MMPE3007 MECHATRONICS (3-0-0)

Module - I: [06 Hours]
Introduction: Introduction to Mechatronics: Mechatronic system, measurement systems, Introduction to Mechanical, Electrical, Fluid and Thermal systems, Rotational and Transnational systems, Electro-Mechanical, Hydraulic-Mechanical systems.

Module - II: [06 Hours]
Sensors: Desirable features, Displacement, position and proximity sensors, Velocity, motion and Force sensors, Time of flight sensors, Binary force sensor, temperature and Pressure measurement, Sensor selection.

Module - III: [06 Hours]
Actuation Systems: Actuation Systems, Pneumatic and Hydraulic systems, Directional control valves, Rotary actuator, Mechanical actuation systems- Mechanical Systems, Electrical Actuation Systems- Electrical Systems, Relays and Solenoids, DC brushed motors, DC brushless motors, DC servo motors, Stepper Motors. Drive selection.

Module - IV: [06 Hours]
Microcontrollers: 8051 Microcontroller, Microprocessor structure, Digital Interfacing, Analog Interfacing, Applications Programming- Assembly/ C (LED Blinking, Controlling a stepper motor).

Module - V: [06 Hours]
Interfacing: Interfacing microcontrollers with general purpose three-state transistors, interfacing relays, Interfacing solenoids, Interfacing stepper motor, Interfacing with sensors, Interfacing with RS 232 and RS485.

COURSE OUTCOMES: At the end of this course, students will demonstrate the ability to
1. Analyze the mechatronics system design and characteristics of sensors and actuators.
2. Define the applications of Sensors.
3. Recognize the applications of Actuation systems.
4. Design 8051 Microcontroller and Programmable Logic Controllers.
5. Analyze the Mechatronics systems by interfacing transistors, sensors, and motors.

Text Book(S):
1. Mechatronics- W Bolton, Pearson Education.
2. MEMS and Microsystems Design and Manufacture- Tai, Ran Hsu, TMH.

Reference Book(S):
1. Mechatronics Principles and Applications- G.C.Onwubolu, Butterworth-Heinemann
2. Foundations of MEMS- Chang Liu, Pearson International Edition.
3. Fundamentals of Microfabrication- Madou, CRC Press.