

**GOPAL KRISHNA COLLEGE OF
ENGINEERING AND TECHNOLOGY
GOURAHARI VIHAR, PO: RANIPUT, JEYPORE – 764 005**

LESSON PLAN

Name of the Subject: KINEMATICS AND DYNAMICS OF MACHINES

Name of the Faculty: Er. BARSHA BARNALI

Subject Code:MEPC2004

Course Structure:3-0-0

Semester: 4th Semester

Branch:Mechanical

Semester From: JANUARY to APRIL

No. of Weeks: 16

Week	Day	Theory / Practical Topics	Classes
1		Unit 1 – Kinematics of Mechanisms	15
	1	Introduction to kinematics, mechanisms and machines	1
	2	Links, kinematic pairs, and chains	1
	3	Degrees of freedom and Gruebler's equation	1
2	4	Inversion of mechanisms	1
	5	Four-bar chain and its inversions	1
	6	Single slider crank mechanism	1
3	7	Double slider crank chain and inversions	1
	8	Graphical position analysis	1
	9	Velocity analysis of mechanisms	1
4	10	Acceleration analysis	1

Week	Day	Theory / Practical Topics	Classes
	11	Instantaneous centre method	1
	12	Aronhold-Kennedy theorem	1
5	13	Rubbing velocity at pin joints	1
	14	Coriolis component of acceleration	1
	15	Numerical/problem-solving (Module-I)	1
		Unit 2 – Gear Trains	9
6	16	Gear terminology and classification	1
	17	Types of gears and tooth profiles	1
	18	Gear force analysis	1
7	19	Simple and compound gear trains	1
	20	Reverted gear trains	1
	21	Epicyclic gear trains	1
8	22	Train value and velocity ratio	1
	23	Tabular and analytical methods	1
	24	Numerical/problem-solving (Module-II)	1
		Unit 3 – Flywheel and Governors	9
9	25	Turning moment diagram	1
	26	Fluctuation of energy and speed	1

Week	Day	Theory / Practical Topics	Classes
	27	Theory of flywheel	1
10	28	Governors: Watt and Porter	1
	29	Proell and Hartnell governors	1
	30	Performance characteristics of governors	1
11	31	Governor effort and power	1
	32	Numerical/problem-solving (Module-III)	1
	33	Revision session	1
		Unit 4 – Friction, Clutches and Drives	9
12	34	Friction: screw jack and pivot bearings	1
	35	Clutches: single plate, multi-plate, cone clutch	1
	36	Anti-friction bearings	1
13	37	Belt, rope and chain drives	1
	38	Tension relations and centrifugal effects	1
	39	Power transmission and slip/creep	1
14	40	Brakes: classification and types	1
	41	Analysis of braking systems	1
	42	Braking of vehicles	1
		Unit 5 – Balancing of Rotating Masses	6

Week	Day	Theory / Practical Topics	Classes
15	43	Balancing: static and dynamic	1
	44	Balancing of rotating masses (same plane)	1
	45	Balancing in different planes	1
16	46	Numerical problems on balancing	1
	47	Overall revision	1
	48	Doubt clearing and exam preparation	1

Books Recommended

1. *Theory of Machines* by S.S. Rattan
2. *Theory of Machines and Mechanisms* by Uicker, Pennock and Shigley
3. *Theory of Machines* by R.S. Khurmi and J.K. Gupta
4. *Mechanism and Machine Theory* by Ashok G. Ambekar

NPTEL Lectures

1. <https://nptel.ac.in/courses/112101096>
2. <https://nptel.ac.in/courses/112103019/>