

Lesson Plan: Dynamics of Machines, PCC-ME305-T

Name of Faculty : Dr. Vikas Gupta, Assistant Professor
Discipline/Semester : Mechanical Engineering., 6th Sem
Course Credits : 3.0
Contact Hrs : 3 hrs/week

Course Outcomes:

Sr. No	Course Outcome	RBT Level
CO1	Students will be able to define various mech. systems e.g. flywheel, transmission drives, governor, brake, gyroscope, dynamometer & balancing & state forces & their effect & fundamental laws of dynamics.	L1
CO2	Students will be able to describe different mechanical systems and their dynamic behaviour.	L2
CO3	Students will be able to solve different kind of problems related to force analysis in diff. Mech. systems.	L3
CO4	Students will be able to analyse different mechanical systems dynamically.	L4
CO5	Students will be able to select & design appropriate mech. system required for a particular application.	L5

Course Assessment Methods (internal: 30; external: 70) Two minor tests each of 20 marks, Lectures attended (4 marks) Assignment and quiz (6 marks), and end semester examination of 70 marks. For the end semester examination, 09 questions are to be set by the examiner. Question no.01 will be compulsory & based on the entire syllabus. It will contain 07 short answers type questions. Rest of the 08 questions is to be given by setting 02 questions from each of the 04 units of the syllabus. A candidate is required to attempt any other 04 questions selecting 01 from each of the remaining 04 units. All questions carry equal marks.

Text Books : **T1:**Theory of Mechanisms and Machines: A.Ghosh & A. krMallik, East-West Press.
T2:Theory of Machines and Mechanisms: JE Shigley & JJ Uicker, Jr. McGraw Hill, Inc
Reference Books : **R1:**Mechanism and Machine Theory: J.S. Rao and R.V. Duddipati, New age International.
R2:Theory and Machine (S I units) S.S. Rattan, Tata McGrawHill
R3: Theory of Machine: RS Khurmi, S chand

Contents	Books
<u>UNIT-III</u>	
<u>Brakes:</u> Brake, Types of Brakes, Block or Shoe Brake, Band Brake, Differential Band Brake, Band and Block Brake, Internal Expanding Shoe Brake, Braking Effect in a Vehicle, Problems	R2, R3, T2
<u>Dynamometers:</u> Dynamometer, Types of Dynamometers, Prony Brake Dynamometer, Rope Brake Dynamometer, Epicyclic Train Dynamometer, Belt Transmission Dynamometer, Torsion Dynamometer	R2, R3, T2
<u>UNIT-II</u>	
<u>Governors:</u> Governor, Types of Governors, Centrifugal Governors, Watt Governor, Porter Governor, Proell Governor, Hartnell Governor, Hartung Governor, Wilson- Hartnell Governor, Pickering Governor, Sensitiveness of Governors, Stability of Governors, Hunting of Governors, Effort and Power of a Governor	R1, R2, R3 T1, R2, R3
<u>Gyroscope:</u> Gyroscope, Gyroscopic Couple, Gyroscopic Stabilization of Aeroplane and Ship, Stability of Four Wheel and Two Wheel Vehicles Moving on Curved Path	
<u>UNIT-IV</u>	
<u>Balancing of Rotating Parts:</u> Static Balancing, Dynamic Balancing, Balancing of Rotating Masses, Balancing of Several Masses Rotating in Same Plane by Graphical Method, Balancing of Several Masses Rotating in Different Planes by Graphical Method	T1, R2, R3
<u>Balancing of Reciprocating Parts:</u> Balancing of Reciprocating Masses, Partial Balancing of Locomotives, Effect of Partial Balancing of Reciprocating Parts of Two Cylinder Locomotives, Balancing of Multi Cylinder Inline Engines, Radial Engines and V- Engines	T1, R2, R3
<u>UNIT-I</u>	
<u>Flywheel:</u> Turning Moment Diagrams, Fluctuation of Energy, Coefficient of Fluctuation of Energy and Speed, Application in Engines and Punching Presses	T1,R2, R3
<u>Belts, Ropes and Chain Drives:</u> Types of Belt Drives, Velocity Ratio, Slip, Belt Length, Crowning of Pulleys, VBelts, Condition for Transmission of Maximum Power, Centrifugal Tension, Chain Drive, Types of Chains, Merits and Demerits of Chain Drive over Belt Drive	T1,R2, R3