Subject Code: 09CH1505

Subject Name: DCS &SCADA

Semester: 5th

Objective: To learn various current automation technology and use of this technology for getting optimal output.

Credits Earned:1 Credits

Course Outcomes: After completion of this course, student will be able to:

1. Analyze current technology, automation machinery in various industries
2. Understand various individual and continuous hybrid process automation in industries
3. Select proper hardware and software for control the process

Pre-requisite of course: Basic instrumentation symbols, process control modes and techniques, sensor/ transducer, converters, final control element

Teaching and ExaminationScheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	Mid Sem (M)	Internal (I)	Practical Exam (V)	Term work (TW)	
0	0	2	1	00	30	20	25	25	**100**

Contents:

Unit	Topics	Contact Hours
1	**Introduction to DCS - History & Development** Early Computer systems: Direct digital control, Centralized computer system, Distributed control Hierarchical Control: Hierarchical computer system for a large manufacturing process, overall task, detail task listing, lower level computer task, higher level computer task.	04
2	**DCS - Basic Packages** Analog control, direct Digital control, Distributed process control, DCS configurations, Local Control Units (Relay rack mounted equipment) :Dedicated card controllers, Unit operations controllers, Multiplexers- Design, system configuration, Remote stations, Super-commutation and sub-commutation - Power supplies, - Input/ Output, - Controller file	06
3	**Software configuration** Operating system configuration, - Controller function configuration, - Algorithm libraries, Process control programming: - Types of program, Features of process control programs, The executive program, Programming language for process control	08
4	**SCADA Overview** Basics of SCADA, SCADA key features, remote Terminal Units (RTU), PLC used as RTU, DCS versus SCADA terminology, SCADA software packages, Application example of SCADA	06

5	**Typical DCS & SCADA System** Honeywell PlantScape system, Foxboro I/A series DCS, Delta system, Citect, Wonderware	04
	Total Hours	**28**

Reference Books:

1. Process Control- Instrument Engineers Handbook by Bela G. Liptak, Chilton book co.
2. Overview of Industrial Process Automation by KLS Sharma, Elsevier pub.
3. Practical Distributed Control Systems (DCS) for engineers and technicians by IDC Technologies
4. Distributed Computer Control Systems in Industrial Autoation by D. Popovic and V. Bhatkar, Marcel Dekker

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Remember	**Understand**	**Apply**	**Analyse**
40%	40%	10%	10%

List of Experiments:

1. DCS-Flow-sheet symbol (ch. 7.11- B.G. Liptak –II – Process control)
2. Study of various DCS display options
3. DCS cost estimation procedure (ch. 7.8- B.G. Liptak –II – Process control)
4. Study of stand-alone single loop PID controller
5. Interfacing of different devices using RS-232, RS-485 and RS-422 communication
6. Study of important features of SCADA software package
7. Study of different type of animations used in SCADA software
8. Development of GUI using different type of scripting on SCADA software
9. Interfacing of PLC with SCADA software package
10. Communication of SCADA software with Ms-excel/SQL/MS-Access
11. Interfacing of I/O modules with SCADA/ DCS package

Major Equipment:

Computers, I/O modules, PLC, SCADA software, DCS set up, PID Controller, etc.

List of Open Source Software/learning website:

1. http://coep.vlab.co.in/?sub=33&brch=97
2. http://www.idc-online.com
3. http://www.isa.org
4. http://www.controleng.com
5. http://literature.rockwellautomation.com
6. http://www.automation.siemens.com