DAY WISE LESSON PLAN

Faculty: Mr. Sudhakar Merugumalla

Designation: Associate Professor

Class: IV/I-ME (B)

Subject: MECHATRONICS

LEARNING OBJECTIVES.

1. Introducing the integrative nature of Mechatronics.
2. Describe the different components and devices of Mechatronics systems.
3. Differentiate various types of sensors and transducers.
4. Design various Hydraulic and Pneumatic circuits.
5. Relate different logic gates and their role in Programmable logic controllers.
6. Design of various electro-mechanical systems.

LEARNING OUTCOMES.

1	Factual	Understand the basic principles and characteristics of components and devices of Mechatronic systems
2	Conceptual	Describe the Working of Mechatronic devices and their Applications
3	Procedural	Use of logic gates in hydraulic and pneumatic circuits
4	Applied	Designing of hydraulic and pneumatic systems for real time applications

Day	Topic	Learning Objective	Before class	During class	After class
2.9.21	Elements & levels of mechatronics system	To discuss Various Elements & levels of mechatronics system	Student should be aware of Mechatronic system, Elements present in Mechatronics system.	Discussion of Elements & levels of mechatronics system for 10mins, Explanation for 30mins, Time for discussion 10mins	One question is given to student from question bank to study at home
3.9.21	Mechatronics design process, system, measurement systems	To Learn the steps involved in Mechatronics design process	Student should be aware of basic measurement systems	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
4.9.21	Control systems, microprocessor-based controllers, advantages and disadvantages of mechatronics systems	To discuss Various types of control systems, advantages and disadvantages of Mechatronics system	Student should have basic knowledge on microprocessor based controllers	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
6.9.21	**Sensors and transducers:** types, displacement.	To know the basic principle of working of sensors and transducers	Student should be aware of difference between sensor and transducer and their applications.	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
7.9.21	Position, proximity	To know the basic principle of working of Position, proximity sensors with examples.	Student should be aware of definitions of position and proximity.	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
8.9.21	Velocity, motion	To know the basic principle of working of Velocity, motion sensors with examples.	Student should have knowledge on Velocity and Motion.	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home

9.9.21	Force, acceleration, torque	To know the basic principle of working of Force, acceleration, torque, sensors with examples.	Student should have basic knowledge on of Force, Acceleration and Torque.	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
13.9.21	Fluid pressure, liquid flow	To know the basic principle of working of Fluid Pressure, liquid flow sensors with examples.	Student should have awareness on fluid pressure and fluid flow	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
14.9.21	Liquid level, temperature	To know the basic principle of working of Liquid level, temperature sensors with examples.	Student should have awareness on level Measurement and Temperature Measuring Devices.	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
15.9.21	Light sensors.	To know the basic principle of working of Light sensors. Sensors with examples.	Student should have basic knowledge on of working of sensors.	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	Student has to complete the quiz which is provided in Google class room
16.9.21	After completion of unit, sufficient time is given for the clarification of doubts and assignment is given from unit-1. Students have to submit the assignment through LMS.				

17.9.21	**Solid state electronic devices** - PN junction diode	To Learn the characteristics of Diodes and its applications	Student should have basic knowledge on working of diode	Discussion of Elements & levels of mechatronics system for 10mins, Explanation for 30mins, Time for discussion 10mins	One question is given to student from question bank to study at home
18.9.21	BJT, FET	To Learn the characteristics of BJT, FET and its applications.	Student should have basic knowledge on working of Transducer	Discussion of Elements & levels of mechatronics system for 10mins, Explanation for	One question is given to student

