

DISCIPLINE		SEMESTER	NAME OF THE TEACHING FACULTY
E&TC Engg		5th	Mr. PRASANTA KUMAR MAJHI GF (E&TC)
WAVE PROPAGATION & BROADBAND COMMUNICATION		NO. OF DAYS PER WEEK CLASS ALLOTTED : 04	SEMESTER FROM 14/07/2022 TO 15/11/2022 NO. OF WEEKS:- 15 NOS.
WEEKS	CLASS DAYS	THEORY TOPICS	
1ST WEEK	1ST	Effects of environments such as reflection, refraction, interference, diffraction, absorption and attenuation (Definition only)	
	2ND	Classification based on Modes of Propagation-Ground wave, Ionosphere, Sky wave propagation, Space wave propagation	
	3RD	Definition of critical frequency, max. useable frequency, skip distance, fading, Duct propagation	
	4TH	Definition of Troposphere scatter propagation actual height and virtual height	
2ND WEEK	1ST	Radiation mechanism of an antenna-Maxwell equation.	
	2ND	Definition of Antenna gains, Directive gain, Directivity, effective aperture, polarization	
	3RD	Definition of input impedance, efficiency, Radiator resistance, Bandwidth, Beam width, Radiation pattern	
	4TH	Antenna -types of antenna: Mono pole and dipole antenna and omni directional antenna	
3RD WEEK	1ST	Operation of Directional high frequency antenna : Yagi & Rohmbus only with advantage & applications. a)	
	2ND	Operation of UHF & Microwave antenna.: Dish antenna (with parabolic reflector) & Horn antenna with advantage and applications	
	3RD	Basic Concepts of Smart Antennas	
	4TH	Concept and benefits of smart antennas	
4TH WEEK	1ST	Fundamentals of transmission line.	
	2ND	Equivalent circuit of transmission line & RF equivalent circuit	
	3RD	Characteristics impedance, methods of calculations	
	4TH	simple numerical	
5TH WEEK	1ST	Losses in transmission line	
	2nd	Standing wave – SWR, VSWR	
	3rd	Reflection coefficient, simple numerical	
	4th	Quarter wave & half wavelength line	
6TH WEEK	1ST	Impedance matching & Stubs – single & double	
	2nd	Primary & secondary constant of X-mission line	
	3rd	Define-Aspect ratio, Rectangular Switching, Flicker, Horizontal Resolution, Video bandwidth	
	4th	Define- Interlaced scanning, Composite video signal, Synchronization pulses	
7TH WEEK	1ST	TV Transmitter – Block diagram & function of each block	
	2nd	Monochrome TV Receiver -Block diagram & function of each block	
	3rd	Colour TV signals (Luminance Signal (I & Q,U & V Signals)	
	4th	Colour TV signals (Chrominance Signal,(I & Q,U & V Signals)	
8TH WEEK	1ST	Types of Televisions by Technology- cathode-ray tube TVs, Plasma Display Panels	
	2nd	Digital Light Processing (DLP), Liquid Crystal Display (LCD)	
	3rd	Organic Light-Emitting Diode (OLED) Display, Quantum Light-Emitting Diode (QLED)	
	4th	Discuss the principle of operation - LCD display, Large Screen Display	
9TH WEEK	1ST	CATV systems & Types & networks	
	2nd	Digital TV Technology-Digital TV Signals, Transmission of digital TV signals	
	3rd	Digital TV receiver Video programme processor unit	
	4th	Define Microwave Wave Guides	
10TH WEEK	1ST	Operation of rectangular wave guides and its advantage	
	2nd	Propagation of EM wave through wave guide with TE modes	
	3rd	Propagation of EM wave through wave guide with TM modes	
	4th	Circular wave guide	
11TH WEEK	1ST	Operational Cavity resonator	
	2nd	Working of Directional coupler, Isolators	
	3rd	Working of Circulator	
	4th	Microwave tubes-Principle of operational of two Cavity Klystron	
12TH WEEK	1ST	Microwave tubes-Principle of operational of two Cavity Klystron	
	2nd	Principle of Operations of Travelling Wave Tubes	
	3rd	Principle of Operations of Travelling Wave Tubes	
	4th	Principle of Operations of Cyclotron	

