LESSON PLAN SESSION JAN. – JUNE 2024

SUBJECT: Cellular Optical Communication **SEMESTER: 6th**

BRANCH: - Electronics and Telecommunication Engineering

UNIT NUMBER	NAME OF THE TOPIC	NO OF CLASS REQUIRED	TOTAL CLASSES	REMARK
Unit 1.0 Introduction to Mobile Communication	1.1 Evolution of Mobile Radio Communication, Definition of basic terms used in mobile communication: forward channel, handoff, Mobile Station (MS), Mobile Switching Centre(MSC), reverse channel, subscriber and transceiver, mobile communication frequency bands and channel bandwidth.	02	08	
	1.2 Generations of mobile communication: First Generation (1G), Second Generation (2G), 2.5 G, Third Generation (3G), Fourth Generation (4G), and Fifth Generation (5G) networks.	01		
	1.3 Mobile Phone Unit(Mobile handset) : Block diagram , working, features of transmitter and receiver section, power supply section, sensors: speakers and microphone, camera, touch screen, battery and battery charger section, SIM slots, memory slots, motion sensors and other common sensors used in the smart phone, SIM card and its functions, registration, activation, authentication and installation of mobile applications on mobile handset, basic mobile trouble shooting procedure and commands.	04		
	• Concepts beyond class	01		
	• QUIZ. • Doubt clearing session			ASSIGNMENT -1
Unit 2.0 Cellular Concepts	2.1 Cell structure and its types, Cluster, Reuse factor, minimum reuse distance, basic cellular system: mobile station, base station, Traffic channel (Forward and Reverse), Control channel (Forward and Reverse), Frequency reuse, channel assignment strategies.	03	08	
	2.2 Handoff strategies: Concept of handoff, Types of Handoffs: Hard, Soft, Queued, delayed, MAHO (Mobile Assisted Handoff) , Proper and Improper Handoff, Umbrella cell approach	01		
	2.3 Interference: Co-Channel interference and reduction, Adjacent Channel Interference and reduction	01		
	2.4 Improving Coverage and capacity in cellular systems: Cell splitting, Sectoring, frequency reuse, hand off.	01		
	2.5 Mobile testing commands: Call control commands, network service commands, security commands, phone book commands, short message commands, data commands, AT	02		

	commands.			
	• Concepts beyond class			
	• QUIZ • Doubt clearing session			ASSIGNMENT-2
Unit 3.0 Cellular Network Standards	3.1 Global System for Mobile (GSM): System architecture and interfaces, services and features, Handover, GSM channels, establishment of a GSM call, Channel uses during GSM call, User Validation.	04	10	
	3.2 CDMA Technology for Mobile: System architecture, system blocks and functions, CDMA channels, establishment of a CDMA call, User Validation.	04		
	• Concepts beyond class	01		
	• QUIZ • Doubt clearing session	01		ASSIGNMENT-3
Unit 4.0 Overview of Optical Fibre Communication	4.1 Evolution of Fibre Optic communication, frequency bands of optical fiber communication and their applications	02	12	
	4.2 Elements of an Optical Fibre Transmission link	01		
	4.3 Ray theory of propagation of light, refractive index, numerical aperture, fibre cable structure: core and cladding, modes of light transmission through step index fiber and graded index fiber	03		
	4.4 Fiber materials-Glass fibers, and plastic fibers	01		
	4.5 Types of losses and attenuation in optical fibers: attenuation due to absorption and scattering.	03		
	• Concepts beyond class	01		
	• QUIZ • Doubt clearing session	01		ASSIGNMENT-4
Unit 5.0 Fibre Optic Communication Components	5.1 Optical sources: LED and LASER diode, construction , working principle and characteristics.	04	10	
	5.2 Optical detectors: PIN diode, photodiodes, Avalanche photodiodes, construction , working principle and characteristics.	02		
	5.3 Fibre joints, splices ,connectors, coupler, circulator and isolator.	02		
	5.4 Optical Fibre link design: Power budget analysis.	01		
	5.5 Basics of optical powermeter and OTDR (Optical Time Domain Reflectometer).	01		
	• Concepts beyond class			
	• QUIZ • Doubt clearing session			ASSIGNMENT-5
	Total Classes Required	48	48	

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