Subject: Theory Of Machines & Mechanism(Th-1)

Name of Faculty: Santosh Kumar Patra, Lecturer Stage-I

Total Periods: 45
Theory: 3P/Week
Session: 22/12/2025 to 18/04/2026

Sl. No.	Week	Period	Topics To Be Covered
1	1st	1st	Unit-I: Simple Mechanism: Link, kinematic pair and types (Lower pair and higher pair)
		2nd	Kinematic chain, mechanism, Inversion concepts.
		3rd	Four bar link mechanism and its inversion.
Sl. No.	Week	Period	Topics To Be Covered
2	2nd	1st	Cams and Followers: Concept; Definition and application; Classification of Cams and Followers.
		2nd	Different follower motions and displacement diagrams: Uniform velocity, SHM.
		3rd	Displacement diagrams: Uniform acceleration and Retardation.
Sl. No.	Week	Period	Topics To Be Covered
3	3rd	1st	Unit-II: Power Transmission: Types of Drives (Belt, Chain, Rope, Gear) & their comparison.
		2nd	Belt Drives: Flat belt, V-belt & its applications; Material for flat and V-belt.
		3rd	Angle of lap, Belt length calculation; Concepts of Slip and Creep.
Sl. No.	Week	Period	Topics To Be Covered
4	4th	1st	Determination of Velocity Ratio, Ratio of tight side and slack side tension.
		2nd	Centrifugal tension and Initial tension; Condition for maximum power transmission.
		3rd	Simple numerical problems on Belt Drives.
Sl. No.	Week	Period	Topics To Be Covered
5	5th	1st	Chain Drives: Advantages & Disadvantages; Selection of Chain & Sprocket wheels; Lubrication methods.
		2nd	Gear Drives: Spur gear terminology; Types of gears and gear trains.
		3rd	Selection of gears for applications; Law of gearing.
Sl. No.	Week	Period	Topics To Be Covered
6	6th	1st	Train value & Velocity ratio for compound and reverted gear trains.
		2nd	Velocity ratio for simple Epicyclic gear train; Methods of lubrication.
		3rd	Rope Drives: Types, applications, advantages & limitations of Steel ropes.
Sl. No.	Week	Period	Topics To Be Covered
7	7th	1st	Unit-III: Flywheel and Governors: Flywheel Concept, function and application.
		2nd	Turning moment diagram for single cylinder 4-Stroke I.C. Engine (Explanation).
		3rd	Coefficient of fluctuation of energy, Coefficient of fluctuation of speed and significance.
Sl. No.	Week	Period	Topics To Be Covered
8	8th	1st	Governors: Types and explanation with sketches (Centrifugal basics).
		2nd	Watt Governor: Construction and working with neat sketches.
		3rd	Porter Governor: Construction and working with neat sketches.
Sl. No.	Week	Period	Topics To Be Covered
9	9th	1st	Terminology of Governors: Sensitivity, stability and isochronism.
		2nd	Simple numerical problems on Watt and Porter Governor.
		3rd	Comparison between Flywheel and Governor.
Sl. No.	Week	Period	Topics To Be Covered
10	10th	1st	Unit-IV: Brakes, Dynamometers, Clutches & Bearings: Function and types of brakes and dynamometers; Comparison.
		2nd	Construction and working of i) Shoe brake, ii) Band Brake.
		3rd	Numerical problems to find braking force and braking torque for shoe & band brakes.

No.	Week	Period	Topics To Be Covered
1	11th	1st	Concept of Self Locking & Self energizing brakes.
		2nd	Construction and working of Dynamometers: i) Rope Brake, ii) Hydraulic Dynamometer.
		3rd	Clutches: Uniform pressure and Uniform Wear theories; Function and application.
No.	Week	Period	Topics To Be Covered
2	12th	1st	Construction and working: i) Single plate clutch, ii) Multiplate clutch.
		2nd	Construction and working: iii) Centrifugal Clutch, iv) Cone clutch, v) Diaphragm clutch.
		3rd	Simple numerical problems on single and Multiplate clutch.
No.	Week	Period	Topics To Be Covered
3	13th	1st	Bearings: i) Simple Pivot, ii) Collar Bearing, iii) Conical pivot.
		2nd	Torque & power lost in friction (no derivation); Simple numerical.
		3rd	Unit-V: Balancing & Vibrations: Concept of balancing; Balancing of single rotating mass.
No.	Week	Period	Topics To Be Covered
4	14th	1st	Graphical method for balancing of several masses revolving in same plane.
		2nd	Concept and terminology used in vibrations.
		3rd	Causes of vibrations in machines; their harmful effects.
No.	Week	Period	Topics To Be Covered
5	15th	1st	Remedies for vibrations in machines.
		2nd	Revision: Units 1, 2 & 3 (Mechanisms, Drives, Flywheels).
		3rd	Final Semester Examination Discussion / Doubt Clearing (Units 4 & 5).

REFERENCES:

1. **Theory of Machines** - S.S.Rattan, Tata McGraw-Hill publications.
2. **Theory of Machines** - R.K.Bansal, Laxmi publications.
3. **Theory of Machines** - R.S. Khurmi & J.K.Gupta, S.Chand publications.
4. **Dynamics of Machines** - JBK Das, Sapna Publications.

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