GOVERNMENT CO-ED POLYTECHNIC RAIPUR (C.G)

DEPARTMENT OF MECHANICAL ENGINEERING

LESSON PLAN

Session start as per university calendar:

Session: JAN-JUNE 2025

Course Name: Theory Of Machines

Course code : 2037471(037)

Name of Subject Teacher- MR. HEMSAGAR GUPTA

Lecturer plan Theory = 50

Discipline: Mechanical	Semester: 4th					
Lecture No.	Unit No.	Topic to be covered under this unit	Total hours	Planned Date	Execution Date	Remarks if any
1		1.1 Kinematics of Machines: Introduction to Statics, Kinematics, Kinetics, Dynamics. Mechanism and machine, rigid and resistant bodies, Kinematic links, joints, pairs, chain and its types, degree of freedom, Constrained motion and its types.		17/02/25 21/02/25	17/02/25	
2		1.2 Four link planar mechanisms and Inversions		17/02/25	21/02/25	
3	Popular Planar Mechanisms	i. Four bar chain: Locomotive coupler, Beam engine and Pantograph.	6	17/02/25	21/02/25	
4		ii. Single slider Crank chain: Pendulum pump, Rotary I.C. engine mechanism, Oscillating cylinder engine		21/02/25	24/02/25	
5		Whitworth quick return Mechanism, Quick return mechanism of shaper.		21/02/25	24/02/25	

6	iii. Double Slider chain: Scotch Yoke mechanism Elliptical trammels, Oldham's Coupling.	21/02/25	07/03/25
7	2.1 Concept of relative velocity and relative acceleration of a point on a link, angular acceleration Inter-relation between linear and angular velocity and acceleration.	28.02/25	07/03/25
8	2.2 Analytical method and Klein's construction to determine velocity and acceleration of different links in single slider crank mechanism.	28/02/25	07/03/25
9 Velocity and Acceleration in Mechanisms	velocity and acceleration of different links in single slider crank mechanism.	28/02/25	10/03/25
10	2.3 Velocity and acceleration diagrams for simple mechanisms.	07/03/25	10/03/25
11	2.4 Determination of velocity and acceleration of point on link by relative velocity method (Excluding Coriollis component of acceleration)	07/03/25	17/03/25
12	2.5 Mechanical advantage calculation.	07/03/25	17/03/25
13	3.1 Clutches:Classification, Functions and Applications, Construction and principle of working of i. Single-plate clutch,ii. Multi-plate clutch	21/03/25	21/03/25
14	Construction and principle of working of Centrifugal Clutch,iv. Cone clutch,v. Diaphragm clutch.	21/03/25	21/03/25

No.	Unit	Topic	Hours	Date	Date
15		3.2 Calculation of power loss assuming uniform pressure and uniform wear theory.		21/03/25	24/03/25
16	Application of Friction	Calculation of power loss assuming uniform pressure and uniform wear theory.	8	23/03/25	24/03/25
17		3.3 Brakes:Functions, Types, Applications		28/03/25	24/03/25
18		3.4 Construction and working principle of Shoe brake ii. Band brake		28/03/25	28/03/25
19		Construction and working principle of iii. Internal expanding shoe brake iv. Disc Brake		04/04/25	28/03/25
20		i.		04/04/25	28/03/25
20		3.5 Braking force, braking torque and power for shoe and band brake		04/04/25	28/03/25
21		4.1 Introduction to Cams and Followers. Cam and follower terminology. Classification of Cams and Followers. Applications of Cams and Followers.		04/04/25	04/04/25
22		4.2 Types of follower motions-uniform velocity		07/04/25	04/04/25
23		Types of follower motions-uniform acceleration		07/04/25	04/04/25
24		Types of follower motions-S.H.M		11/04/25	07/04/25
25		Types of follower motions-uniform velocity, uniform acceleration and S.H.M and their displacement, velocity and acceleration diagrams.		11/04/25	07/04/25
26	Cams and Followers	Displacement, velocity and acceleration diagrams for follower motions uniform velocity, uniform acceleration & S.H.M	8	11/04/25	11/04/25

No.	Topic	Chapter	Hrs	Planned	Actual
27	4.3 Drawing of profile of a radial cam based on given motion of reciprocating knife- edge and roller follower with and without offset.			21/04/25	11/04/25
28	Drawing of profile of a radial cam based on given motion of reciprocating knife- edge and roller follower with and without offset.			21/04/25	11/04/25
29	5.1 Belt Drives – Introduction to Flat belt, V-belt & its applications, materials used for flat and V- belts.			24/04/25	21/04/25
30	Introduction of timing belt and pulley. Angle of lap, length of belt, Slip and creep. Determination of velocity ratio of tight side and slack side tension, centrifugal tension and initial tension,			25/04/25	21/04/25
31	Condition for maximum power transmission.Merits, demerits and selection of belts for given applications.			25/04/25	25/04/25
32	5.2 Chain Drives – Introduction to chain drives, Types of chains and sprockets, Methods of lubrication	Power Transmission	8	28/04/25	28/04/25
33	Merits, demerits and selection of chains for given applications.			28/04/25	25/04/25
34	5.3 Gear Drives – Introduction to gear drives , Classification of gears, Law of gearing			02/05/25	28/04/25
35	5.4 Gear trains- Types of gear, simple gear train , compound, reverted gear train.			02/05/25	28/04/25
36	Epicyclic gear train. Computation of velocity ratio in gear train.Computation of velocity ratio in gear train.			09/05/25	02/05/25

No.	Unit	Content	Periods		
37		6.1 Dynamics of reciprocating engine mechanism, inertia force due to reciprocating mass. 6.2 Piston effort, crank effort, turning moment of crank shaft.		09/05/25	02/05/25
38		6.3 Fluctuation of energy and speed, Coefficient of fluctuation of energy and speed. (No derivation)		09/05/25	02/05/25
39	Flywheel and Governors	Numerical Problems		16/05/25	05/05/25
40		6.4 Principle and application of flywheel.		16/05/25	05/05/25
41		6.5 Governor- Function of governor and its comparison with flywheel.	8	23/05/25	09/05/25
42		6.6 Classification of governor, Watt governor construction and working.		23/05/25	09/05/25
43		Porter, Proell, Hartnell governor construction and working.		23/05/25	09/05/25
44		6.7 Equation for lift of governors. (No derivation)		30/05/25	12/05/25
45		7.1 Balancing- Need and types of balancing, Effects of unbalanced masses.		30/05/25	12/05/25
46		7.2 Balancing of rotating masses in same plane- Analytical method for balancing of several masses revolving in same plane.		30/05/25	16/05/25
47	Balancing of Rotating and Reciprocating unbalanced masses and vibrations	Balancing of rotating masses in same plane- Graphical method for balancing of several masses revolving in same plane.	6	06/06/25	16/05/25
48		7.3 Balancing of reciprocating masses. (No numerical examples).		06/06/25	16/05/25

| 49 | 7.4 Elements of vibrations, Natural frequency of single degree of freedom systems. | 23/06/25 | 19/05/25 |
| 50 | Damped Vibration , Numerical Problems | 23/06/25 | 19/05/25 |

Subject / Class Teacher