GOVERNMENT POLYTECHNIC FOR WOMEN
KANDAGHAT, DISTT. SOLAN (HP) - 173215

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

LESSON PLAN

Academic Year	2022-23
Semester	5TH
Subject Code	N2017-5.1
Subject Title	Basics of Management and Entrepreneurship Development
Name of Faculty	Nalini Mahajan, Lecturer MOP
Semester Start & End Dates	01.09.2022-20.12.2022

STUDY AND EVALUATION SCHEME

Sr. No.	Name of the Subject	Th	Pr	Internal Assessment			External Assessment					Total Marks
				Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
5.1	Basics of Management and Entrepreneurship Development	4	-	50	-	50	100	3	-	-	100	150

Subject objectives:

Day	Unit & Topic of Discussion	Topic objectives	Delivery Method
Unit-1 : Introduction to Management			
Day 1	Introduction to Management	Overview of syllabus, Definition of Management	Chalk and talk
Day 2	Management	Concept and Functions Management	Chalk and talk
Day 3	Various areas of Management	Human Resource Management	Chalk and talk
Day 4	Various areas of Management	Materials and Stores Management	Chalk and talk
Day 5	Various areas of Management	Marketing and Sales Management	Chalk and talk
Day 6	Various areas of Management	Financial Management	Chalk and talk
Day 7	Various areas of Management	Levels of Management	Chalk and talk
Day 8	Structure of an Organization	Meaning , Concept and Importance of Organization Structure	Chalk and talk
Day 9	Structure of an Organization	Types:- Line, Functional and Line & Staff Organization and revision	Chalk and talk
Unit-2 : Self-Management and Development			
Day 10	Life Long Learning Skills	Overview, Concept of Life Long Learning and Personality Development	Chalk and talk
Day 11	Life Long Learning Skills	Ethics and Moral values, concept of intelligence	Chalk and talk
Day 12	Concept of Physical Development	Significance of health, hygiene, body gestures	Chalk and talk
Day 13	Time Management	Concept and its importance	Exercise
Day 14	Intellectual Development	Reading and speaking Skills	Chalk and talk
Day 15	Intellectual Development	Listening and Writing Skills	Chalk and talk

Day 16	Intellectual Development	Critical thinking	Chalk and talk
Day 17	Intellectual Development	Problem Solving Techniques	Chalk and talk
Day 18	Psychological Management	Techniques of Stress Management	Chalk and talk
Day 19	Psychological Management	Techniques of Emotions Management	Exercise
Day 20	Psychological Management	Anxiety and their management, use of IT tools for impressive presentations and revision	Chalk and talk
Unit-3 : Team Management			
Day 21	Concept of Team Dynamics	Overview, Introduction, Team Dynamics and team related skills	Chalk and talk
Day 22	Team Dynamics	Managing cultural, social and ethnic diversity in a team	Chalk and talk
Day 23	Communication	Effective group communication and conversations.	Seminar
Day 24	Team Building	Various stages of team building	Exercise
Day 25	Leadership	Characteristics, functions and importance of leadership	Role play
Day 26	Leadership	Styles of Leadership	Chalk and talk
Day 27	Motivation	Need and importance of motivation	Chalk and talk
Day 28	Motivation	Maslow's theory of motivation and revision	Chalk and talk
Unit-4 : Project Management			
Day 29	Project Management	Overview, Methods of Project Management	Chalk and talk
Day 30	Project Management	Stages of Project Management	Chalk and talk
Day 31	Project Management	SWOT analysis and its applications and revision	Seminar
Unit-5 : Introduction to Entrepreneurship			
Day 32	Entrepreneurship	Overview, Concept and need of entrepreneurship	Chalk and talk
Day 33	Entrepreneurship	Entrepreneur and his qualities	Chalk and talk
Day 34	Entrepreneurship	Classification of entrepreneurs, Reasons for failure of an entrepreneur	Chalk and talk
Day 35	Business Ownerships	Its features, Forms of Business Ownership	Chalk and talk
Day 36	Business Ownerships	Sole Proprietorship	Chalk and talk
Day 37	Business Ownerships	Partnership, Public Private Partnership	Chalk and talk
Day 38	Business Ownerships	Joint Stock Company	Chalk and talk
Day 39	Industry	Micro, Small, Medium and Large Industries and revision	Chalk and talk
Unit-6 : Entrepreneurial Support System			
Day 40	Entrepreneurial support system	Overview, District Industries Centers (DIC's)	Chalk and talk
Day 41	Entrepreneurial support system	State Financial Corporation (SFC's)	Chalk and talk
Day 42	Entrepreneurial support system	Small Industries Service Institutes,	Chalk and talk
Day 43	Entrepreneurial support system	Commercial Banks	Chalk and talk
Day 44	Entrepreneurial support system	National Bank for Agriculture and Rural Development (NABARD)	Chalk and talk
Day 45	Entrepreneurial support system	Micro, Small, Medium Enterprises (MSME) and revision	Chalk and talk
Unit-7 : Market Study and Opportunity Identification			
Day 46	Market Study	Overview, Market Study and its importance	Chalk and talk
Day 47	Market Study	Types of market study- Primary and secondary	Chalk and talk
Day 48	Market Study	Product and Service Identification	Exercise
Day 49	Opportunity Identification	Assessment of Demand and Supply	Chalk and talk

