



Course: M. Tech Electronics & Communication	Name of Faculty: Arun A. Balakrishnan
Topic: Advanced Digital Communication	Semester: I
Lecture Hall: Room No. 118	Timings: as per CBCS, slot B

Week and date	Lecture topics	Assignments	Remarks
Week 1 (23 rd Nov 20)	Introduction to Digital Communication		
Week 2 (30 th Nov 20)	Review of Fourier Analysis		
Week 3 (7 th Dec 20)	Transmission of signals through LTI system, Complex envelopes of band-pass signals, Complex low-pass representation of band-pass systems		
Christmas Vacation			
Week 4 (29 th Dec 20)	Review of probability theory		
Week 5 (4 th Jan 21)	Random variables, Concept of Expectation, Characteristic functions, Gaussian distribution, Markov and Chebyshev Inequalities, Central limit theorem	<i>Assignment-1</i>	
Week 6 (11 th Jan 21)	Stochastic process, Mean, correlation and covariance functions of Weakly stationary processes, Transmission of Weakly Stationary process through a LTI filter		
Week 7 (18 th Jan 21)	Geometric representation of signals, Gram - Schmidt Orthogonalization Procedure	<i>Assignment-1 submission</i>	
Week 8 (25 th Jan 21)	Conversion of Continuous AWGN Channel in to a vector channel, Likelihood function, Maximum Likelihood Decoding		
Week 9 (1 st Feb 21)	Correlation Receivers, Matched Filter Receiver, Probability of Error	<i>Assignment-2</i>	
First Internals			
Week 10 (15 th Feb 21)	Digital modulation using coherent detection – BPSK, BFSK, MSK		
Week 11 (22 nd Feb 21)	Signals with random phase in AWGN Channels, Quadrature receivers, non-coherent orthogonal modulation techniques, BFSK and DPSK using non-coherent detection, BER comparison of signaling schemes over AWGN channels		
Week 12 (1 st Mar 21)	Synchronization – Recursive Maximum Likelihood Estimation		
Week 13 (8 th Mar 21)	Inter Symbol Interference (ISI), Signal design for zero ISI, Ideal Nyquist pulse for distortionless baseband transmission, raised cosine spectrum, square root raised cosine spectrum	<i>Assignment-2 submission</i>	
Week 14 (15 th Mar 21)	Eye pattern, Equalization Techniques- Zero forcing linear Equalization- Decision feedback equalization- Adaptive Equalization		
Week 15 (22 nd Mar 21)	Propagation effects, Statistical characterization of wideband wireless channels, Power-Delay profile, Doppler power spectrum, Classification of multipath Channels, FIR modeling of doubly spread channels, Comparison of BER of modulation schemes		
Second Internals			
Week 16 (29 th Mar 21)	Diversity techniques, Multiple-Input Multiple-Output Systems, Orthogonal Frequency Division Multiplexing		
Week 17 (6 th Apr 21)	Publishing Internals		