GUJARAT TECHNOLOGICAL UNIVERSITY

INSTRUMENTATION AND CONTROL (APPLIED INSTRUMENTATION) (03)
INDUSTRIAL DATA NETWORKS
SUBJECT CODE: 2740302
M.E. 4TH SEMESTER

Type of course: Major Elective-V

Prerequisite: Analog and Digital Communication, Data communication and networking

Rationale:
This course provides an overview and fundamentals of various types of Protocols for Industrial Data communication.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
				Theory Marks		Practical Marks				
L	T	P	C	ESE (E)	PA (M)	ESE (V)		PA (I)		
						ESE	OEP	PA	RP	
3	2#	0	4	70	30	30	0	10	10	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	An Introduction to Networks in Process Automation	2	2%
2	PLC Proprietary and Open Networks	2	5 %
3	Hardware Selection for Field bus Systems	2	5 %
4	Sorting Out the Protocols	2	5 %
5	Overall Field bus Trends	2	5 %
6	Field bus Advantages and Disadvantages	2	2%
7	Field bus Design, Installation, Economics, and Documentation	2	5 %
8	Instrumentation Network Design and Upgrade	2	5 %
9	Global System Architectures	2	5 %
10	Advantages and Limitations of Open Networks	2	5 %
11	HART Networks	4	8 %
12	Foundation Field bus Network	2	8%
13	PROFIBUS-PA	4	5 %
14	Designing PROFIBUS-PA and Foundation Field bus Segments	2	5 %
15	Ethernet and TCP/IP-Based Systems	2	5 %
16	Field bus Networks Catering to Specific Niches of Industry	2	5 %
17	Proprietary Networks	2	5 %
18	Fiber-Optic Networks	4	10 %
19	Satellite, Infrared, Radio, and Wireless LAN Networks	2	5 %

Reference Books:

1. Instrument engineers' handbook : process software and digital networks / Béla G. Lipták, editor-in-chief.—3rd ed., CRC Press

Course Outcome:

After learning the course the students should be able to

1. Understand HART Networks
2. Understand Ethernet and TCP/IP-Based Systems
3. Understand Fiber-Optic Networks
4. Understand Satellite, Infrared, Radio, and Wireless LAN Networks
5. Understand PLC Proprietary and Open Networks
6. Understand Advantages and Limitations of Open Networks

List of Tutorials:

Student has to understand various types of protocols for industrial data communication.

Prepare research paper and submit report of various types of protocols for industrial data communication

List of Open Source Software/learning website: NPTEL

Review Presentation (RP): The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers, integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website.