13TH WEEK	1ST	Principle of Operations of Tunnel Diode
	2nd	Principle of Operations of Gunn diode
	3rd	Broadband communication system-Fundamental of Components
	4th	Broadband communication system-Network architecture
14TH WEEK	1ST	Cable broadband data network- architecture, importance
	2nd	Cable broadband data network- future of broadband telecommunication internet based network
	3rd	SONET(Synchronous Optical Network)-Signal frame components topologies
	4th	SONET(Synchronous Optical Network)-advantages applications, and disadvantages
15TH WEEK	1ST	ISDN - ISDN Devices interfaces, services
	2nd	ISDN - ISDN Devices Architecture, applications
	3rd	BISDN -interfaces & Terminals
	4th	BISDN - protocol architecture applications

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16/7/2025

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DISCIPLINE		NAME OF THE TEACHING FACULTY	
E&TC Engg		5TH	
		Mr. PRASANTA KUMAR MAJHI GF (E&TC)	
ANALOG & DIGITAL COMMUNICATION		NO. OF DAYS PER WEEK CLASS ALLOTTED : 05	SEMESTER FROM 14/07/2025 TO 15/11/2025 NO. OF WEEKS:- 15 NOS.
WEEKS	CLASS DAYS	THEORY TOPICS	
1ST WEEK	1st	Communication Process- Concept of Elements of Communication System	
	2nd	Communication Process- Communication System Block diagram	
	3rd	Source of information & Communication Channels	
	4th	Classification of Communication systems (Line & Wireless or Radio)	
	5th	Modulation Process, Need of modulation	
2nd WEEK	1st	classify modulation process	
	2nd	Analog and Digital Signals	
	3rd	Analog and Digital Signals conversion	
	4th	Basic concept of Signals & Signals classification (Analog and Digital)	
	5th	Bandwidth limitation	
3rd WEEK	1st	Amplitude modulation & derive the expression for amplitude modulation signal	
	2nd	power relation in AM wave & find Modulation Index	
	3rd	Generation of Amplitude Modulation(AM)- Linear level AM modulation only	
	4th	Demodulation of AM waves (liner diode detector)	
	5th	Demodulation of AM waves (square law detector & PLL)	
4th WEEK	1st	Explain SSB signal	
	2nd	Explain DSBSC signal	
	3rd	Methods of generating SSB-SC signal	
	4th	Methods of detection SSB-SC signal (Indirect method only)	
	5th	Methods of generation DSB-SC signal (Ring Modulator)	
5th WEEK	1st	Methods of detection of DSB-SC signal(Synchronous detection)	
	2nd	Concept of Balanced modulators	
	3rd	Concept of Balanced modulators	
	4th	Vestigial Side Band Modulation	
	5th	Vestigial Side Band Modulation	
6th WEEK	1st	Concept of Angle modulation & its types (PM & FM)	
	2nd	Basic principle of Frequency Modulation	
	3rd	Frequency Spectrum of FM Signal	
	4th	Expression for Frequency Modulated Signal & Modulation Index	
	5th	sideband of FM signal	
7th WEEK	1st	Explain Phase modulation- working principle with Block Diagram	
	2nd	difference of FM & PM	
	3rd	Compare between AM and FM modulation (Advantages & Disadvantages)	
	4th	Methods of FM Generation (Indirect (Armstrong) method only) working principle with Block Diagram	
	5th	Methods of FM Demodulator or detector (Forster-Seely & Ratio detector)- working principle with Block Diagram	
8th WEEK	1st	Classification of Radio Receivers	
	2nd	Define the terms Selectivity, Sensitivity, Fidelity and Noise Figure	
	3rd	AM transmitter - working principle with Block Diagram	
	4th	Concept of Frequency conversion, RF amplifier	
	5th	Concept of IF amplifier, Tuning, S/N ratio	
9th WEEK	1st	Working of super heterodyne radio receiver with Block diagram	
	2nd	Working of FM Transmitter with Block Diagram	
	3rd	Working of FM Receiver with Block Diagram	
	4th	Concept of Sampling Theorem, Nyquist rate & Aliasing	
	5th	Sampling Techniques (Instantaneous)	
10th WEEK	1st	Sampling Techniques (Natural, Flat Top)	
	2nd	Analog Pulse Modulation - Generation and detection of PAM system with the help of Block diagram	
	3rd	Analog Pulse Modulation - Generation and detection of PWM & PPM system with the help of Block diagram	
	4th	Comparison all the above	
	5th	Concept of Quantization of signal	
	1st	Concept of Quantization error	
	2nd	Generation of PCM system with Block diagram	

