



# GOVERNMENT POLYTECHNIC, BALASORE

Government of Odisha

ସରକାରୀ ବହୁବୃତ୍ତି ଅନୁଷ୍ଠାନ, ବାଲେଶ୍ଵର

ACADEMIC LESSON PLAN FOR WINTER SEMESTER - 2025

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

NAME OF THE FACULTY: ER. LIPIKA SANDHA (LECT. STAGE -I, E & TC)

TH.4: WAVE PROPAGATION & BROADBAND COMMUNICATION ENGINEERING

DISCIPLINE: ELECTRONICS & TELECOMMUNICATION ENGINEERING	SEMESTER: 5TH	NAME OF THE TEACHING FACULTY: ER. LIPIKA SANDHA (LECT. STAGE -I)
SUBJECT: WAVE PROPAGATION & BROADBAND COMMUNICATION ENGINEERING	NO. OF DAYS/PER WEEK CLASS ALLOTTED: 4	SEMESTER FROM DATE: 14 <sup>TH</sup> , JULY 2025  NO. OF WEEKS: 15
WEEK	CLASS DAY	THEORY TOPICS
1 <sup>ST</sup>	1 <sup>ST</sup>	<b>Unit-1: WAVE PROPAGATION &amp; ANTENNA(12)</b> 1.1 Effects of environments such as reflection, refraction, interference, diffraction, absorption and attenuation (Definition only)
	2 <sup>ND</sup>	1.2 Classification based on Modes of Propagation-Ground wave, Ionosphere, Sky wave propagation, Space wave propagation
	3 <sup>RD</sup>	1.3 Definition – critical frequency, max. useable frequency, skip distance, fading, Duct propagation & Troposphere scatter propagation actual height and virtual height
	4 <sup>TH</sup>	1.3 Definition – critical frequency, max. useable frequency, skip distance, fading, Duct propagation & Troposphere scatter propagation actual height and virtual height
2 <sup>ND</sup>	1 <sup>ST</sup>	1.4 Radiation mechanism of an antenna-Maxwell equation.
	2 <sup>ND</sup>	1.5 Definition - Antenna gains, Directive gain, Directivity, effective aperture, polarization, input impedance, efficiency, Radiator resistance, Bandwidth, Beam width, Radiation pattern
	3 <sup>RD</sup>	1.5 Definition - Antenna gains, Directive gain, Directivity, effective aperture, polarization, input impedance, efficiency, Radiator resistance, Bandwidth, Beam width, Radiation pattern
	4 <sup>TH</sup>	1.6 Antenna -types of antenna: Mono pole and dipole antenna and omni directional antenna
3 <sup>RD</sup>	1 <sup>ST</sup>	1.6 Antenna -types of antenna: Mono pole and dipole antenna and omni directional antenna
	2 <sup>ND</sup>	1.7 Operation of following antenna with advantage & applications. a) Directional high frequency antenna : , Yagi & Rohmbus only
	3 <sup>RD</sup>	b) UHF & Microwave antenna.: Dish antenna (with parabolic reflector) & Horn antenna
	4 <sup>TH</sup>	1.8 Basic Concepts of Smart Antennas- Concept and benefits of smart antennas
4 <sup>TH</sup>	1 <sup>ST</sup>	<b>Unit-2: TRANSMISSION LINES(10)</b> 2.1 Fundamentals of transmission line.

