

OEI551 LOGIC AND DISTRIBUTED CONTROL SYSTEMS

DETAILED SYLLABUS

OBJECTIVES:

- To give an introductory knowledge on Programmable Logic Controller (PLC) and their programming languages
- To give adequate knowledge about applications of PLC
- To give basic knowledge about Computer Controlled Systems
- To give basic knowledge on the architecture and local control unit of Distributed Control System (DCS)
- To give adequate information with respect to interfaces used in DCS

UNIT I PROGRAMMABLE LOGIC CONTROLLER

Evolution of PLCs – Components of PLC – Architecture of PLC – Discrete and analog I/O modules – Programming languages -Ladder diagram – Function block diagram (FBD) - Programming timers and counters

UNIT II APPLICATIONS OF PLC

Instructions in PLC – Program control instructions, math instructions, data manipulation Instructions, sequencer and shift register instructions – Case studies in PLC

UNIT III COMPUTER CONTROLLED SYSTEMS

Basic building blocks of computer-controlled systems – Data acquisition system – Supervisory control – Direct digital control- SCADA: - Hardware and software, Remote terminal units, Master Station and Communication architectures.

UNIT IV DISTRIBUTED CONTROL SYSTEM

DCS – Various Architectures – Comparison – Local control unit – Process interfacing issues – Communication facilities

UNIT V INTERFACES IN DCS

Operator interfaces - Low level and high-level operator interfaces – Displays - Engineering interfaces – Low level and high-level engineering interfaces – Factors to be considered in selecting DCS – Case studies in DCS

OUTCOMES:

- Ability to understand and analyze Instrumentation systems and their applications to various industries.
- Ability to understand and analyse, linear and digital electronic circuits.

TEXT BOOKS:

1. F.D. Petruzella, Programmable Logic Controllers, Tata Mc-Graw Hill, Third edition, 2010
2. Michael P. Lukas, Distributed Control Systems: Their Evaluation and Design, Van Nostrand Reinhold Co., 1986
3. D. Popovic and V.P.Bhatkar, "Distributed computer control for industrial Automation" Marcel Dekker, Inc., Newyork ,1990.

REFERENCES:

1. T.A. Hughes, Programmable Controllers, Fourth edition, ISA press, 2005
2. Krishna Kant, Computer Based Industrial Control, Second edition, Prentice Hall of India, New Delhi, 2010.
3. John W. Webb and Ronald A. Reis, 'Programmable Logic Controllers, Fifth edition, Prentice Hall of India, New Delhi, 2010.
4. John R. Hackworth and Frederick D. Hackworth Jr, Programmable Logic Controllers, Pearson, New Delhi, 2004.
5. Clarke, G., Reynders, D. and Wright, E., "Practical Modern SCADA Protocols: DNP3,4. 60870.5 and Related Systems", Newnes, 1st Edition, 2004.
6. E.A.Parr, Programmable Controllers, An Engineer's Guide, Elsevier, 2013