NILASAILA INSTITUTE OF SCIENCE & TECHNOLOGY
SERGARH-756060, BALASORE (ODISHA)
(Approved by AICTE& affiliated to SCTE&VT, Odisha)

LESSON PLAN

SUBJECT:Wave Propagation &Broadband Communication Engineering(TH-4)

Name Of The Faculty :- Er. NIRANJAN SAHU
Branch :- Electrical and Electronics Engineering
Semester :- 5th
Session :-2024-25
Examination :-2024 (W)

CHAPTER WISE DISTRIBUTION OF PERIODS

Sl.No.	Name of the chapter as per the Syllabus	No. of Periods as per the Syllabus	No. of periods actually needed
1	WAVE PROPAGATION & ANTENNA	12	14
2	TRANSMISSION LINES	10	10
3	TELEVISION ENGINEERING	13	14
4	MICROWAVE ENGINEERING	15	16
5	BROADBAND COMMUNICATION	10	11
TOTAL		60	65

Sign of Faculty

Sign of H.O.D

Discipline: ELECTRICAL AND ELECTRONIC ENGINEERING	Semester: 5th	**Name of the Teaching Faculty:** Er. NIRANJAN SAHU
		SESSION : 2024-25 **EXAMINATION : 2024 (W)**
Week	**Class Day**	**Topics to be Covered**
1st	1st	**Unit-1: WAVE PROPAGATION & ANTENNA** 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	1.2 Classification based on Modes of Propagation-Ground wave, Ionosphere ,Sky wave propagation, Space wave propagation
	4th	1.2 Classification based on Modes of Propagation-Ground wave, Ionosphere ,Sky wave propagation, Space wave propagation
	5th	1.3 Definition – critical frequency, max. useable frequency, skip distance, fading, Duct propagation & Troposphere scatter propagation actual height and virtual height
2nd	1st	1.3 Definition – critical frequency, max. useable frequency, skip distance, fading, Duct propagation & Troposphere scatter propagation actual height and virtual height
	2nd	1.4 Radiation mechanism of an antenna-Maxwell equation.
	3rd	1.5 Definition - Antenna gains, Directive gain, Directivity, effective aperture, polarization, input impedance, efficiency, Radiator resistance, Bandwidth, Beam width, Radiation pattern
	4th	1.5 Definition - Antenna gains, Directive gain, Directivity, effective aperture, polarization, input impedance, efficiency, Radiator resistance, Bandwidth, Beam width, Radiation pattern
	5th	1.6 Antenna -types of antenna: Mono pole and dipole antenna and omni directional antenna

Week	Class Day	Topics to be Covered
3rd	1st	1.7 Operation of following antenna with advantage & applications. a) Directional high frequency antenna : , Yagi & Rohmbus only
	2nd	b) UHF &Microwave antenna.: Dish antenna (with parabolic reflector) & Horn antenna
	3rd	1.8 Basic Concepts of Smart Antennas- Concept and benefits of smart antennas
	4th	**Unit-2: TRANSMISSION LINES.** 2.1 Fundamentals of transmission line.
	5th	2.2 Equivalent circuit of transmission line & RF equivalent circuit
4th	1st	2.3 Characteristics impedance, methods of calculations & simple numerical.
	2nd	2.3 Characteristics impedance, methods of calculations & simple numerical.
	3rd	2.4 Losses in transmission line.
	4th	2.5 Standing wave – SWR, VSWR, Reflection coefficient, simple numerical.
	5th	2.5 Standing wave – SWR, VSWR, Reflection coefficient, simple numerical.
5th	1st	2.6 Quarter wave & half wavelength line
	2nd	2.7 Impedance matching & Stubs – single & double
	3rd	2.8 Primary & secondary constant of X-mission line.
	4th	**Unit-3: TELEVISION ENGINEERING.** 3.1 Define-Aspect ratio, Rectangular Switching. Flicker, Horizontal Resolution, Video bandwidth, Interlaced scanning, Composite video signal, Synchronization pulses
	5th	3.1 Define-Aspect ratio, Rectangular Switching. Flicker, Horizontal Resolution, Video bandwidth, Interlaced scanning, Composite video signal, Synchronization pulses

