Department of Electronics & Communication Engineering

Lesson Plan & Work-Done Diary for AY 2024-25 ODD Semester

Course: Wireless Communication Systems **Course Code: BEC703**			**Faculty:**			**Semester :** 7th **Section:** A and B	
Module 1							
Class No.	**Date Planned (DD/MM)**	**Topics to be covered**	**TLP Planned**	**Date of Conduction (DD/MM)**	**Topics Covered**	**TLP Executed**	**Remarks if any deviation**
1		Introduction to the course and course outline	Chalk and Talk				
2		Signals & Systems Basics					
3		Linear Algebra Refresher					
4		Linear Algebra Refresher					
5		Introduction and The Wireless Communication Environment, Modelling of Wireless Systems	Chalk and Talk and PPT				
6		System Model for Narrowband Signals					
7		Rayleigh fading Wireless Channel					
8		Rayleigh fading Wireless Channel.. contnd Baseband Model of a Wireless System					
9		System Model for Narrowband Signals					
10		Basics of Wireless Channel Modelling Maximum Delay Spread, RMS Delay Spread					
11		RMS Delay Based on Average Power Profile					
12		Average Delay Spread in Outdoor Cellular Channels, Coherence Bandwidth in Wireless Communications					
13		Relation Between ISI and Coherence Bandwidth					
14		Doppler Fading in Wireless Systems Doppler Shift Computation					

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Module 2							
Class No.	**Date Planned (DD/MM)**	**Topics to be covered**	**TLP Planned**	**Date of Conduction (DD/MM)**	**Topics Covered**	**TLP Executed**	**Remarks if any deviation**
15		Introduction to CDMA Basic CDMA Mechanism Fundamentals of CDMA Codes	Chalk and Talk and PPT				
16		Spreading Codes based on Pseudo-Noise (PN) Sequences, Properties of PN Sequences					
17		Correlation Properties of Random CDMA Spreading Sequences					
18		Advantages of CDMA Advantage 1: Jammer Margin Advantage 2: Graceful Degradation Advantage 3: Universal Frequency Reuse					
19		Multipath Diversity and Rake Receiver					
20		Introduction Motivation and Multicarrier Basics Multicarrier Transmission					
21		Cyclic Prefix in OFDM Impact of Cyclic Prefix on Data Rate					
22		OFDM Example, MIMO-OFDM					
23		OFDM–Peak-to-Average Power Ratio (PAPR)					
24		SC-FDMA, Quiz-2					

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Module 3							
Class No.	**Date Planned (DD/MM)**	**Topics to be covered**	**TLP Planned**	**Date of Conduction (DD/MM)**	**Topics Covered**	**TLP Executed**	**Remarks if any deviation**
25		First Generation Cellular Systems Advanced Mobile Phone Service (AMPS)	Chalk and Talk and PPT				
26		2G Digital Cellular Systems, GSM and Its Evolution, 3G Broadband Wireless Systems					
27		Key Enabling Technologies and Features of LTE, Orthogonal Frequency Division, Multiplexing (OFDM), SC-FDE and SC-FDMA					
28		Channel Dependent Multi-user Resource Scheduling, Multiantenna Techniques IP-Based Flat Network Architecture					
29		LTE Network Architecture					
30		Multiple Access for OFDM Systems, Multiple Access Overview, Random Access vs. Multiple Access					
31		Frequency Division Multiple Access (OFDM-FDMA), Time Division Multiple Access (OFDM-TDMA), Code Division Multiple Access (OFDM-CDMA or MC-CDMA)					
32		Orthogonal Frequency Division Multiple Access (OFDMA) OFDMA: How It Works, Advantages and Disadvantages					
33		Single-Carrier Frequency Division Multiple Access (SC-FDMA), SC-FDMA: How It Works , Advantages and Disadvantages					

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Module 4							
Class No.	**Date Planned (DD/MM)**	**Topics to be covered**	**TLP Planned**	**Date of Conduction (DD/MM)**	**Topics Covered**	**TLP Executed**	**Remarks if any deviation**
34		Introduction to MIMO Wireless Communications MIMO System Model	Chalk and Talk and PPT				
35		MIMO Zero-Forcing (ZF) Receiver					
36		Properties of the Zero-Forcing Receiver Matrix Principle of Orthogonality Interpretation of ZF Receiver					
37		MIMO MMSE Receiver					
38		Robustness of MMSE to Noise Amplification Low and High SNR Properties of the MMSE Receiver					
39		Singular Value Decomposition (SVD) of the MIMO Channel					
40		Singular Value Decomposition and MIMO Capacity					
41		Optimal MIMO Capacity					
42		Alamouti and Space-Time Codes Alamouti Code: Procedure					
43		Another OSTBC Example					
44		Nonlinear MIMO Receiver: V-BLAST Quiz-3					

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Module 5							
Class No.	**Date Planned (DD/MM)**	**Topics to be covered**	**TLP Planned**	**Date of Conduction (DD/MM)**	**Topics Covered**	**TLP Executed**	**Remarks if any deviation**
45		Introduction to LTE, Design Principles	Chalk and Talk and PPT				
46		Network Architecture, Radio Interface Protocols					
47		Hierarchical Channel Structure of LTE Logical Channels: What to Transmit Transport Channels: How to Transmit					
48		Physical Channels: Actual Transmission, Channel Mapping					
49		Downlink OFDMA Radio Resources, Frame Structure					
50		Physical Resource Blocks for OFDMA Resource Allocation, Supported MIMO Modes					
51		Uplink SC-FDMA Radio Resources Frame Structure, Physical Resource Blocks for SC-FDMA					
52		Resource Allocation, Supported MIMO Modes (Quiz)					

	Activity	Planned	Actual	Remarks
1	Theory Classes	52	40	
2	Assignments/Quizzes/ Self Study	3		
3	Tutorials/ Extra classes	-		
4	Internal Assessments	3		
5	ICT based Teaching (% of usage in Curriculum)	80%		
Planning			**Execution**	
Faculty Signature:			**Faculty Signature:**	
HoD Signature:			**HoD Signature:**	