GUJARAT TECHNOLOGICAL UNIVERSITY

ELECTRONICS & COMMUNICATION (SIGNAL PROCESSING & COMMUNICATION) (41)
COMMUNICATION SYSTEMS
SUBJECT CODE: 2714108
SEMESTER: I

Type of course: Major Elective I, Review and extended content on communication systems

Prerequisite: Analog and Digital communication

Rationale: This course introducing the fundamental and extended concepts in analog and digital system design. It comprises encoding, mathematically models of communication system and design for band limited system with focus on optimum receiver design.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks		Practical Marks				
				ESE (E)	PA (M)	PA (V)		PA (I)		
						ESE	OEP	PA	RP	
3	2	2	5	70	30	20	10	20	0	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	Introduction to the analysis and design of analog and digital communication systems.	7	15
2	Analog and digital modulation schemes, digital encoding of messages.	15	40
3	Mathematical modeling of communications systems, Noise in communication links and calculation of performance measures for practical links.	10	20
4	Modeling of bandlimited systems and pulse-shape design, optimal receiver design for bandlimited systems, linear and nonlinear equalization. Simulation of practical digital transmission systems.	13	25

Reference Books:

1. Principles of Communication Engineering Proakis J.J, D Wozencraft J.M. and Jacobs I.M. John Wiley.
2. Communication System, 3rd Edition Carlson A McGraw Hill.
3. Detection, Estimation and Modulation Theory   Van Trees H.L John Wiley and Sons
4. Digital Transmission of Information Blahut R.F Addison Wesley
5. Digital Transmission Theory   Benedetto S., Biglieri E. and Castellari V.   Prentice Hall

Course Outcome:

After learning the course the students should be able to design of analog and digital communication modulation scheme and different encoding techniques. Also, students are able to simulate practical digital transmission systems. As an outcome, students would develop realistic approach in communication system design in subsequent semester.

List of Experiments:

1. Channel equalizer design using (LMS, RLS)
2. Transform based compression techniques
3. Design of Adaptive filters
4. Implementation of Polyphase filter structures
5. Performance Evaluation of digital modulation schemes
6. Implementation of source Codes
7. Performance evaluation of Digital Data Transmission through Fiber Optic Link
8. Fiber optic characterization using OTDR
9. Simulation studies of Communication Systems

Major Equipments:

1. Data Formatting and Carrier Modulation Transmitter
2. RF Measurement set up
3. Spectrum Analyser
4. Simulation Software

List of Open Source Software/learning website:

NPTEL website and IITs virtual laboratory

Open Ended Problems:

1. Design communication system with encoders.
2. Obtain Mathematical modeling of communication system.
3. Design of simple transmitters and receivers