Year & Sem: E2S1	Course Code: ME2101	Course Name: **Dynamics of Machines**	No. of Credits: 4	L	T&PS	P
				2	2	0

UNIT I: Static Force Analysis; Reciprocating Engine Mechanism, Quick Return Mechanism, Four Link Mechanism, Six Link Mechanism Analysis, Friction in Linkages, Slider in Equilibrium under the Action of Concurrent Forces, Slider in Equilibrium under the Action of Nonconcurrent Forces, Inertia Forces of A Reciprocating Engine Mechanism, Four Link Mechanism, Quick Return Mechanism, More Details of Reciprocating Engine Mechanism;

UNIT II: Combined Static and Inertia Force Analysis, Twin Cylinder Engine Example, Dynamics of Reciprocating Engine Mechanism, Correction Torque, Bearing Loads of A Reciprocating Engine Example, Turning Moment Diagram and Flywheel, Turning Moment Diagram and Crankshaft Speed Fluctuation, Fly Wheel, Flywheel of An Internal Combustion Engine, Flywheel of A Punch Press, Analytical Expressions for the Turning Moment, Flywheel for Reciprocating Machinery;

UNIT III: Balancing of rotating components; Unbalance in one Plane, Unbalance in Several Planes, Balancing Machines Balancing of Linkages; Inertia Force of A Reciprocating Mass, Balancing of Multicylinder In-Line Engine, Firing Order, Balancing of Radial Engines, Balancing of V-Type Engine, Balancing of Four-Bar Linkages [Shaking Forces], Balancing of Four-Bar Linkages [Shaking Moments], Complete Balancing of Four-Bar Linkages

UNIT IV: Gear and Cam Forces; Spur Gears, Helical Gears, Worm Gears, Bevel Gears, Cam Forces;

UNIT V: Mechanisms for Control: Governors and Gyroscopes; Illustration Of Mechanisms In Control, Governors, Watt Governor, Porter Governor, Proell Governor, Performance Parameters, Spring Controlled Fly-Ball [Hartnell] Governor, Spring Controlled Governor With Auxiliary Spring [Wilson-Hartnell Governor], Spring Controlled Governor with Bell Crank attached to the Sleeve, Hartung Governor, Pickering Governor, Governor Effort and Power, Controlling Force, Friction and Insensitiveness, Centrifugal Effect of the Revolving Arms;

UNIT VI: Gyroscopes, Gyroscopic Forces and Couple, Thin Rod Rotating About Its Centroidal Axis, Gyroscopic Stabilization, Stability of A Four Wheel Vehicle Moving on A Curved Path, Stability of A Two Wheel Vehicle

References/Text Books:

1. J. E. Shighley and J.J. Uicker, *Theory of Machines and Mechanisms*
2. A. K. Mallik, A. Ghosh, G. Dittrich, *Kinematic analysis and synthesis of Mechanisms.*
3. J. S. Rao and R. V. Dukkipati, *Mechanism and Machine Theory*.
4. S. S. Rattan, *Theory of Machines*.

Lecture Plan: Unit-I & -II syllabus for MID-I, Unit-III & -IV syllabus for MID-II and Unit-V & -VI syllabus for MID-III examinations.