Week	Class Day	Topics to be Covered
6th	1st	3.2 TV Transmitter – Block diagram & function of each block
	2nd	3.2 TV Transmitter – Block diagram & function of each block
	3rd	3.3 Monochrome TV Receiver -Block diagram & function of each block.
	4th	3.3 Monochrome TV Receiver -Block diagram & function of each block.
	5th	3.3 Monochrome TV Receiver -Block diagram & function of each block.
7th	1st	3.4 Colour TV signals (Luminance Signal & Chrominance Signal,(I & Q,U & V Signals).
	2nd	3.5 Types of Televisions by Technology- cathode-ray tube TVs, Plasma Display Panels, Digital Light Processing (DLP),Liquid Crystal Display (LCD),Organic Light-Emitting Diode (OLED) Display, Quantum Light-Emitting Diode (QLED) – only Comparison based on application
	3rd	3.5 Types of Televisions by Technology- cathode-ray tube TVs, Plasma Display Panels, Digital Light Processing (DLP),Liquid Crystal Display (LCD)
	4th	Organic Light-Emitting Diode (OLED) Display, Quantum Light-Emitting Diode (QLED) – only Comparison based on application
	5th	3.6 Discuss the principle of operation - LCD display, Large Screen Display
8th	1st	3.6 Discuss the principle of operation - LCD display, Large Screen Display
	2nd	3.7 CATV systems & Types & networks
	3rd	3.7 CATV systems & Types & networks
	4th	3.8 Digital TV Technology-Digital TV Signals, Transmission of digital TV signals & Digital TV receiver Video programmeprocessor unit.
	5th	3.8 Digital TV Technology-Digital TV Signals, Transmission of digital TV signals & Digital TV receiver Video programmeprocessor unit.

Week	Class Day	Topics to be Covered
9th	1st	**Unit-4: MICROWAVE ENGINEERING.** 4.1 Define Microwave Wave Guides.
	2nd	4.2 Operation of rectangular wave gives and its advantage
	3rd	4.3 Propagation of EM wave through wave guide with TE & TM modes
	4th	4.3 Propagation of EM wave through wave guide with TE & TM modes
	5th	4.4 Circular wave guide
10th	1st	4.5 Operational Cavity resonator.
	2nd	4.5 Operational Cavity resonator.
	3rd	4.6 Working of Directional coupler, Isolators & Circulator.
	4th	4.6 Working of Directional coupler, Isolators & Circulator.
	5th	4.7 Microwave tubes-Principle of operational of two
11th	1st	4.7 Microwave tubes-Principle of operational of two CavityKlystron.
	2nd	4.9 Principle of Operations of Cyclotron
	3rd	4.8 Principle of Operations of Travelling Wave Tubes
	4th	4.10 Principle of Operations of Tunnel Diode & Gunn diode
	5th	4.10 Principle of Operations of Tunnel Diode & Gunn diode
12th	1st	**Unit-5: Broadband communication** 5.1 Broadband communication system-Fundamental of Components and Network architecture
	2nd	5.2 Cable broadband data network- architecture, importance & future of broadband telecommunication internet based network.
	3rd	5.2 Cable broadband data network- architecture, importance & future of broadband telecommunication internet based network.
	4th	5.3 SONET(Synchronous Optical Network)-Signal frame components topologies advantages applications, and disadvantages
	5th	5.3 SONET(Synchronous Optical Network)-Signal frame components topologies advantages applications, and disadvantages

Week	Class Day	Topics to be Covered
13th	1st	5.4 ISDN - ISDN Devices interfaces, services, Architecture,applications,
	2nd	5.4 ISDN - ISDN Devices interfaces, services, Architecture,applications,
	3rd	5.4 ISDN - ISDN Devices interfaces, services, Architecture, applications,
	4th	5.5 BISDN -interfaces & Terminals, protocol architecture applications
	5th	5.5 BISDN -interfaces & Terminals, protocol architecture applications

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