GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering
Subject Code: 3720734
Semester – II
Subject Name: SCADA SYSTEM AND APPLICATIONS

Type of course:

Prerequisite:

Rationale:

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs
1	• Introduction to SCADA • Data acquisition systems • Evolution of SCADA • Communication technologies.	8
2	• Monitoring and supervisory functions • SCADA applications in Utility Automation • Industries SCADA	6
3	• Industries SCADA System Components • Schemes- Remote Terminal Unit (RTU) • Intelligent Electronic Devices(IED) • Programmable Logic Controller (PLC) • Communication Network, SCADA Server, SCADA/HMI Systems	8
4	• SCADA Architecture • Various SCADA architectures, advantages and disadvantages of each system • Single unified standard architecture -IEC 61850.	8
5	• SCADA Communication • various industrial communication technologies • wired and wireless methods and fibre optics • Open standard communication protocols	8
6	• SCADA Applications: Utility applications • Transmission and Distribution sector operations, monitoring, analysis and improvement • Industries - oil, gas and water	6

	• Case studies, Implementation, Simulation Exercises	

Reference Books:

1. Stuart A. Boyer: "SCADA-Supervisory Control and Data Acquisition", Instrument Society of America Publications,USA,2004
2. Gordon Clarke, Deon Reynders: "Practical Modern SCADA Protocols: DNP3, 60870.5 and Related Systems", Newnes Publications, Oxford, UK,2004
3. William T. Shaw, "Cybersecurity for SCADA systems", PennWell Books, 2006
4. David Bailey, Edwin Wright, "Practical SCADA for industry", Newnes, 2003
5. Michael Wiebe, "A guide to utility automation: AMR, SCADA, and IT systems for electric power", PennWell 1999

Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	Describe the basic tasks of Supervisory Control Systems (SCADA) as well as their typical applications	20
CO-2	Understand SCADA architecture, advantages and disadvantages of each system	25
CO-3	Learn about SCADA system components for the development of a typical application.	30
CO-4	Learn and understand about SCADA applications in transmission and distribution sector, industries etc	25

List of Experiments:

1. To study basic structure of the SCADA system.
2. To study monitoring and supervisory functions of SCADA systems.
3. To study industries SCADA system component.
4. To study various SCADA architectures.
5. To study various SCADA communication technologies.
6. To study SCADA applications in transmission and distribution system.
7. Prepare two different case studies of SCADA system.
8. Prepare simulation for any SCADA system.

Major Equipment:

- ✓ Simulation software like MATLAB along with necessary toolbox, PSIM or Scilab

List of Open Source Software/learning website:

1. Courses available through NPTEL.
   - website : nptel.ac.in