	2 <sup>ND</sup>	2.2 Equivalent circuit of transmission line & RF equivalent circuit
	3 <sup>RD</sup>	2.3 Characteristics impedance, methods of calculations & simple numerical.
	4 <sup>TH</sup>	2.3 Characteristics impedance, methods of calculations & simple numerical.
5 <sup>TH</sup>	1 <sup>ST</sup>	2.4 Losses in transmission line.
	2 <sup>ND</sup>	2.5 Standing wave – SWR, VSWR,
	3 <sup>RD</sup>	Reflection coefficient, simple numerical.
6 <sup>TH</sup>	4 <sup>TH</sup>	2.6 Quarter wave & half wavelength line
	1 <sup>ST</sup>	2.7 Impedance matching & Stubs – single & double
	2 <sup>ND</sup>	2.8 Primary & secondary constant of X-mission line.
	3 <sup>RD</sup>	<b>Unit-3: TELEVISION ENGINEERING(13)</b> 3.1 Define-Aspect ratio, Rectangular Switching. Flicker, Horizontal Resolution; Video bandwidth, Interlaced scanning, Composite video signal, Synchronization pulses
	4 <sup>TH</sup>	3.1 Define-Aspect ratio, Rectangular Switching. Flicker, Horizontal Resolution, Video bandwidth, Interlaced scanning, Composite video signal, Synchronization pulses
	1 <sup>ST</sup>	3.2 TV Transmitter – Block diagram & function of each block.
7 <sup>TH</sup>	2 <sup>ND</sup>	3.3 Monochrome TV Receiver -Block diagram & function of each block.
	3 <sup>RD</sup>	3.4 Colour TV signals (Luminance Signal & Chrominance Signal, (I & Q, U & V Signals).
	4 <sup>TH</sup>	3.5 Types of Televisions by Technology- cathode-ray tube TVs, Plasma Display Panels,
8 <sup>TH</sup>	1 <sup>ST</sup>	Digital Light Processing (DLP), Liquid Crystal Display (LCD)
	2 <sup>ND</sup>	Organic Light-Emitting Diode (OLED) Display, Quantum Light-Emitting Diode (QLED) – only Comparison based on application
	3 <sup>RD</sup>	3.6 Discuss the principle of operation - LCD display,
	4 <sup>TH</sup>	Large Screen Display.
9 <sup>TH</sup>	1 <sup>ST</sup>	3.7 CATV systems & Types & networks
	2 <sup>ND</sup>	3.8 Digital TV Technology-Digital TV Signals, Transmission of digital TV signals & Digital TV receiver Video programme processor unit.
	3 <sup>RD</sup>	3.8 Digital TV Technology-Digital TV Signals, Transmission of digital TV signals & Digital TV receiver Video programme processor unit.
	4 <sup>TH</sup>	<b>Unit-4: MICROWAVE ENGINEERING(15)</b> 4.1 Define Microwave Wave Guides.
10 <sup>TH</sup>	1 <sup>ST</sup>	4.2 Operation of rectangular wave guides and its advantage.
	2 <sup>ND</sup>	4.3 Propagation of EM wave through wave guide with TE & TM modes.
	3 <sup>RD</sup>	4.3 Propagation of EM wave through wave guide with TE & TM modes.
	4 <sup>TH</sup>	4.4 Circular wave guide.
11 <sup>TH</sup>	1 <sup>ST</sup>	4.5 Operational Cavity resonator.
	2 <sup>ND</sup>	4.6 Working of Directional coupler, Isolators & Circulator.
	3 <sup>RD</sup>	4.6 Working of Directional coupler, Isolators & Circulator.
	4 <sup>TH</sup>	4.7 Microwave tubes-Principle of operational of two Cavity Klystron.
12 <sup>TH</sup>	1 <sup>ST</sup>	4.7 Microwave tubes-Principle of operational of two Cavity Klystron.
	2 <sup>ND</sup>	4.8 Principle of Operations of Travelling Wave Tubes
	3 <sup>RD</sup>	4.8 Principle of Operations of Travelling Wave Tubes
13 <sup>TH</sup>	4 <sup>TH</sup>	4.9 Principle of Operations of Cyclotron
	1 <sup>ST</sup>	4.10 Principle of Operations of Tunnel Diode & Gunn diode
	2 <sup>ND</sup>	4.10 Principle of Operations of Tunnel Diode & Gunn diode

	3 <sup>RD</sup>	<b>Unit-5: Broadband communication (10)</b> 5.1 Broadband communication system-Fundamental of Components and Network architecture
	4 <sup>TH</sup>	5.1 Broadband communication system-Fundamental of Components and Network architecture
14 <sup>th</sup>	1 <sup>ST</sup>	5.2 Cable broadband data network- architecture, importance & future of broadband telecommunication internet based network.
	2 <sup>ND</sup>	5.2 Cable broadband data network- architecture, importance & future of broadband telecommunication internet based network.
	3 <sup>RD</sup>	5.3 SONET(Synchronous Optical Network)-Signal frame components topologies advantages applications, and disadvantages
	4 <sup>TH</sup>	5.3 SONET(Synchronous Optical Network)-Signal frame components topologies advantages applications, and disadvantages
15 <sup>TH</sup>	1 <sup>ST</sup>	5.4 ISDN - ISDN Devices interfaces, services, Architecture, applications,
	2 <sup>ND</sup>	5.4 ISDN - ISDN Devices interfaces, services, Architecture, applications,
	3 <sup>RD</sup>	5.5 BISDN -interfaces & Terminals, protocol architecture applications
	4 <sup>TH</sup>	5.5 BISDN -interfaces & Terminals, protocol architecture applications

*[Signature]*  
08/07/2025

Faculty

Lipika Sandha, Lect. (Stage-I)  
(E & TC)

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08/07/25  
H.O.D