

GUJARAT TECHNOLOGICAL UNIVERSITY
ELECTRONICS & COMMUNICATION (SIGNAL PROCESSING & COMMUNICATION)
 (41)
DESIGN OF COMMUNICATION CIRCUITS
SUBJECT CODE: 2734105
SEMESTER: III

Type of course: Design based laboratory type course on communication circuits.

Prerequisite: Fundamentals of signals and systems, knowledge of electronic circuit design with passive and active components. Fundamentals of transmission and reception of communication signals.

Rationale: The students need learn how to design communication circuits and test them for various applications.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P		Theory Marks		Practical Marks				
			ESE (E)	PA (M)	ESE (V)		PA (I)			
					ESE	OEP	PA	RP		
0	2#	8	5	0	0	50	30	10	10	100

Contents:

Sr. No.	Content	Total Hrs	% Weightage
1.	Review of communication theory and systems. The design of communication circuits and systems operating from baseband to UHF frequencies.	08	5
2.	Design Tuned-RF amplifiers, Oscillators, Mixers, LC and Ceramic bandpass filters and demodulators. Effectiveness of passive components.	16	25
3.	Design of various antennas including microstrip antennas	08	20
4.	Measurement of various communication parameter using VNA, spectrum analyser and field strength measurements	08	20
5.	Projects on the design and performance testing of a complete radio receiver	10	30

Reference Books:

1. Communication System, Simon Haykin, Wiley Publications Indian Edition
2. Electronic Communication System, Wayne Tomasi, Pearson Education Asia
3. Principles of Communication Systems, Taub, Schilling and Saha, TMH Publications
4. RF Microelectronics, Behadi Rezavi, Pearson Education Asia
5. Practical RF System Design, William F. Egan, Wiley Interscience
6. Communication System Design Using DSP Algorithms, Steven A. Tretter, Springer

Course Outcome:

1. Students would be able to understand communication circuits and systems
2. Students would learn how to design communication circuits at different frequencies.
3. Students would be able test and measure various parameters.
4. Student would be able to prepare communication circuits on PCB with test reports.

Major Equipments and Software:

1. Matlab®,
2. NI LabVIEW®
3. Software Define Radio
4. CST Microwave Studio
5. RF Transmitter/Receiver system
6. Spectrum Analyser and DSO
7. Network Analyser
8. Circuit Design and Simulation Software
9. PCB making facility.

Open Ended Problems:

1. Design of various Digital Modulators and Coding System
2. Design of Communication Transmitter and Receiver System.
3. Simulation and Design of Wireless and Mobile Communication System
4. Design of Secure Communication System

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.