				30mins, Time for discussion 10mins	from question bank to study at home.
20.9.21	DIAC, TRIAC	To Learn the characteristics of DIAC, TRIAC and its applications.	Student should have knowledge of terminals and directional devices.	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
22.9.21	LEDs	To Learn the characteristics of LEDs and its applications	Student should have basic knowledge on working of diode	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	MCQ'S are given to students on LED
23.9.21	Analog signal conditioning	To Learn how signal is conditioned.	Student should have knowledge of amplification of signals	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
24.9.21	Operational amplifiers	To Learn working of Amplifiers and its applications	Student should have knowledge on working of amplifier.	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home
25.9.21	Operational amplifiers	To Learn working of Amplifiers and its applications	Student should have knowledge of amplification of signals	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	MCQ.S are given to students on operational amplifiers
27.9.21	Noise reduction, filtering	To Learn how noise is reduced and filtered from the signal.	Students should have awareness on methods for filtering and noise reduction.	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	Student has to complete the quiz which is provided in Google class room
29.9.21	After completion of unit, sufficient time is given for the clarification of doubts and assignment is given from unit-2. Students have to submit the assignment through LMS.				

30.9.21	**Hydraulic and pneumatic actuating systems** - Fluid systems.	To discuss the elements and basic principles of fluid systems.	Student should know the elements in system and its importance	Discussion of Elements & levels of mechatronics system for 10mins, Explanation for 30mins, Time for discussion 10mins	One question is given to student from question bank to study at home
01.10.21	Components, control valves.	To discuss the elements and basic working principles of control valves.	Students should know the symbols of components and valves	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
04.10.21	Electro-pneumatic.	To discuss the elements and basic principles of Electro-Pneumatic systems.	Students should know the symbols of components and valves along with their working	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home
06.10.21	Hydro-pneumatic.	To discuss the elements and basic principles of Hydro-Pneumatic systems.	Students should know the symbols of components and valves along with their working	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
07.10.21	Electro-hydraulic servo systems.	To discuss the elements and basic principles of Electro-hydraulic systems.	Students should know the symbols of components and valves along with their working	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
08.10.21	Mechanical actuating systems.	To discuss the elements and basic principles of Mechanical actuating systems.	Students should know different types of valves used along with their working	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.

09.10.21	Mechanical actuating systems.	To discuss the elements and basic principles of Mechanical actuating systems.	Students should know different types of valves used along with their working	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
11.10.21	Electrical actuating systems.	To discuss the elements and basic principles of Mechanical actuating systems.	Students should know different types of valves used along with their working	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
14.10.21	Electrical actuating systems.	To discuss the elements and basic principles of Mechanical actuating systems.	Students should know different types of valves used along with their working	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	Student has to complete the quiz which is provided in Google class room
25.10.21	After completion of unit, sufficient time is given for the clarification of doubts and assignment is given from unit-3. Students have to submit the assignment softcopy through LMS.				
27.10.21	**Digital electronics and systems**, digital logic control	To Learn the basics of Logic control like gates.	Student should have knowledge on logical operation of gates.	Discussion of Elements & levels of mechatronics system for 10mins, Explanation for 30mins, Time for discussion 10mins	One question is given to student from question bank to study at home
28.10.21	Micro processors	To Learn the Logical operation of Microprocessor and its Applications.	Student should know the architecture and block diagram of microprocessor	Discussion of Elements & levels of mechatronics system for 10mins, Explanation for 30mins, Time for discussion 10mins	One question is given to student from question bank to study at home.
29.10.21	Micro processors	To Learn the Logical operation of Microprocessor and its Applications.	Student should know the architecture and block diagram of microprocessor	Discussion of Elements & levels of mechatronics system for 10mins, Explanation for	One question is given to student from question bank to study at home.

				30mins, Time for discussion 10mins	
30.10.21	Micro controllers,	To Learn the Logical operation of Microcontroller and its Applications	Student should know the architecture and difference between Microprocessor and Micro-controller	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
1.11.21	Micro controllers,	To Learn the Logical operation of Microcontroller and its Applications	Student should know the architecture and difference between Microprocessor and Micro-controller	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
3.11.21	Programming	To discuss how to write program using instructions In PLC	Student should have knowledge on selection of valves and components	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home
5.11.21	Process controllers	To Learn the working process of various types of controllers	Student should have basic knowledge of controllers	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
6.11.21	Programmable logic controllers	To Discuss the working of PLC's and its Applications	Student should have basic knowledge of integration and differentiation.	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
8.11.21	Programmable logic controllers	To Discuss the working of PLC's and its Applications	Student should have basic knowledge of integration and differentiation.	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.

