

B.E Semester: V Mechanical Engineering**Subject Name: Theory of Machines****A. Course Objective**

- To develop a solution oriented approach by in depth knowledge of Theory of Machines.
- To address the underlying concepts, methods and application of different machines.

B. Teaching / Examination Scheme

SUBJECT		Teaching Scheme				Total Credit	Evaluation Scheme					Total Marks
		L	T	P	Total		THEORY		IE	CIA	PR. / VIVO	
CODE	NAME	Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	
ME501	Theory of Machine	3	0	2	5	4	3	70	30	20	30	150

C. Detailed Syllabus

1. Brakes and Dynamometers: Introduction, Brakes classification, Mechanical Brakes-Shoe brake, Band brake, Band and block brake, Internal expanding shoe brake, Braking of vehicle, Dynamometer, Absorption and transmission type.
2. Governors: Introduction, Function and types of governors, Centrifugal governors, Watt governor, Porter governor, Proell governor, Hartnell governor, characteristics of governor-stability, Sensitivity, isochronism, Hunting controlling forces and stability, Effort and power of governor, Inertia governor.
3. Gyroscope: Concept of gyroscope, Angular acceleration, Gyroscopic effects in ships, Airplanes, Stability of two wheeled vehicle, Stability of automobile negotiating a curve, Gyroscopic analysis of inclined rotating discs.
4. Flywheel: Function, construction, Flywheel's rim and dimensions, Operation of flywheel in a punching machine, Turning moment diagram, Fluctuation of energy and fluctuation of speed of crank shaft, Coefficient of fluctuation of energy and speed.
5. Inertia forces in reciprocating parts: Introduction, D –Alberts's Principle, Effect of number of forces on a rigid, Velocity and acceleration of the piston, Forces on the reciprocating parts of an engine considering friction and inertia of moving parts- piston effort, force acting along connecting rod, Thrust on sides of cylinder walls, Crank effort, Thrust on crank shaft, Dynamically equivalent systems, Compound pendulum, Bifilar suspension, Trifilar suspension, Klein's construction.
6. Synthesis of linkages: Kinematic synthesis, Function generation, Path generation, Motion generation, Graphical synthesis, Precision positions, Structural error and chebychev spacing.

D. Lesson planning

SR.NO	DATE/WEEK	UNIT NO	%WEIGHTAGE	TOPIC NO
1	1 ST , 2 ND , 3 RD	1	20	1
2	4 TH , 5 TH , 6 TH	2	20	2
3	7 TH , 8 TH , 9 TH	3,4	20	3,4
4	10 TH , 11 TH , 12 TH	5	20	5
5	13 TH , 14 TH , 15 TH	6	20	6

E. Instructional Method & Pedagogy

1. At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
2. Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal weightage should be given to all topics while teaching and conduction of all examinations.
3. Attendance is compulsory in lectures and laboratory, which may carries five marks in overall evaluation.
4. One/Two internal exams may be conducted and total/average/best of the same may be converted to equivalent of 30 marks as a part of internal theory evaluation.
5. Assignment based on course content will be given to the student for each unit/topic and will be evaluated at regular interval. It may carry an importance of ten marks in the overall internal evaluation.
6. Surprise tests/Quizzes/Seminar/Tutorial may be conducted and having share of five marks in the overall internal evaluation.
7. The course includes a laboratory, where students have an opportunity to build an appreciation for the concept being taught in lectures.
8. Experiments shall be performed in the laboratory related to course contents and as per below suggested list of experiments:
 1. To demonstrate different types of Brakes to calculate braking effort.
 2. To perform evaluation of brake type dynamometer.
 3. To demonstrate & perform Gravity control governors evaluation.
 4. To demonstrate & perform spring control governors evaluation.
 5. To demonstrate & perform gyroscope evaluation.
 6. To demonstrate flywheel and its effect on dynamic of system.
 7. Analyze Influence of Inertia Upon Velocity & Acceleration.
 8. To perform synthesis of mechanism by analytical method.
 9. To perform synthesis of mechanism by graphical method.

F. Students Learning Outcomes

- The student can identify different areas of Theory of Machines.
- Can find the applications of all the areas in day to day life.

G. Recommended Demonstrate Materials

Text & Reference Books:

1. Theory of Machines by S.S. Rattan., Tata McGraw Hill.
2. Dynamics of Machinery by Farazdak Haideri, Nirali Publication.
3. Theory of Machines by Dr. Sadhu Singh Pearson Education.
4. Theory of Machines and Mechanisms by J.Uicker, Gordon R Penstock & J.E. Shigley Oxford International Edition.
5. Kinematics, Dynamics and Design of Machinery by Kenneth J Waldron, Gary L Kinzel Wiley Edition.
6. Theory or Mechanisms and Machines by Amitabh Ghosh and A. Kumar Mallik.
7. Theory of Machines – P. L. Ballaney
8. Kinematics By V.M. Fairs (McGraw Hill)
9. Mechanism Design: Analysis and Synthesis Vol. I by A. Erdman and G.N. Sander (Prentice Hall)
10. Kinematics and Dynamics of Planer Mechanisms by Jeremy Hirsihham (McGraw Hill).