

IAGE-311: SCADA System and Applications

(2 Credits: 50 Marks)

Course Outcomes:

On completion of the course, students should be able to –

1	State the basic features of SCADA, HMI
2	Develop architecture of SCADA and explain the importance of SCADA in critical infrastructure.
3	Analyze the theory and applications of SCADA
4	Develop projects with SCADA and HMI
5	Implementation of SCADA application.

Course Contents:

MODULE – I : SCADA System

(08 Hrs)

Introduction, definitions and history of Supervisory Control and Data Acquisition, typical SCADA system Architecture, Communication requirements, Desirable Properties of SCADA system, features, advantages, disadvantages and applications of SCADA. SCADA Architectures (First generation - Monolithic, Second generation - Distributed, Third generation – Networked Architecture),

SCADA systems in operation and control of interconnected power system, Power System Automation (Automatic substation control and power distribution), Petroleum Refining Process, Water Purification System, Chemical Plant

MODULE – II : SCADA Protocols

(07 Hrs)

Open systems interconnection (OSI) Model, TCP/IP protocol, DNP3 protocol, IEC61850 layered architecture, Control and Information Protocol (CIP), Device Net, Control Net, Ether Net/IP, Flexible Function Block process (FFB), Process Field bus (Profibus). Interfacing of SCADA with PLC

Module – IV: Project Development and HMI

(08 Hrs)

Project Development: Creating Project , Screens project Configuration, Device Settings, Communication Configuration and Defining Tags

Graphic Control: Planning Graphic Design, Screen Preparation and Navigation Control, Graphic Elements and Libraries and Linking Objects with Tags

Other HMI Features: Tag Logging, On Line and Historical Trending, Alarm System – Designing and Handling and Recipes- Designing and Handling, User Administration and Transferring Project to HMI

MODULE – III : Various Case Studies on SCADA Applications

(07 Hrs)

Case Study on Controlling Electrical Power System Network, Manufacturing Industries and Waste Water Treatment and Distribution Plants

Module V: Tutorials, assignments and presentation based on Module I to IV

References:

1. Ronald L. Krutz, “Securing SCADA System”, Wiley Publications.
2. Stuart A Boyer, “SCADA supervisory control and data acquisition”, ISA, 4th Revised edition 4. Gordan Clark, Deem Reynders, “Practical Modern SCADA Protocols”, ELSEVIER
3. Scada: Supervisory Control And Data Acquisition 4th Edition by Author Stuart A. Boyer ISBN-13: 978-1936007097 ISBN-10: 1936007096
4. A Guide to Utility Automation: Amr, Scada, and: it Systems for Electric PowerPaperback – Import, 15 Jan 1999 by Author Michael Wiebe
5. Power System SCADA and Smart Grids 1st Edition by Mini S. Thomas (Author), John Douglas McDonald (Author) ISBN-13: 978-1482226744 ISBN-10: 148222674X
6. Behrouz A. Forouzan 2005, Data Communications Networking, McGraw-Hill Education [ISBN: 9780071254427]
7. David Bailey 2003, PRACTICAL SCADA FOR INDUSTRY, NEWNES [ISBN: 13: 978-0-7506-5805-8]