10.11.21	PLCs versus computers	To know the difference between PLC and Computer in real time applications.	Students should be aware of working of PLC's and Computer	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
11.11.21	Application of PLCs for control.	To know the difference between PLC and Computer in real time applications	Students should be aware of working of PLC's and Computer	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
12.11.21	Programming	To discuss how to write program using instructions In PLC	Student should have knowledge on selection of valves and components	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	Student has to complete the quiz which is provided in Google class room
13.11.21	After completion of unit, sufficient time is given for the clarification of doubts and assignment is given from unit-4. Students have to submit the assignment softcopy through LMS.				
15.11.21	**System interfacing and data acquisition** – Data Acquisition Systems	To discuss how data is stored and retrieved in DAS	Student should know the elements used in Data acquisition system	Discussion of Elements & levels of mechatronics system for 10mins, Explanation for 30mins, Time for discussion 10mins	One question is given to student from question bank to study at home
17.11.21	Analog to Digital conversion	To Learn how Analog signal is converted into Digital signal	Student should have knowledge on logical operation of gates.	Discussion of Elements & levels of mechatronics system for 10mins, Explanation for 30mins, Time for discussion 10mins	One question is given to student from question bank to study at home.
18.11.21	Digital to Analog conversion	To Learn how Digital signal is converted into Analog signal	Student should have knowledge on logical operation of gates.	Revision of previous class concepts for 10mins	One question is given to student from question bank to study at home.

				Explanation about today's concepts for 30 mins, discussion and doubts 10mins	
19.11.21	Data flow in DSPs	To Learn the flow of Data into Digital Signal Processor	Student should know the importance of block diagram	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
20.11.21	Data flow in DSPs	To Learn the flow of Data into Digital Signal Processor	Student should know the importance of block diagram	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
22.11.21	Block diagrams	To Learn the Sequence of Elements in Block diagram and its importance	Student should know the function of each element in block diagram	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home
24.11.21	Typical layouts	To Learn the arrangement of Elements in Layouts	Student should know the arrangement of each element in layout.	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
25.11.21	Interfacing motor drives	To Learn the Interfacing of motor drives	Student should have awareness on Motor drives	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
26.11.21	Interfacing motor drives	To Learn the Interfacing of motor drives	Student should have awareness on Motor drives	Discussion of Elements & levels of mechatronics system for 10mins, Explanation for 30mins, Time for discussion 10mins	Student has to complete the quiz which is provided in Google class room

27.11.21	After completion of unit, sufficient time is given for the clarification of doubts and assignment is given from unit-5. Students have to submit the assignment softcopy through LMS.				
29.11.21	Dynamic models and analogies	To Learn how to sketch block diagrams representing control system.	Student should have basic Mathematical knowledge like Laplace Transforms.	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
1.12.21	System response	To obtain time response from the Transfer function for a given input signal	Student should know what is Transfer Function	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
2.12.21	Process Controllers	To Learn the Principles of Process controllers.	Student should have knowledge types of controllers	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
3.12.21	Process Controllers	To Learn the Principles of Process controllers.	Student should have basic knowledge of integration and differentiation.	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
4.12.21	Digital Controllers,	To Learn the Principles of Digital controllers.	Student should be able to know the elements present in digital controller	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
6.12.21	Digital Controllers,	To Learn the Principles of Digital controllers.	Student should be able to know the elements present in digital controller	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.

