COURSE CODE	MECHATRONICS SYSTEMS	L	T	P	C
1151ME109		3	0	0	3

1. Preamble

This course provides an introduction to the multidisciplinary field of engineering, modeling of Mechatronics systems; microprocessor programming and interfacing; architecture of PLC; selection and implementation of sensors and actuators; and case studies in Mechatronics systems

2. Pre requisite

Basic Electronics Engineering 1150EC101

3. Links to other courses

Project Work

4. Course Educational Objectives

Students undergoing this course are expected to gain

- Knowledge in mechanical, electronics and computing Engineering.
- The terminologies of microprocessor programming, understand the principles of Sensors, Actuators and Control systems.
- The knowledge to design solutions for the Mechatronics systems.

5. Course Outcomes

The students would be benefitted with the following outcomes:

CO Nos.	Course Outcomes	Level of learning domain (Based on revised Bloom's)
CO1	Understand the concepts of various mechatronics and its applications	K2
CO2	Describe the working principles of microprocessors used in mechatronics.	K3
CO3	Describe about various electrical drives and PLC	K3
CO4	Understand various sensors with its application in Mechatronics	K3
CO5	Apply the knowledge of mechatronics system design in real time requirements	K3

(K3-Apply)

6. Correlation of Cos with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	H											L	L	
CO2	H		L									L	L	
CO3	H		L		L							L	L	
CO4	H		L		L		L					L	L	
CO5	H		L				L				L	L	L	

H- High; M-Medium; L-Low

7. Course Content

UNIT I INTRODUCTION **L- 9**

Introduction to Mechatronics systems, Mechatronics system components - Measurement Systems, Control Systems - Open and Closed Loops Systems, Sequential Controllers with examples – Water level controller, Shaft speed control, Washing machine control, Automatic camera and Engine management systems

UNIT II MICROPROCESSOR IN MECHATRONICS **L-9**

Development of microprocessor systems, 8085 – Architecture, Pin diagram, Input and Output peripheral circuits, communications – Input, Output and Memory with timing diagrams, A/D and D/A converters. Introduction to embedded systems.

UNIT III ELECTRICAL DRIVES AND PLC **L-9**

Electrical drives - stepper motors and servo motors and Linear motors. Programmable logic controller - Programming units - Memory - Input - Output Modules - Mnemonics - Timers- Internal relays - Counters - Shift Registers - Programming the PLC using Ladder diagram - Simple example of PLC application.

UNIT IV SENSORS INTERFACING AND MONITORING **L-9**

Resistive, capacitive and inductive transducers, Position Sensors, Limit Switches, Optical encoders – Absolute and Incremental, Proximity Sensors, Solid State Sensors and Transducers, Temperature and Pressure sensors, Introduction to Lab View software-analysis of hydraulic and pneumatic systems.

UNIT V MECHATRONICS SYSTEM DESIGN AND APPLICATION **L-9**

Stages in designing Mechatronics Systems – Traditional and Mechatronics Design - Case Studies of Mechatronics Systems –Pick and place robot – Automatic car park systems –Wind screen wiper motion –Skip control of CD player – Time delay of blower- Position control of permanent magnet DC motor.

Total: 45 periods

8. Text Books

1. W.Bolton, Electronic Control Systems in Mechanical and Electrical Engineering, Prentice Hall, New Delhi,2003.
2. James Harter, Electromechanics, Principles and Concepts and Devices, Prentice Hall, New Delhi,2003.

9. References

1. David W. Pessen, Industrial Automation Circuit Design and Components, John Wiley, New York, 1990.
2. Rohner, P., Automation with Programmable Logic Controllers, Macmillan / McGraw Hill, New York, 1996.
3. Brian Morris, Automatic Manufacturing Systems Actuators, Controls and Sensors, McGraw Hill, New York, 1994.
4. Goankar, R. S., Microprocessor Architecture Programming and Applications, Wiley Eastern, New Delhi, 1997.