ACADEMIC LESSION PLAN FOR WINTER SEMESTER - 2022

DEPT. OF ELECTRONICS & TELECOMMUNICATION, GOVT. POLYTECHNIC,BALASORE

NAME OF THE FACULTY: PRAKASH CHANDRA DAS

TH4: WAVE PROPAGATION & BROADBAND COMMUNICATION ENGINEERING

DISCIPLINE: ELECTRONICS & TELECOMMUNICATION ENGINEERING	**SEMESTER:** 5TH	**NAME OF THE TEACHING FACULTY:** PRAKASH CHANDRA DAS
SUBJECT: WAVE PROPAGATION & BROADBAND COMMUNICATION ENGINEERING	**NO. OF DAYS/PER WEEK CLASS ALLOTED:** 4	**SEMESTER FROM DATE:** 15th , SEPTEMBER 2022 **TO DATE:** 22 DECEMBER 2022 **NO. OF WEEKS:** 15
WEEK	**CLASS DAY**	**THEORY/PRACTICAL TOPICS**
1ST	1ST	**Unit-1: WAVE PROPAGATION & ANTENNA(12)** 1.1 Effects of environments such as reflection, refraction, interference, diffraction, absorption and attenuation (Definition only)
	2ND	1.2 Classification based on Modes of Propagation-Ground wave, Ionosphere , Sky wave propagation, Space wave propagation
	3RD	1.3 Definition – critical frequency, max. useable frequency, skip distance, fading, Duct propagation & Troposphere scatter propagation actual height and virtual height
	4TH	1.3 Definition – critical frequency, max. useable frequency, skip distance, fading, Duct propagation & Troposphere scatter propagation actual height and virtual height
2ND	1ST	1.4 Radiation mechanism of an antenna-Maxwell equation.
	2ND	1.5 Definition - Antenna gains, Directive gain, Directivity, effective aperture, polarization, input impedance, efficiency, Radiator resistance, Bandwidth, Beam width, Radiation pattern
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	4TH	1.6 Antenna -types of antenna: Mono pole and dipole antenna and omni directional antenna
3RD	1ST	1.6 Antenna -types of antenna: Mono pole and dipole antenna and omni directional antenna
	2ND	1.7 Operation of following antenna with advantage & applications. a) Directional high frequency antenna : , Yagi & Rohmbus only
	3RD	b) UHF &Microwave antenna.: Dish antenna (with parabolic reflector) & Horn antenna
	4TH	1.8 Basic Concepts of Smart Antennas- Concept and benefits of smart antennas
4TH	1ST	**Unit-2: TRANSMISSION LINES(10)** 2.1 Fundamentals of transmission line.
	2ND	2.2 Equivalent circuit of transmission line & RF equivalent circuit
	3RD	2.3 Characteristics impedance, methods of calculations & simple numerical.
	4TH	2.3 Characteristics impedance, methods of calculations & simple numerical.
5TH	1ST	2.4 Losses in transmission line.
	2ND	2.5 Standing wave – SWR, VSWR,

	3RD	Reflection coefficient, simple numerical.
	4TH	2.6 Quarter wave & half wavelength line
6TH	1ST	2.7 Impedance matching & Stubs – single & double
	2ND	2.8 Primary & secondary constant of X-mission line.
	3RD	**Unit-3: TELEVISION ENGINEERING(13)** 3.1 Define-Aspect ratio, Rectangular Switching. Flicker, Horizontal Resolution, Video bandwidth, Interlaced scanning, Composite video signal, Synchronization pulses
	4TH	3.1 Define-Aspect ratio, Rectangular Switching. Flicker, Horizontal Resolution, Video bandwidth, Interlaced scanning, Composite video signal, Synchronization pulses
7TH	1ST	3.2 TV Transmitter – Block diagram & function of each block.
	2ND	3.3 Monochrome TV Receiver -Block diagram & function of each block.
	3RD	3.4 Colour TV signals (Luminance Signal & Chrominance Signal,(I & Q,U & V Signals).
	4TH	3.5 Types of Televisions by Technology- cathode-ray tube TVs, Plasma Display Panels,
8TH	1ST	Digital Light Processing (DLP), Liquid Crystal Display (LCD)
	2ND	Organic Light-Emitting Diode (OLED) Display, Quantum Light-Emitting Diode (QLED) – only Comparison based on application
	3RD	3.6 Discuss the principle of operation - LCD display,
	4TH	Large Screen Display.
9TH	1ST	3.7 CATV systems & Types & networks
	2ND	3.8 Digital TV Technology-Digital TV Signals, Transmission of digital TV signals & Digital TV receiver Video programme processor unit.
	3RD	3.8 Digital TV Technology-Digital TV Signals, Transmission of digital TV signals & Digital TV receiver Video programme processor unit.
	4TH	**Unit-4: MICROWAVE ENGINEERING(15)** 4.1 Define Microwave Wave Guides.
10TH	1ST	4.2 Operation of rectangular wave gives and its advantage.
	2ND	4.3 Propagation of EM wave through wave guide with TE & TM modes.
	3RD	4.3 Propagation of EM wave through wave guide with TE & TM modes.
	4TH	4.4 Circular wave guide.
12TH	1ST	4.5 Operational Cavity resonator.
	2ND	4.6 Working of Directional coupler, Isolators & Circulator.
	3RD	4.6 Working of Directional coupler, Isolators & Circulator.
	4TH	4.7 Microwave tubes-Principle of operational of two Cavity Klystron.
13TH	1ST	4.7 Microwave tubes-Principle of operational of two Cavity Klystron.
	2ND	4.8 Principle of Operations of Travelling Wave Tubes
	3RD	4.8 Principle of Operations of Travelling Wave Tubes
	4TH	4.9 Principle of Operations of Cyclotron
14TH	1ST	4.10 Principle of Operations of Tunnel Diode & Gunn diode
	2ND	4.10 Principle of Operations of Tunnel Diode & Gunn diode
	3RD	**Unit-5: Broadband communication (10)** 5.1 Broadband communication system-Fundamental of Components and Network architecture
	4TH	5.1 Broadband communication system-Fundamental of Components and Network architecture
14th	1ST	5.2 Cable broadband data network- architecture, importance & future of broadband telecommunication internet based network.
	2ND	5.2 Cable broadband data network- architecture, importance & future of broadband telecommunication internet based network.

	3RD	5.3 SONET(Synchronous Optical Network)-Signal frame components topologies advantages applications, and disadvantages
	4TH	5.3 SONET(Synchronous Optical Network)-Signal frame components topologies advantages applications, and disadvantages
15TH	1ST	5.4 ISDN - ISDN Devices interfaces, services, Architecture, applications,
	2ND	5.4 ISDN - ISDN Devices interfaces, services, Architecture, applications,
	3RD	5.5 BISDN -interfaces & Terminals, protocol architecture applications
	4TH	5.5 BISDN -interfaces & Terminals, protocol architecture applications

Signature of Faculty

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