

Siruseri IT park, OMR, Chennai - 603103

LESSON PLAN							
Department Mechanical Engineering							
Name of the Subject	MECHATRONICS			Name of the handling Faculty	S.Sonadevi		
Subject Code	ME8791			Year / Sem	IV/VII		
Acad Year	2022-23			Batch	2019-2023		
Course Objective							
To impart knowledge about the elements and techniques involved in Mechatronics systems which are very much essential to understand the emerging field of automation.							
Course Outcome							
CO1	system						
CO2	Discuss the mechatronics system with the help of Microprocessor						
CO3	Discribe the Programmable interface and emerging field of automation						
CO4	Discuss the architecture of PLC.						
CO5	Identify and design mechatronics system with actuators and other electrical and Electronics Circuits						
Lesson Plan							
Sl. No.	Topic(s)	T / R*	Periods Required	Mode of Teaching (BB / PPT / NPTEL / MOOC / etc)	Blooms Level (L1-L6)	CO	PO
		Book					
UNIT I INTRODUCTION							
1	Introduction to Mechatronics	T1,R1	1	BB,PPT	L1	CO1	PO1-PO12
2	Systems	T1,R1	1	BB,PPT	L1	CO1	PO1-PO12
3	Concepts of Mechatronics approach	T1,R1	1	BB,PPT	L2	CO1	PO1-PO12
4	Need for Mechatronics	T1,R1	1	BB,PPT	L2	CO2	PO1-PO12
5	Emerging areas of Mechatronics	T1,R1	1	BB,PPT	L2	CO2	PO1-PO12
6	Classification of Sensors and Transducers,Static and dynamic Characteristics of Sensor	T1,R1	1	BB,PPT	L4	CO5	PO1-PO12
7	Potentiometers, LVDT , Capacitance Sensors, Strain gauges	T1,R1	1	BB,PPT	L4	CO5	PO1-PO12
8	Eddy current sensor,Hall effect sensor,	T1,R1	1	BB,PPT	L4	CO5	PO1-PO12
9	Temperature sensors,Light Sensors	T1,R1	1	BB,PPT	L4	CO5	PO1-PO12
Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any							
Evaluation method : Assignments on LVDT and Strain gaugeage							
UNIT II-MICROPROCESSOR AND MICROCONTROLLER							
10	Introduction	T2,R5	1	BB,PPT	L1	CO3	PO1-PO12
11	Architecture of 8085	T2,R5	1	BB,PPT	L1	CO3	PO1-PO12
12	Pin Configuration	T2,R5	1	BB,PPT	L2	CO3	PO1-PO12
13	Addressing Modes	T2,R5	1	BB,PPT	L2	CO3	PO1-PO12
14	Instruction set	T2,R5	1	BB,PPT	L4	CO3	PO1-PO12
15	Timing diagram of 8085	T2,R5	1	BB,PPT	L4	CO3	PO1-PO12
16	Concepts of 8051 microcontroller	T2,R5	1	BB,PPT	L3	CO5	PO1-PO12
17	Concepts of 8051 microcontroller -Continued	T2,R5	1	BB,PPT	L3	CO5	PO1-PO12
18	Block diagram	T2,R5	1	BB,PPT	L4	CO5	PO1-PO12
Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any							
Practical Hands on Experiment on 8085 and 8051							
Evaluation method Tutorials on Pin Configuration of 8085							
UNIT III-PROGRAMMABLE PERIPHERAL INTERFACE							

18	Introduction and Architecture of 8255	T2,R5	2	BB,PPT	L2	CO5	PO1-PO12
19	Keyboard interfacing	T2,R5	1	BB,PPT	L3	CO5	PO1-PO12
20	LED display and interfacing	T2,R5	1	BB,PPT	L3	CO5	PO1-PO12
21	ADC interface	T2,R5	1	BB,PPT	L3	CO5	PO1-PO12
22	DAC interface	T2,R5	1	BB,PPT	L3	CO5	PO1-PO12
23	Temperature Control	T2,R5	1	BB,PPT	L3	CO5	PO1-PO12
24	Stepper Motor Control	T2,R5	1	BB,PPT	L4	CO5	PO1-PO12
25	Traffic Control interface	T2,R5	1	BB,PPT	L4	CO5	PO1-PO12

Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any

Evaluation method

Tutorials on ADC and DAC Interface

UNIT IV PROGRAMMABLE LOGIC CONTROLLER

25	Introduction, Basic structure of PLC	T1,R1	2	BB,PPT	L2	CO4	PO1-PO12
26	Input and output processing	T1,R1	1	BB,PPT	L3	CO4	PO1-PO12
27	Programming and Mnemonics	T1,R1	1	BB,PPT	L3	CO4	PO1-PO12
28	Timers, counters	T1,R1	1	BB,PPT	L3	CO4	PO1-PO12
29	Internal relays	T1,R1	1	BB,PPT	L3	CO4	PO1-PO12
30	Data handling	T1,R1	1	BB,PPT	L3	CO4	PO1-PO12
31	Selection of PLC.	T1,R1	2	BB,PPT	L3	CO4	PO1-PO12

Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any

Quiz

and Tutorial on Mnemonics

Evaluation method

Assignments on Leadership and Barriers in communication

UNIT V-ACTUATORS AND MECHATRONICS SYSTEM DESIGN

33	Stepper motors Construction, working Principle, Advantages and Disadvantages	T1,R1	1	BB,PPT	L4	CO5	PO1-PO12
34	Servo motors Construction, working Principle, Advantages and Disadvantages.	T1,R1	2	BB,PPT	L4	CO5	PO1-PO12
35	Design process-stages of design process	T1,R1	1	BB,PPT	L4	CO5	PO1-PO12
36	Mechatronics design concepts	T1,R1	1	BB,PPT	L4	CO5	PO1-PO12
37	Case studies of Mechatronics systems.	T1,R1	1	BB,PPT	L4	CO5	PO1-PO12
38	Pick and place Robot	T1,R1	1	BB,PPT	L4	CO5	PO1-PO12
39	Engine Management system	T1,R1	1	BB,PPT	L4	CO5	PO1-PO12
40	Automatic car park barrier	T1,R1	1	BB,PPT	L4	CO5	PO1-PO12

Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any

1. Mini projects on Mechatronics Case studies

2. Quiz on Current new Mechatronics systems

Evaluation method: MCQ/ Quizzes on Traditional and Mechatronics Design

Content Beyond the Syllabus Planned

1	Arduino Programming and Interfaces
2	Motor Interfaces in Robotics

Text Books

1	Bolton, "Mechatronics", Printice Hall, 2008
2	Ramesh S Gaonkar, "Microprocessor Architecture, Programming, and Applications with the 8085" 5th Edition, Prentice Hall, 2008.

Reference Books

1	Michael B.Histand and Davis G.Alciatore, "Introduction to Mechatronics and Measurement systems", McGraw Hill International edition, 2007
2	Bradley D.A, Dawson D, Buru N.C and Loader A.J, "Mechatronics", Chapman and Hall, 1993.
3	Clarence W, de Silva, "Mechatronics" CRC Press, First Indian Re-print, 2013

4	Devadas Shetty and Richard A. Kolk, “Mechatronics Systems Design”, PWS publishing company, 2007.													
5	Krishna Kant, “Microprocessors & Microcontrollers”, Prentice Hall of India, 2007.													
6	Clarence W, de Silva, "Mechatronics" CRC Press, First Indian Re-print, 2013													
Website / URL References														
1	https://nptel.ac.in/courses/112/103/112103174/													
Blooms Level														
Level 1 (L1) : Remembering					Lower Order Thinking	Fixed Hour Exams	Level 4 (L4) : Analysing						Higher Order Thinking	Projects / Mini Projects
Level 2 (L2) : Understanding							Level 5 (L5) : Evaluating							
Level 3 (L3) : Applying							Level 6 (L6) : Creating							
Mapping syllabus with Bloom’s Taxonomy LOT and HOT														
Unit No	Unit Name					L1	L2	L3	L4	L5	L6	LOT	HOT	Total
Unit 1	INTRODUCTION					2	3	0	4	0	0	5	4	9
Unit 2	MICROPROCESSOR AND MICROCONTROLLER					2	2	2	3	0	0	6	3	9
Unit 3	PROGRAMMABLE PERIPHERAL INTERFACE					0	2	2	5	0	0	4	5	9
Unit 4	PROGRAMMABLE LOGIC CONTROLLER					0	2	0	7	0	0	2	7	9
Unit 5	ACTUATORS AND MECHATRONICS SYSTEM DESIGN					0	0	0	9	0	0	0	9	9
Total						4	9	4	28	0	0	17	28	45
Total Percentage						8.89	20.00	8.89	62.22	0.00	0.00	37.78	62.22	100.00
CO PO Mapping														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	2	2	1	2	2	1	2	2	2	2	1	2
CO2	3	-	1	2	2	2	2	1	2	2	2	2	2	2
CO3	3	-	2	2	2	1	2	-	1	2	2	2	2	2
CO4	3	1	2	2	2	1	2	-	1	2	2	2	2	2
CO5	3	1	2	2	2	2	2	-	2	2	3	2	2	2
Avg	3	0.4	1.8	2	1.8	1.6	2	0.4	1.6	2	2.2	2	1.8	2
Justification for CO-PO mapping														
CO1	Students will be able to demonstrate the fundamentals of mechatronics system and its various aspects.													
CO2	Architecture of Microcontroller and characteristics of mechatronic system and sensors can be done.													
CO3	Interpretation of the characteristics of mechatronic system and sensors can be done.													
CO4	Students will be able to identify and interpret the various needs in mechatronics and think of PLC for various applications.													
CO5	Design solutions for robotics and mechatronics using the knowledge gained through studying about servo, stepper motors and system modelling													
3	High level				2	Moderate level				1	Low level			
Name & Sign of Faculty Incharge : Mrs.S.Sonadevi														
Name & Sign of Subject Expert : Dr.Prasath														
Head of the Department : Mr.M.Sivakumar														