11th WEEK	3rd	Demodulation of PCM system with Block diagram & its applications
	4th	Companding in PCM & Vocoder
	5th	Time Division Multiplexing & explain the operation with circuit diagram
12th WEEK	1st	Generation of Delta modulation with Block diagram
	2nd	demodulation of Delta modulation with Block diagram
	3rd	Generation of DPCM with Block diagram
	4th	demodulation of DPCM with Block diagram
	5th	Comparison between PCM, DM, ADM & DPCM
13th WEEK	1st	Concept of Multiplexing (FDM) - (Basic concept , Transmitter & Receiver)
	2nd	Concept of Multiplexing (TDM)- (Basic concept , Transmitter & Receiver) & Digital modulation formats
	3rd	Advantages of digital communication system over Analog system
	4th	Digital modulation techniques & types
	5th	Generation of binary ASK, FSK, PSK, QPSK, QAM, MSK, GMSK
14th WEEK	1st	Detection of binary ASK, FSK, PSK, QPSK, QAM, MSK, GMSK
	2nd	Working of T1-Carrier system
	3rd	Spread Spectrum & its applications
	4th	Working operation of Spread Spectrum Modulation Techniques (DS-SS)
	5th	Working operation of Spread Spectrum Modulation Techniques FH-SS)
15th WEEK	1st	Define bit, Baud, symbol(Shannon Theorems)
	2nd	Define channel capacity formula.(Shannon Theorems)
	3rd	Application of Different Modulation Schemes
	4th	Application of Different Modulation Schemes
	5th	Types of Modem & its Application

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DISCIPLINE		SEMESTER	NAME OF THE TEACHING FACULTY	
E&TC Engg		3RD	Mr. PRASANTA KUMAR MAJHI GF (E&TC)	
SIGNAL AND SYSTEMS		NO. OF DAYS PER WEEK CLASS ALLOTTED : 03		SEMESTER FROM 14/07/2025 TO 15/11/2025 NO. OF WEEKS:- 15 NOS.
WEEKS	CLASS DAYS	THEORY TOPICS		
1ST WEEK	1ST	Signals and systems in everyday life		
	2ND	Signals and systems in engineering disciplines		
	3RD	Electrical, mechanical, hydraulic, thermal biomedical signal and example		
2ND WEEK	1ST	Extracting common features of signals and systems		
	2ND	Energy and power signals and systems		
	3RD	Signal properties, periodicity, absolute integrability		
3RD WEEK	1ST	Deterministic signals vs stochastic signals		
	2ND	Special signals- unit step unit impulse		
	3RD	The sinusoidal and exponential signals		
4TH WEEK	1ST	Continuous and discrete time signals		
	2ND	Continuous time signal classification		
	3RD	linearity, additivity, Homogeneity		
5TH WEEK	1ST	shift-invariance and causality		
	2nd	stability and reliability		
	3rd	Revision and small quiz		
6TH WEEK	1ST	LTI system introduction		
	2nd	Impulse response and step response		
	3rd	Convolution basics		
7TH WEEK	1ST	Convolution properties and examples		
	2nd	input- output with aperiodic signal		
	3rd	Cascade interconnections		
8TH WEEK	1ST	Causality and Stability of LTI systems		
	2nd	System Representation using difference equations		
	3rd	System Representation using difference equations		
9TH WEEK	1ST	Frequency response and impulse response		
	2nd	Fourier series- basics		
	3rd	Fourier series representation		
10TH WEEK	1ST	Fourier Transform- definition and properties		
	2nd	Convolution/Multiplication in frequency domain		
	3rd	Magnitude/phase response, duality		
11TH WEEK	1ST	Discrete-time fourier Transform(DTFT)		
	2nd	Discrete fourier Transform(DFT)		
	3rd	Parseval's theorem		
12TH WEEK	1ST	Eigenfunctions of LTI systems		
	2nd	Region of convergence		
	3rd	Poles and zeros		
13TH WEEK	1ST	Laplace transform of standard functions		
	2nd	System analysis using laplace		
	3rd	Generalization of Parseval		
14TH WEEK	1ST	Block-diagram representation		
	2nd	State-Space analysis and multi-input/output systems		
	3rd	Sampling theorem Basics		
15TH WEEK	1ST	Spectrum, interpolation, ZOH, FOH		
	2nd	Aliasing and discrete-time system relation		
	3rd	Modulation, time frequency representation, STFT and wavelets		

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