

GUJARAT TECHNOLOGICAL UNIVERSITY
POWER ELECTRONICS ENGINEERING
B. E. SEMESTER: VII

Subject Name: **Industrial Communication Systems**
 Subject Code: **172405**

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam (E)		Mid Sem Exam (Theory) (M)	Practical (Internal)
				Theory	Practical		
4	0	2	6	70	30	30	20

Sr. No	Course Content	Total Hrs.
1.	Basic of Communication System <ul style="list-style-type: none"> • Communication, Communication systems, Modulation, Bandwidth Requirement. • Noise, External and Internal noise, Noise calculation, Noise figure & Temperature. 	04
2.	Modulation: <ul style="list-style-type: none"> • Theory of Amplitude Modulation, Frequency spectrum of AM wave, Representation of AM, Power Relation in the AM wave. • Theory of Frequency Modulation, Mathematical Representation of FM, Frequency spectrum of FM wave. • Theory of Phase Modulation, Comparison of different modulations • Modulation for Digital signal: Introduction, modulation circuit, demodulation circuit and waveform for ASK, FSK, PSK and PWM. 	10
3.	Basic Principles of Data Communication <ul style="list-style-type: none"> • Bit, Bytes and Characters, Communication principle, Communication modes, Synchronous and asynchronous system, Error detection, Transmission Characteristics, Data coding, UART. 	04

4.	Serial Communication Standard <ul style="list-style-type: none"> Serial data communication interface standards, Balanced and unbalanced transmission lines, RS 232 interface standard, Troubleshooting serial data communication circuits, Test equipment, RS 485 Standard, Troubleshooting and testing with RS 485, 20 mA Current loop, GPIB ,USB. 	10
5.	Cabling , Electrical Noise and Interference <ul style="list-style-type: none"> Cabling: Introduction, Copper based cable, Coaxial cable, Twisted pair cable, Fiber optic cable. Electrical Noise and Interference: Definition of noise, Frequency analysis of noise, Source of electrical noise, Electrical coupling of noise, Shielding, Cable ducting, Cable spacing, Earthing and grounding requirement, Suppression techniques. 	08
6.	Industrial Protocols <ul style="list-style-type: none"> Introduction to protocols Modbus protocol HART Fieldbus and Device Net system TCP / IP 	12
7.	LAN and Wireless Communication Systems <ul style="list-style-type: none"> Overview of class of network, Network Topologies, Transmission Techniques, Ethernet. Wireless LAN using CSMA/CA, Cellular Digital Packet Network, Satellite communication. 	04

Text Books:

1. Electronic Communication Systems, Kennedy and Devis
2. Practical Data Communications for Instrumentation and Control, John Park

Reference Books:

1. Introduction to Data and Network Communication, Michael A. Miller
2. Instrument Engineers Handbook Vol. III, B. G. Liptak
3. Details of Various Data Communication Standards available on Internet