GOVERNMENT POLYTECHNIC JAJPUR
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DEPARTMENT OF MCHANICAL ENGINEERING

LESSON PLAN

Discipline: Mechanical	Semester: 4th	Name of the Teaching faculty: SUSHANTA KUMAR MOHANTA
Subject: Th5.C MECHATRONICS	No of Days/Week class alloted: 3	Semester from Date: 22/12/25　　　　To Date:　18/04/26　　No of weeks: 15

Week	Class Day	Topics
1st	1st	**Introduction to Mechatronics**
	2nd	Importance of Mechatronics; Systems: Mea- surement systems;
	3rd	Control systems and their types; Closed-loop control System;
2nd	1st	Automatic water level controller
	2nd	Automatic water level controller
	3rd	Measurement System terminology:
3rd	1st	Displacement, Position & Proximity Sensors;
	2nd	Velocity and Mo- tion Sensors;
	3rd	Force Sensors; Fluid Pressure Sensors Flow Sensors; Liquid Level Sensors
4th	1st	Tempera- ture Sensors; Light Sensors; Selection of Sensors.
	2nd	**Mechanical Actuation Systems T**ypes of motion; Freedom and constraints; Loading
	3rd	GearTrains; Pawl & Ratchet; Belt & Chain drives

5th	1st	Bearings: Selection, Ball & Roller bearings	
	2nd	Mechanical aspects of motor selection	
	3rd	Electrical Actuation Systems: Switches & Relays; Solenoid	
6th	1st	D.C Motors; A.C.Motors; Stepper Mo- tors:	
	2nd	Specifications and Control of stepper motors;	
	3rd	D.C Servomotor and A.C Servomotor.	
7th	1st	Pneumatic & Hydraulic Systems: Power supplies	
	2nd	DCV; PCV; Cylinders; Rotary actuators.	
	3rd	DCV; PCV; Cylinders; Rotary actuators.	
8th	1st	**Mathematical Model**: Introduction to Mathematical model Mechanical System building blocks;	
	2nd	Electrical System building blocks;Fluid System building blocks; Thermal System building block	
	3rd	**INTERNAL ASSESMENT**	
9th	1st	Rotational, Translational Systems ElectroMechanical System; Hydro-Mechanical System .System Model: Engineering.	
	2nd	Input/Output Systems: Interfacing; Input/output ports; Interface requirements:	
	3rd	Buffers, Hand- shaking, Polling and interrupts, Serial interfacing;	
10th	1st	Introduction to PIA; Serial communications inter- face	
	2nd	Example of interfacing of a seven-segment display with a decoder	

10th	3rd	**Programmable Logic Controller (PLC)** Definition; Basic block diagram
11th	1st	structure of PLC
	2nd	Input/Output processing
	3rd	PLC Programming: Ladder diagram
12th	1st	its logic functions, Latching and Sequencing;
	2nd	PLC mnemonics; Timers
	3rd	Internal relays and Counters
13th	1st	Shift registers; Master and Jump Control
	2nd	Data handling; Analog input/output
	3rd	Selection of PLC
14th	1st	**Design Examples & Advanced Applications in Mechatronics** Design process stages;Traditional Vs Mechatronics designs; Possible design solutions
	2nd	Design process stages;Traditional Vs Mechatronics designs; Possible design solutions
	3rd	A pick-and-place robot, Car park barrier, Car engine management system, Automatic
15th	1st	.Sensors for Condition Monitoring Systems of Production Systems: Examples of Monitoring methods:
	2nd	vibration monitoring, Temperature monitoring, Wear behavior monitoring; Mechatronics control in automated manufacturing: Monitoring of Manufacturing processes
	3rd	On-line quality moni- toring, Model based systems, Hardware in-the-loop simulation, Supervisory control in manufacturing inspection, Integration of heterogeneous systems

REFERENCES:

1. Mechatronics – W. Bolton, Pearson Education India.
2. A Text Book on Mechatronics – R.K.Rajput, S.Chand& Co, New Delhi.
3. Mechatronics – M.D.Singh & Joshi, Prentice Hall of India.
4. Mechatronics – HMT, Tata McGraw Hill, New Delhi.
5. Mechatronics System – Devadas Shetty, PWS Publishing
6. Exploring Programmable Logic Controllers with applications – Pradeep Kumar Srivastava, BPB Publications.

22/12/25

Signature of Faculty