

The Maharaja Sayajirao University of Baroda Polytechnic Diploma in Electronics & Communication Engg. (HPP)			ACADEMIC YEAR 2023-24	
Year	III	CORE / ELECTIVE / FOUNDATION INSTRUMENTATION AND CONTROL ENGINEERING (ELE3522)	Lecture/Lab Hrs per week	4/2
Semester	I		Max marks	100
Pre-Requisite: Basic Mathematics, Basic Electronics				
CO1	Explain measurement concepts, instrument elements, performance characteristics, statistical analysis, and instrumentation amplifiers.			
CO2	Demonstrate active and passive transducers, ADC/DAC operation, null methods, and transducer roles in instrumentation systems.			
CO3	Describe methods for measuring non-electrical quantities such as pressure, temperature, distance, flow, and speed.			
CO4	Analyze control system types, transfer functions, and mathematical models of automatic control systems.			
CO5	Implement process control strategies including open/closed loop control, P/PI/PID controllers, PLC logic, DCS, and SCADA operations.			
BT	1. Remember 2. Understand 3. Application 4. Analysis 5. Evaluation 6. Creation			
COURSE CONTENT/SYLLABUS				
Unit	Unit Name	Hrs	Weightage	CO
1	BASIC CONCEPTS AND QUALITIES OF MEASUREMENTS Measurements and its aim, The functional elements of an Instruments, Performance characteristics, Statistical analysis, Instrumentation Amplifier.	6	10	CO1
2	ACTIVE AND PASSIVE TRANSDUCERS Analog and Digital mode of operation, Null deflection methods, ADC, DAC, Transducers as input element instrumentation system.	10	20	CO2
3	MEASUREMENT OF NON-ELECTRICAL QUANTITIES Pressure, temperature, distance, weight, flow, speed, etc.	12	20	CO3
4	CONTROL SYSTEM AND MATHEMATICAL MODELING Types of control systems, Concepts of Transfer Function, Automatic Control system.	6	10	CO4
5	PROCESSES CONTROL SYSTEM Open loop and Closed loop control system, feedback and feed forward control configurations. Electronic controllers: ON-OFF Controller (Schmitt Trigger), Proportional, Integral and Derivative Controller, PI Controller, PID controller.	10	20	CO5
6	PLC, DCS & SCADA Introduction of PLC, Operation of PLC, Basic Input/ Output Devices used for the Process Control, Concept of Ladder Logic using NO and NC contacts, Concept of Latching, Application development based on Timers and Counters, Application of PLC, Concept of DCS System, SCADA.	12	20	CO5
		56	100	
REFERENCE BOOKS:				
1.	Industrial Instrumentation and control - S.K. Singh; Tata McGraw Hill			
2.	Process Control Principles and Applications – Surekha Bhanot; OXFORD University			
3.	Electronics Instrumentation – H.S. Kalsi ; Tata McGraw Hill			
4.	Process Control Instrumentation Technology by C. D. Johnson; Prentice Hall India.			