08.12.21	Programmable Logic Controllers	To Discuss the working of PLC's and its Applications	Student should have basic knowledge of integration and differentiation.	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
09.12.21	Programmable Logic Controllers	To Discuss the working of PLC's and its Applications	Student should have basic knowledge of integration and differentiation.	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	One question is given to student from question bank to study at home.
10.12.21	Design of mechatronics systems & future trends	To Learn the steps involved in Mechatronics design process	Student should be aware of Mechatronic system, Elements present in Mechatronics system.	Revision of previous class concepts for 10mins Explanation about today's concepts for 30 mins, discussion and doubts 10mins	Student has to complete the quiz which is provided in Google class room
11.12.21	After completion of unit, sufficient time is given for the clarification of doubts and assignment is given from unit-6. Students have to submit the assignment softcopy through LMS.				

Teacher/Instructor: Mr.Sudhakar Merugumalla

Associate Professor, Department of Mechanical Engineering

Lesson plan for a Day

Semester/Year: I/2020-21

MICRO LESSON PLAN

(ACCORDING TO BLOOM'S DIGITAL TAXONOMY)

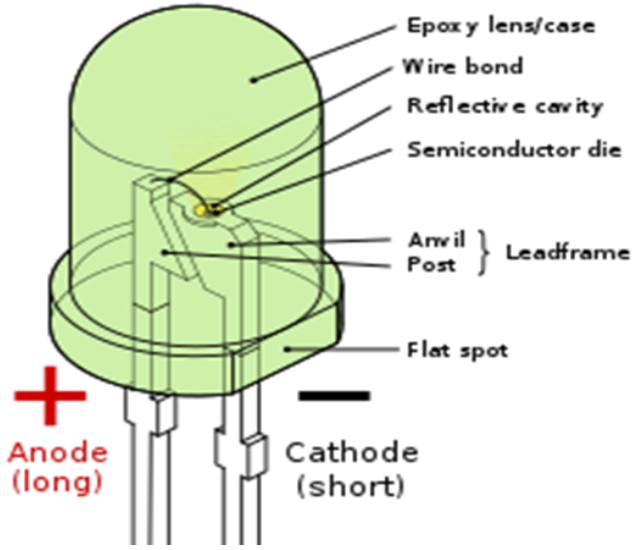
PROGRAM	B.TECH
YEAR/SEMESTER	IV/I
SUBJECT TITLE	MECHATRONICS
SUBJECT CODE	R1641031
CLASS HOURS	6 PER WEEK
TOTAL HOURS	64
CREDITS	3
MAX.MARKS	100
UNIT& TITLE	UNIT-2&SOLID STATE ELECTRONIC DEVICES
TEACHING & LEARNING TOOLS	GOOGLE CLASS ROOM,POWER POINT PRESENTATION,BLACK BOARD,VIDEO LECTURES

LESSON-2 SOLID STATE ELECTRONIC DEVICES LESSON OBJECTIVES		
1	Factual	Students shall be able to understand the basic principles and characteristics of components and devices of Electronic devices
2	Conceptual	Students shall be able to describe the Working of Electronic devices and their Applications

MICRO LESSON PLAN: DATE- 22.9.2021

1. **PRE CLASS ACTIVITY:** Students should have basic knowledge on working of diodes.
   VIDEO LINK: https://www.youtube.com/watch?v=TFgWDcBp-uY

2. **DURING CLASS ACTIVITY: LIGHT EMITTING DIODE(LED)**



- **Elements in LED**
- **Working Principle**
- **Applications**
- **Symbol**

3. POST CLASS ACTIVITY: CLARIFYING THE DOUBTS & STUDENTS ARE GIVEN MCQ'S ON LED.

Multiple Choice Questions: Sample Questions

1. The efficiency of LED is directly proportional to

a) Applied voltage b) Current injected c) Temperature d) Level of Doping

2. What is the use of an LED Driver?

a) It converts AC to DC b) It converts DC to AC c) It converts AC to AC

d) It converts DC to DC