

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. SEMESTER : VIII

MECHATRONICS ENGINEERING

Subject Name: **THEORY OF MECHANISMS**

Sr. No.	Course Contents	Total Hrs
1.	Kinematic Fundamentals Number Synthesis, Grashof conditions, Practical considerations, Motors and Drivers	03
2.	Synthesis of Linkages (Four bar mechanisms) Function generation, Motion generation, Path generation, Dimensional synthesis, Graphical methods, Analytical methods	08
3.	Kinematic Force and Motion Analysis of Plane Mechanisms Motion of rigid body subjected to a system of forces, Principle of virtual work, D'Alembert's Principles and dynamic equilibrium, Dynamic force analysis Graphical and Analytical	06
4.	Friction in Mechanisms Friction between screw and nut, Friction in turning pairs, Friction in slider crank mechanism, Friction in four bar mechanism	04
5.	Vibrations in Mechanical Systems Single Degree of Freedom Systems Free Vibrations, Damped Vibrations, Forced Vibrations, Vibration Isolations and transmissibility.	11
6.	Torsional Vibrations Torsional equivalent system, Stepped Shaft, Two Rotor systems, Three Rotor Systems, Geared Systems	04
7.	Longitudinal and Transverse Vibration, Whirling of Shaft	03
8.	Two Degree and Multi Degree of Freedom Vibrations	03
9.	Vibration of Continuous Systems	03
10.	Mathematical Modelling – Case Study	02
11.	Vibration Measurements	03

List of Experiments:

1. Computerized synthesis of mechanisms.
2. Dimensional synthesis by graphical methods.
3. Force Analysis of the mechanisms (case study).
4. Vibrations experimentations :
 1. Experiments on single degree of freedom systems :
 - Free vibration
 - Damped vibration
 - Forced vibration
 2. Torsional vibration
 3. Critical speed of shaft.

Text Book:

1. Theory of Mechanisms and Machines – Amitabha Ghosh, Ashok kumar Mallik
Affiliated East-West Press Private Limited- New Delhi

Reference Book:

1. Design of Machinery – R. L. Norton, Tata McGraw Hil
2. Theory of Machines and Mechanisms – J. J. Uicker, G. R. Pennock, J. E. Shigley
Oxford University Press