway buffers, and Governor springs; Leaf springs: Construction and Application.
	2ND	Simple Numericals;
	3RD	Unit – 5 (Design of Fasteners) Stresses in Screwed fasteners; Bolts of Uniform Strength;
14TH	1ST	Design of Bolted Joints subjected to eccentric loading;
	2ND	Design of Parallel and Transverse fillet welds;
	3RD	Simple Numericals;
15TH	1ST	Axially loaded symmetrical section; Merits and demerits of screwed and welded joints.
	2ND	Ergonomics of Design: Man–Machine relationship; Design of Equipment for control, environment & safety;
	3RD	Aesthetic considerations regarding shape, size, color & surface finish.
16TH	1ST	Simple Numericals;
	2ND	Simple Numericals;
	3RD	Revision

Sign. of Faculty Concerned

Sign. of HOD