IAC – 210

Communication Protocols for Instrumentation

(02 credits – 50 marks)

Course Outcomes:

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

1	Identify the issues and challenges in the architecture of computer network
2	Explain the concept of communication model, OSI reference model, Recent Industry Networks.
3	Classify the Network selection applicable for specific industrial needs.
4	Differentiate the Network Architecture and describe the concepts of Industrial protocols.
5	Classify and Compare various Wireless Networking protocols

Course Contents:

Module-I: Introduction and Communication Protocols   (06 Hrs)

An Introduction to Networks in process automation: Information flow requirements, Hierarchical communication model, Data Communication basics, OSI reference model, Industry Network, Introduction to Communication Protocols: Communication basics, Network Classification, Device Networks, Control Networks.

Module-II: Network Architectures   (06 Hrs)

Proprietary and open networks: Network Architectures, Building blocks, Industry open protocols (RS-232C, RS- 422, and RS-485), Ethernet, Advantages and Limitations of Open networks, IEEE 1394

Module-III: Field Bus   (06 Hrs)

Field bus: Field bus Trends, Hardware selection, Field bus design, Installation, Documentation, Field bus advantages and limitations. HART: Introduction, Design, Installation, calibration, commissioning.

Module-IV:Planning and Commissioning   **(06 Hrs)**

Foundation Field bus & Profibus: Introduction, Design, Calibration, Commissioning, Application in Hazardous and Non-Hazardous area. Introduction to wireless Protocols: WPAN, Wi-Fi, Bluetooth, ZigBee, Z-wave.

Module-V:

Presentations, case studies, Assignments, Tutorials based on Module I to IV.

Ref. Books:

1. B.G. Liptak - Process Software and Digital Networks - CRC Press ISA-, 2002.
2. R. Bowden - HART. Communications Protocol-Fisher-Rosemount, 2003.
3. A.S. Tanenbaum -Computer Networks - Pearson Education, 1996/PHI.
4. K. Kant – Computer based Process Control – New Age International, 1998