

ET2005 – Communications Engineering I

Subject Code	ET2005	Subject Title	Communications Engineering I															
Credits	4.0	Total Hours	Lectures	45 h	Pre-Requisites	None												
GPA/NGPA	GPA		Lab/Assignment	30 h														
Aim: To provide an introductory knowledge on telecommunications, its fundamental theory, and applications.																		
Learning Outcomes:																		
On successful completion of this module, students are able to:																		
<ol style="list-style-type: none"> 1. Identify the main functional blocks of a communication network, and their evolution with time. 2. Describe signals in terms of their characteristics, and identify their relevance to communication systems. 3. Explain basic analog communication systems using fundamental concepts. 4. Explain basic digital communication systems using fundamental concepts. 5. Distinguish between different multiplexing and multiple access techniques. 6. Compare and contrast different transmission media, their characteristics, and identify their applications. 																		
LO 1.	Introduction to telecommunications [5 h] A block diagram of a telecommunication system with an overview of the transmitter, transmission medium and the receiver, while linking with topics to be covered under LO 2-5; Overview of the history and evolution of telecommunication and current trends; Overview of circuit and packet switching																	
LO 2.	Signals [15 h] Signal Classification:- periodic/non-periodic, deterministic/random, transient/non-transient, digital/analog; Time and frequency domain representation of signals:- Revision of probability and random variables; Use of probability distributions and statistics for the study of random signals; Probability models in communications such as the binary symmetric channel																	
LO 3.	Analog communication systems [5 h] Necessity for modulation, Analog modulation and demodulation:- AM, FM.																	
LO 4.	Digital communication systems [10 h] Analog to digital conversion, Quantization and Digital modulation:- ASK, FSK, PSK, QAM, PAM, PCM. Band pass modulation:- Bit Error Rate, Line codes:- unipolar, polar, bipolar, RZ, NRZ, HDB3, CMI. A-law.																	
LO 5.	Multiplexing [5 h] Necessity for multiplexing and duplexing; Multiplexing schemes:- time, frequency, code division and hybrids. Multiplexing hierarchies; Multiple access techniques.																	
LO 6.	Transmission media [5 h] Overview of transmission media:- Copper, fibre, radio; Radio spectrum; Introduction to Twin lines, coaxial lines, waveguides; Overview of noise and channel bandwidth.																	
Practical Work: [5×3 h]																		
<ol style="list-style-type: none"> 1. Observe Communication Channel Characteristics 2. Analog Modulation Schemes 3. Digital Modulation Schemes 4. Build and Test a FM Receiver 5. Simulate the effect of Noise on Signal Transmission 																		
Assessment																		
<table> <tr> <td>a</td> <td>Practical work</td> <td>15%</td> </tr> <tr> <td>b</td> <td>Take home Assignment on LO2</td> <td>05%</td> </tr> <tr> <td>c</td> <td>Quiz in class on LO3 and LO4</td> <td>10%</td> </tr> <tr> <td>b</td> <td>End Semester Written examination: 3 h test</td> <td>70%</td> </tr> </table>							a	Practical work	15%	b	Take home Assignment on LO2	05%	c	Quiz in class on LO3 and LO4	10%	b	End Semester Written examination: 3 h test	70%
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Rec. Bks.	<ol style="list-style-type: none"> 1. Modern Digital and Analog Communication Systems; by B.P. Lathi and Zhi Ding (4E) Publisher: Oxford University Press; ISBN-13: 978-0195331455 ISBN-10: 0195331451 2. An Introduction to Analog and Digital Communications by Simon Haykin , Michael Moher (2E) Publisher: Wiley ISBN-13: 978-0471432227 ISBN-10: 0471432229 																	