IIPM SCHOOL OF ENGINEERING AND TECHNOLOGY

LESSON PLAN: 2020-21 THEORY OF MACHINES

**Branch : Mechanical Semester: 4th Duration 60**

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# **Objective :** Mechanical and Automobile engineering is involved with design, manufacturing and use of various types of machines. Each machine consists of a large number static and moving parts called mechanisms. Theory of machines is study of such different kind of mechanisms.

**Learning Outcome :** Understanding effectiveness of

* *machine system consisting of different link assemblies as components*
* *Working principle of machine components such as clutch, brakes bearings based on friction*
* *Working principles related to power transmission systems and predicting the work involved and efficiency.*
* *working principle in speed and torque regulating devices such as governor and flywheels*
* *amount and position of masses required towards static and dynamic balancing*
* *types and causes of vibration in machines and predicting remedial measures*

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| **Sl. No** | **Chapte r** | **Proposed Week for Teaching** | **Period No.** | **Subject Name** | **Important Teaching Points** | **Content Source** |
| 1 | **I** | 1st | 1 | Simple mechanism | * Definition of Theory of Machines * Classification of Theory of Machines | **Theory of Machine R.S**  **Khurmi** |
| 2 | 2 | * Link ,kinematic chain |
| 3 | 3 | * Inversion, four bar link   mechanism and its inversion |
| 4 | 4 | * Lower pair and higher pair * mechanism, machine |
| 5 | 2nd | 1 | * Cam and followers |
| 6 | 2 | * Solved Simple Numerical |
| 7 | 3 | * ASSIGNMENT |
| 8 | 4 | * CLASS TEST |
| 9 | 3rd | 1 | **Friction** | * Friction between nut and screw for square thread, | **Theory of Machine R.S**  **Khurmi** |
| 10 | 2 | * screw jack |
| 11 | 3 | * Bearing and its classification, Description of roller |
| 12 | 4 | * Needle roller& ball bearings. |
| 13 | **II** | 4th | 1 | * Torque transmission in flat pivot bearings |
| 14 | 2 | * Torque transmission in conical pivot bearings. |

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| 15 |  |  | 3 |  | * Flat collar bearing of single   and multiple types. |  |
| 16 | 4 | * Torque transmission for   single and multiple clutches |
| 17 | 5th | 1 | * Working of simple frictional   brakes. |
| 18 | 2 | * Working of Absorption type of dynamometer |
| 19 | 3 | * ASSIGNMENT |
| 20 | 4 | * CLASS TEST |
| 21 | **III** | 4th | 1 | Power Transmission | * Concept of power   transmission   * Type of drives, belt, gear and chain drive. | **Theory of Machine R.S**  **Khurmi** |
| 22 | 2 |
| 23 | 3 |
| 24 | 4 | * Computations of velocity ratio, Computation of velocity ratio, |
| 25 | 5th | 1 | * Lengths of belts open with   and without slip. |
| 26 | 2 | * Lengths of belts cross with   and without slip. |
| 27 | 3 | * Ratio of belt tensions, centrifugal tension and initial tension. |
| 28 | 4 | * Power transmitted by the   belt.   * Determine belt thickness and width for given permissible |
| 29 | 6th | 1 | * Stress for open and crossed belt considering centrifugal tension. |
| 30 | 2 | * V-belts and V-belts pulleys.   Concept of crowning of pulleys. |
| 31 | 3 | * Gear drives and its   terminology. |
| 32 | 4 | * Gear trains, working   principle of simple, compound |
| 33 | 7th | 1 | * Working principle, reverted   and epicyclic gear trains. |
| 34 | 2 | * Solved Simple Numerical |
| 35 | 3 | * ASSIGNMENT |
| 36 | 4 | * CLASS TEST |
| 37 | **IV** | 8th | 1 |  | * Function of governor * Classification of governor |
| 38 | 2 |  |
| 39 | 3 | * Working of Watt, Porter   governors |
| 40 | 4 | * Working of Proel and Hartnell governors. |

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| 41 |  | 9th | 1 | Governors and Flywheel | * Conceptual explanation of   sensitivity, stability and  isochronisms. | **Theory of Machine R.S**  **Khurmi** |
| 42 | 2 | * Function of flywheel |
| 43 | 3 | * Comparison between   flywheel &governor. 4 |
| 44 | 4 | * Fluctuation of energy and |
|  | 10th | 1 | * Coefficient of fluctuation of   speed. |
| 45 | 2 | * Solved Simple Numerical |
| 46 | 3 | * ASSIGNMENT |
| 47 | 4 | * CLASS TEST |
| 48 | **V** | 11th | 1 | Balancing of Machine | * Concept of static and   dynamic balancing. | **Theory of Machine R.S**  **Khurmi** |
| 49 |
| 50 | 2 | * Static balancing of rotating   parts. |
| 51 | 3 | * Principles of balancing of   reciprocating parts. |
| 52 |
| 4 | * Causes and effect of   unbalance. |
| 53 |
| 54 | 12th | 1 | * Difference between static and   dynamic balancing |
| 55 | 2 | * ASSIGNMENT |
| 56 | 3 | * CLASS TEST |
| 57 | 4 | * ASSIGNMENT |
| 58 | VI | 13th | 1 | Vibration of machine parts | * Introduction to Vibration and   related terms (Amplitude, time period and frequency,  cycle) | **Theory of Machine R.S**  **Khurmi** |
| 59 | 2 |
| 60 | 3 | * Classification of vibration. |
| 61 | 4 | * Basic concept of natural,   forced & damped vibration |
| 62 | 14th | 1 | * Torsional and Longitudinal   vibration. |
| 2 | * Causes & remedies of   vibration. |
| 63 |
| 3 | * ASSIGNMENT |
| 64 | 4 | * CLASS TEST |

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| **Text book suggested :** |  | |
| * **Text Book of Theory of Machine** | **R.S Khurmi S.Chand** | **S.Chand** |
| * **Text Book of Theory of Machine** | **R.K. Rajput** | **S.Chand** |

# Signature of Faculty Member HOD Principal/ Director