

GOVERNMENT POLYTECHNIC, MALKANGIRI
DEPARTMENT OF MECHANICAL ENGINEERING


LESSON PLAN

| | | |
|---|---|---|
| <u>LESSON PLAN</u> | | |
| Discipline: Mechanical Engineering | Semester: 4th | Name of the Teaching Faculty: SHARMILA SABAR |
| Subject: Theory of machines & mechanism | No. of days/week class allotted 3 | Semester From date: 24.12.2025 No. of Week: 15 To date: 18.04.2026 |
| PRE-REQUISITE | Strength of Materials | |
| Course Outcomes | <ul style="list-style-type: none"> ◆ Analyze kinematics and dynamics of various machines and mechanisms. ◆ Select suitable drives and mechanisms for specific applications. ◆ Apply the concepts of balancing and vibration in mechanical systems. ◆ Develop the ability to generate innovative mechanical design ideas. ◆ Identify different types of cams and their motions. | |
| Week | Class Day | Theory/Practical Topics |
| 1st | 1st | Simple mechanism: Link, kinematic pair and types (Lower pair and higher pair) |
| | 2nd | Link, kinematic pair and types (Lower pair and higher pair) |
| | 3rd | kinematic chain, mechanism |
| 2nd | 1st | Inversion, four bar link mechanism and its inversion |
| | 2nd | Cams and Followers: Concept, Definition and application of Cams and Followers |
| | 3rd | Classification of Cams and Followers |
| 3rd | 1st | Different follower motions and their displacement diagrams like uniform velocity, SHM, uniform acceleration and Retardation; |
| | 2nd | Power Transmission: Types of Drives – Belt, Chain, Rope, Gear drives & their comparison; Belt Drives - flat belt, V-belt & its applications |
| | 3rd | Material for flat and V-belt; Angle of lap, Belt length. Slip and Creep; |
| 4th | 1st | Determination of Velocity Ratio, Ratio of tight side and slack side tension |
| | 2nd | Centrifugal tension and Initial tension; |
| | 3rd | Condition for maximum power transmission (Simple numericals); |
| 5th | 1st | Chain Drives – Advantages & Disadvantages; Selection of Chain & Sprocket wheels; Methods of lubrication |
| | 2nd | Gear Drives – Spur gear terminology |
| | 3rd | Types of gears and gear trains, their selection for different applications; |
| 6th | 1st | Train value & Velocity ratio for compound, |
| | 2nd | reverted and simple epicyclic gear train; Methods of lubrication |
| | 3rd | ; Law of gearing; Rope Drives – Types, applications, advantages & limitations of Steel ropes. |
| 7th | 1st | Flywheel and Governors: Flywheel - Concept, function and application of flywheel |
| | 2nd | turning moment diagram for single cylinder 4-Stroke I.C. Engine |
| | 3rd | Coefficient of fluctuation of energy, |
| 8th | 1st | , Coefficient of fluctuation of speed and its significance; |
| | 2nd | Governors - Types and explanation with neat sketches (Centrifugal, Watt and Porter) |
| | 3rd | Governors - Types and explanation with neat sketches (Centrifugal, Watt and Porter) |
| 9th | 1st | Concept, function and applications |
| | 2nd | Terminology of Governors (sensitivity, stability and isochronisms) |
| | 3rd | Simple numericals on Watt and Porter Governor |

| | | |
|------|-----|--|
| 10th | 1st | Comparison between Flywheel and Governor |
| | 2nd | Brakes, Dynamometers, Clutches & Bearings: Function of brakes and dynamometers; Types of brakes and Dynamometers |
| | 3rd | Comparison between brakes and dynamometers; Construction and working of i) shoe brake |
| 11th | 1st | Construction and working of , ii) Band Brake, Numerical problems to find braking force and braking torque for shoe & band brakes |
| | 2nd | ;Concept of Self Locking & Self energizing brakes Construction and working of i) Rope Brake Dynamomete |
| | 3rd | Hydraulic Dynamometer Clutches- Uniform pressure and Uniform Wear theories; |
| 12th | 1st | Function of Clutch and its application; Construction and working of i) Single plate clutch |
| | 2nd | Function of Clutch and its application; Construction and working of clutch, ii) Multiplate clutch, |
| | 3rd | iii) Centrifugal Clutch iv) Cone clutch and v) Diaphragm clutch |
| 13th | 1st | (Simple numericals on single and Multiplate clutch) |
| | 2nd | Bearings – i) Simple Pivot, ii) Collar Bearing, iii) Conical pivot. Torque & power lost in friction (no derivation). Simple numericals |
| | 3rd | Balancing & Vibrations: Concept of balancing; Balancing of single rotating mass |
| 14th | 1st | Graphical method for balancing of several masses revolving in same plane |
| | 2nd | Graphical method for balancing of several masses revolving in same plane |
| | 3rd | Graphical method for balancing of several masses revolving in same plane |
| 15th | 1st | Concept and terminology used in vibrations, |
| | 2nd | Causes of vibrations in machines; their harmful effects and remedies |
| | 3rd | Causes of vibrations in machines; their harmful effects and remedies |

Learning Resources:

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 – J B K Das, Sapna Publications.
5. Theory of machines – Jagdishlal, Bombay Metro – Politan book Ltd


Signature of
Faculty


Signature of HOD/


Signature of Academic
Coordinator


Signature of Principal