GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Semester: 1

Mechanical Engineering (CAD/CAM)

Subject Name Mechanical Engineering For Mechatronics

Sr.No	Course content
1.	Introduction to Mechatronics:Origin and evaluation, definition, multidisciplinary scenario, need in industry, objectives, design of Mechatronics systems, modules in the system, Mechatronics technology, Mechatronics and engineering skills, overview, system and Mechatronics, measurement system, microprocessor based controllers, engine management system, automatic camera, automatic washing machine and automatic bathroom scale.
2.	Overview of Sensors and Transducers: Definitions, classification, performance parameters, pressure sensors and flow sensors, Hall effect sensors, light sensors, proximity sensors, optical sensor and desirable features of sensors and transducers.
3	Hydraulic System: Actuators, Hydraulic Cylinders and their types, Hydraulic Motors and their types, Valves and their types, symbols for Hydraulic System Components, general hydraulic circuit, different types of hydraulic circuits and hydrostatic transmission.
5	Pneumatic Systems: Introduction to pneumatics, gas laws, compressed air generation and contamination control, pneumatic actuators, valves and control circuits, multiple-actuators circuits, pneumatic applications, maintenance, trouble shooting and safety.
6	System Models: Elements of mechanical systems, spring mass damper system, an unconventional Approach, arrangement and application of mechanical elements, elements of Electrical Engineering, unconventional solution to RLC circuit, application of DC Servomotor, Hydraulic System Modelling, Modelling of actuators and control valves and Thermal Systems and their Modelling.
7	Elements of Machine Tools: Structure, design considerations for structures, guide ways, their requirements and classification, slide ways, stick-slip phenomena, antifriction ways, shapes and types slide ways, re-circulation ball screw and nut, planetary roller screw, spindle and spindle bearings, types of loads on spindles, types of bearings, bearing material selection, antifriction bearings, preloading and its methods for re-circulating ball screw and antifriction bearing and frictionless bearings

LIST OF PRACTICALS:

Sr. No.	Practicals
1.	Introduction to Mechatronics.
2.	Knowledge of mechanical engineering required for Mechatronics.
3.	Overview of sensors and transducers.
4.	Hydraulic system and its components.
5.	Prepare hydraulic circuit for given application.
6.	Pneumatic system and its components.
7.	Prepare pneumatic circuit for given application.
8.	Preparation of system models.
9.	Machine Tools and their components.
10.	Design of machine tool component.

Reference Books:

(1) Mechatronics- Ganesh S. Hegde, Published by University Science Press (An imprint of Laxmi Publication Private Limited).
(2) Mechatronics by H.M.T., Ltd., Tata McGraw Hill Publication Co. Ltd.
(3) Pneumatic Controls- Joji P, Wiley India Private Limited.