22EEHO104	POWER SYSTEM AUTOMATION				SEMESTER			
PREREQUISITES		CATEGORY	PEC		Credit		C	
Power Generation, Transmission and Distribution System; Power System Analysis and Stability		Hours/Week	L		T	P	TH	
			3		0	0	3	

Course Objectives:

1. To acquire fundamental knowledge on power system instrumentation.
2. To familiarise on automations in electric power distribution systems.
3. To get conceptual aspects in modern tools for power system automation.

UNIT I	MEASUREMENTS AND SIGNAL TRANSMISSION TECHNIQUES	9	0	0	9

Object and philosophy of power system instrumentation to measure large currents, high voltages, Torque and Speed - Standard specifications - Data acquisition systems for Power System applications - Data Transmission and Telemetry - PLC equipment, RTU, IED - computer control of power system - Man Machine Interface.

UNIT II	COMMUNICATION TECHNOLOGIES	9	0	0	9

Communication requirements; Two way capability – outages and faults; Public switched telephone network, Power line carrier communication – ripple control, cyclocontrol, carrier frequency (PLC, DLC, BPL), Radio communication (UHF point to point, UHF multi address system radio, VHF, PSN, Cellular radio), Fibre optics, Satellite communication. Standards: IEE802, IEC61850

UNIT III	DISTRIBUTION SYSTEM INSTRUMENTATION	9	0	0	9

Definitions – automation switching control – management information systems (MIS) – remote terminal units – communication method for data transfer – consumer information service (CIS) – graphical information systems (GIS) - automatic meter reading (AMR) – Remote control load management.

UNIT IV	DISTRIBUTION AUTOMATION	9	0	0	9

Introduction to distribution automation: Customer automation- Feeder automation – Substation automation, Subsystems in distribution control centre – Distribution management systems-Outage management systems, Distribution management system framework-Advanced real time DMS applications- Advanced analytical DMS applications – DMS coordination with other systems.

UNIT V	CONCEPTS FOR SMART SYSTEMS	9	0	0	9

Smart system solutions – Asset optimization, Demand optimization, distribution optimization, smart meter and communications, transmission optimization; Demand side management and demand response – DSM Planning-DSM techniques; Advanced metering infrastructure integration with distribution automation, distribution management system, and outage management system; Smart homes with home energy management systems.

Total (45 L + 0 T)= 45 Periods

Text Books:

1. Pabla. A.S, "Electric Power Distribution", Tata McGraw Hill, New Delhi, 2004.
2. Mini S Thomas, and John D McDonald, "Power System SCADA and Smart Grids", Taylor and Francis, 2015.
3. Mahalanabis, Kothari and Ahson, "Computer Aided Power System Analysis and Control", Tata McGraw Hill Publishers, 1991.

Reference Books:

1. Momoh A. Momoh, and James A. Momoh., "Electric Power Distribution, Automation, Protection, and Control", CRC Press, 2007.
2. Gonen., "Electric Power Distribution System Engineering", BSP Books, Pvt. Ltd, 2007.

Course Outcomes: Upon completion of this course, the students will be able to:			**Bloom's Taxonomy Mapped**
CO1	:	Understand the conceptual aspects in power system measurements and signal transmission techniques.	L2: Understanding
CO2	:	Demonstrate various communication technologies for data transmission.	L3: Applying
CO3	:	Acquire proficiency to distribution system instrumentation.	L3: Applying
CO4	:	Demonstrate the automation in power distribution system.	L3: Applying
CO5	:	Conceptualize the smart tools for automation.	L3: Applying

COURSE ARTICULATION MATRIX

CO\ POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	1	3	3	1	1		1				1	2	1	3	1
CO 2	1	2	3	2	2		2				1	2	1	3	1
CO 3	1	2	3	2	2		2				1	2	1	2	1
CO 4	1	2	2	1	1		1				1	2	1	2	1
CO 5	1	2	3	2	2		2				1	2	1	1	1
Avg	1	2.2	2.8	1.6	1.6	0	1.6	0	0	0	1	2	1	2.2	1

3/ 2/ 1 – indicates strength of correlation (3- High, 2-Medium, 1-Low)