



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

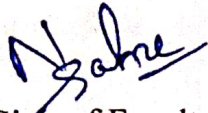
Session :- 2024-25


Semester :- 5th

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


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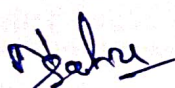
Discipline: ELECTRICAL AND ELECTRONIC ENGINEERING	Semester: 5th	Name of the Teaching Faculty: Er. NIRANJAN SAHU
		SESSION : 2024-25 EXAMINATION : 2024 (W)
Week	Class Day	Topics to be Covered
1 st	1 st	Unit-1: WAVE PROPAGATION & ANTENNA 1.1 Effects of environments such as reflection, refraction, interference, diffraction, absorption and attenuation (Definition only)
	2 nd	1.2 Classification based on Modes of Propagation-Ground wave, Ionosphere ,Sky wave propagation, Space wave propagation
	3 rd	1.2 Classification based on Modes of Propagation-Ground wave, Ionosphere ,Sky wave propagation, Space wave propagation
	4 th	1.2 Classification based on Modes of Propagation-Ground wave, Ionosphere ,Sky wave propagation, Space wave propagation
	5 th	1.3 Definition – critical frequency, max. useable frequency, skip distance, fading, Duct propagation & Troposphere scatter propagation actual height and virtual height
2 nd	1 st	1.3 Definition – critical frequency, max. useable frequency, skip distance, fading, Duct propagation & Troposphere scatter propagation actual height and virtual height
	2 nd	1.4 Radiation mechanism of an antenna-Maxwell equation.
	3 rd	1.5 Definition - Antenna gains, Directive gain, Directivity, effective aperture, polarization, input impedance, efficiency, Radiator resistance, Bandwidth, Beam width, Radiation pattern
	4 th	1.5 Definition - Antenna gains, Directive gain, Directivity, effective aperture, polarization, input impedance, efficiency, Radiator resistance, Bandwidth, Beam width, Radiation pattern
	5 th	1.6 Antenna -types of antenna: Mono pole and dipole antenna and omni directional antenna


Week	Class Day	Topics to be Covered
3 rd	1 st	1.7 Operation of following antenna with advantage & applications. a) Directional high frequency antenna : , Yagi & Rohmbus only
	2 nd	b) UHF & Microwave antenna.: Dish antenna (with parabolic reflector) & Horn antenna
	3 rd	1.8 Basic Concepts of Smart Antennas- Concept and benefits of smart antennas
	4 th	Unit-2: TRANSMISSION LINES. 2.1 Fundamentals of transmission line.
	5 th	2.2 Equivalent circuit of transmission line & RF equivalent circuit
4 th	1 st	2.3 Characteristics impedance, methods of calculations & simple numerical.
	2 nd	2.3 Characteristics impedance, methods of calculations & simple numerical.
	3 rd	2.4 Losses in transmission line.
	4 th	2.5 Standing wave – SWR, VSWR, Reflection coefficient, simple numerical.
	5 th	2.5 Standing wave – SWR, VSWR, Reflection coefficient, simple numerical.
5 th	1 st	2.6 Quarter wave & half wavelength line
	2 nd	2.7 Impedance matching & Stubs – single & double
	3 rd	2.8 Primary & secondary constant of X-mission line.
	4 th	Unit-3: TELEVISION ENGINEERING. 3.1 Define-Aspect ratio, Rectangular Switching. Flicker, Horizontal Resolution, Video bandwidth, Interlaced scanning, Composite video signal, Synchronization pulses
	5 th	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
6 th	1 st	3.2 TV Transmitter – Block diagram & function of each block
	2 nd	3.2 TV Transmitter – Block diagram & function of each block
	3 rd	3.3 Monochrome TV Receiver -Block diagram & function of each block.
	4 th	3.3 Monochrome TV Receiver -Block diagram & function of each block.
	5 th	3.3 Monochrome TV Receiver -Block diagram & function of each block.
7 th	1 st	3.4 Colour TV signals (Luminance Signal & Chrominance Signal,(I & Q,U & V Signals).
	2 nd	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
	3 rd	3.5 Types of Televisions by Technology- cathode-ray tube TVs, Plasma Display Panels, Digital Light Processing (DLP),Liquid Crystal Display (LCD)
	4 th	Organic Light-Emitting Diode (OLED) Display, Quantum Light-Emitting Diode (QLED) – only Comparison based on application
	5 th	3.6 Discuss the principle of operation - LCD display, Large Screen Display
8 th	1 st	3.6 Discuss the principle of operation - LCD display, Large Screen Display
	2 nd	3.7 CATV systems & Types & networks
	3 rd	3.7 CATV systems & Types & networks
	4 th	3.8 Digital TV Technology-Digital TV Signals, Transmission of digital TV signals & Digital TV receiver Video programmeprocessor unit.
	5 th	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
9 th	1 st	Unit-4: MICROWAVE ENGINEERING. 4.1 Define Microwave Wave Guides.
	2 nd	4.2 Operation of rectangular wave guides and its advantage
	3 rd	4.3 Propagation of EM wave through wave guide with TE & TM modes
	4 th	4.3 Propagation of EM wave through wave guide with TE & TM modes
	5 th	4.4 Circular wave guide
10 th	1 st	4.5 Operational Cavity resonator.
	2 nd	4.5 Operational Cavity resonator.
	3 rd	4.6 Working of Directional coupler, Isolators & Circulator.
	4 th	4.6 Working of Directional coupler, Isolators & Circulator.
	5 th	4.7 Microwave tubes-Principle of operational of two
11 th	1 st	4.7 Microwave tubes-Principle of operational of two Cavity Klystron.
	2 nd	4.9 Principle of Operations of Cyclotron
	3 rd	4.8 Principle of Operations of Travelling Wave Tubes
	4 th	4.10 Principle of Operations of Tunnel Diode & Gunn diode
	5 th	4.10 Principle of Operations of Tunnel Diode & Gunn diode
12 th	1 st	Unit-5: Broadband communication 5.1 Broadband communication system-Fundamental of Components and Network architecture
	2 nd	5.2 Cable broadband data network- architecture, importance & future of broadband telecommunication internet based network.
	3 rd	5.2 Cable broadband data network- architecture, importance & future of broadband telecommunication internet based network.
	4 th	5.3 SONET(Synchronous Optical Network)-Signal frame components topologies advantages applications, and disadvantages
	5 th	5.3 SONET(Synchronous Optical Network)-Signal frame components topologies advantages applications, and disadvantages

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


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