Course Content with lecture plan:

Sr. No.	Chapter	Course outcome(s)	Lecture(s) required	Faculty
1.	**Dynamic force analysis of mechanisms:** Introduction, D'alembert's principle, equivalent offset inertia force, dynamic analysis of four link mechanism, dynamic analysis of slider crank mechanism, velocity & acceleration of piston, angular velocity & angular acceleration of connecting rod, engine force analysis, dynamically equivalent system inertia of the connecting rod, inertia force in reciprocating engines	CO1	4	HDP
2.	**Turning moment diagrams and flywheel** Turning moment diagram for various type of engines, fluctuation of energy, fluctuation of speed, flywheel, energy stored in flywheel, dimensions of flywheel rims, flywheel in punching presses	CO1	4	HDP
3.	**Balancing:** Introduction, static balancing, dynamic balancing, transference of force from one plane to another plane, balancing of several masses in different planes, force balancing of linkages, balancing of reciprocating mass, balancing of locomotives, Effects of partial balancing in locomotives, secondary balancing, balancing of inline engines, balancing of v-engines, balancing of radial engines, balancing machines.	CO2	11	KKD
4.	**Gyroscope:** Angular velocity, angular acceleration, gyroscopic torque, gyroscopic effect on naval ships, aero plane, stability of an automobile, stability of two wheel vehicle	CO3	5	HNJ
5.	**Free vibrations and damped free vibrations:** Types of vibrations, elements constituting vibration, spring mass system, free undamped vibrations, equation of motion, equivalent spring stiffness, free damped vibrations, equation of motion for viscous damper, damping factor, under damped system, critically damped system, over damped system, logarithmic decrement, free torsional vibration of a two and three rotor system, torsionally equivalent shaft, torsional vibration of a geared system.	CO4	12	AND
6.	**Forced damped vibrations:** Analytical solution of forced damped vibration, vector representation of forced vibrations, Magnification factor, force transmissibility, forced vibration with rotating and reciprocating unbalance, forced vibration due to excitation of support, vibration frequency measurement.	CO4	8	HNJ
7.	**Critical speeds of shafts:** Critical speed of shaft carrying single rotor and having no damping, Critical speed of shaft carrying single rotor and having damping, secondary critical speeds in horizontal shafts, critical speed of shaft having multiple rotors.	CO5	5	HDP

Reference Books:
1. Theory of Machines, S.S.Rattan , Tata Mc-Graw Hill.
2. Mechanical Vibrations and Noise Engineering, A. G. Ambekar, Prentice Hall of India.
3. Dynamics of Machinery, Farazdak Haideri, Nirali Prakashan.
4. Dynamics of Machines, S. Balaguru, Cengage Learning India Pvt. Ltd.
5. Kinematics and Dynamics of Machinery, Norton R L, McGraw-Hill
6. Theory of Machines : Kinematics and Dynamics, Sadhu Singh, Pearson