Day 50	Opportunity Identification	Product and Service Identification	Chalk and talk
Day 51	Opportunity Identification	Sales Forecasting and its methods revision	Chalk and talk
Unit-8 : Project Report Preparation			
Day 52	Project report preparation	Overview, Preliminary Project Report	Chalk and talk
Day 53	Project report	Techno-economic feasibility report	Chalk and talk
Day 54	Project report	Detailed Project Report	Exercise
Day 55	Project report	Detailed Project Report	Chalk and talk
Day 56	Project report	Detailed Project Report and revision	Chalk and talk

	Name of Book	Author Name	Publication
Prescribed Books	Principles and Practice of Management	Shyamal Bannerjee	Oxford and IBM Publishing Co. New Delhi
	Entrepreneurship Development	CB Gupta and P Srinivasan	Sultan Chand and Sons, New Delhi
Reference Books	Management	James AF Stoner, R Edward Freeman and Daniel R Gilbert Jr.	Prentice Hall of India Pvt. Ltd., New Delhi
	A Handbook of Entrepreneurship	B S Rathore and Dr. J S Saini	
	Essentials of Management	H Koontz and O' Daniel	McGraw Hill

Faculty in Charge

HOD 27/8/22

GOVERNMENT POLYTECHNIC FOR WOMEN
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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

LESSON PLAN

Academic Year	**2022-23**
Semester	**5TH**
Subject Code	**N2017-5.2**
Subject Title	**DIGITAL COMMUNICATION**
Name of Faculty	**Nishi Verma, Lecturer ECE**
Semester Start & End Dates	**01.09.2022 -20.12.2022**

STUDY AND EVALUATION SCHEME

Sr. No.	Name of the Subject	Th	Pr	Internal Assessment			External Assessment					Total Marks
				Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
5.2	Digital Communication	4	2	30	20	50	100	3	50	3	150	200

Subject objectives:

Day	Unit & Topic of Discussion	Topic objectives	Delivery Method
	Unit-1 : Introduction		
Day 1	Introduction to Communication System	Review of previous learning of Analog Communication System and overview of syllabus	Chalk and talk
Day 2	Digital Communication System	Basic block diagram of digital communication systems and working	Chalk and talk
Day 3	Data Communication System	Basic block diagram of data communication systems and working	Chalk and talk
Day 4	comparison	Comparison of Digital Comm. System with analog communication systems.	Chalk and talk
	Unit-2 : Coding		
Day 5	Introduction to various common codes	Need of Coding and 5 bit Baudot code	Chalk and talk
Day 6	ASCII code	7 bit ASCII code and its importance	Chalk and talk
Day 7	ARQ & EBCDIC	ARQ & EBCDIC Codes and importance	Chalk and talk
Day 8	Code error detection and correction techniques	Types of Errors, error detection and correction techniques – Redundancy & parity check	Chalk and talk
Day 9	Code error detection technique BCC	block check character	Chalk and talk
Day 10	Code error detection technique VRC	Vertical Redundancy check method	Chalk and talk
Day 11	Code error detection technique LRC	Longitudinal Redundancy Check (LRC)	Chalk and talk
Day 12	Code error detection technique CRC	Cyclic Redundancy check method	Chalk and talk
Day 13	Correction technique Hamming code	Hamming code error correction technique	Chalk and talk
Day 14	Hamming code	Explanation of Hamming Code by Example	Chalk and talk

	Unit-3 : Digital Modulation Techniques		
Day 15	Digital Modulation Techniques	Digital Modulation & its various techniques	Chalk and talk
Day 16	Digital Modulation by ASK	Basic block diagram and principle of working of the following: - Amplitude shift keying (ASK)	Chalk and talk
Day 17	ASK	ASK Merits and Demerits	Chalk and talk
Day 18	ICW	Why ASK is also calledInterrupted continuous wave (ICW)	Chalk and talk
Day 19	Two tone modulation	FSK as two tone modulation	Chalk and talk
Day 20	Digital Modulation by FSK	principle of Frequency Shift keying (FSK)	Chalk and talk
Day 21	FSK	block diagram of FSK	Chalk and talk
Day 22	FSK	FSK Merits and Demerits	
Day 23	Digital Modulation by PSK	Principle of Phase shift keying (PSK)	Chalk and talk
Day 24	PSK	Block diagram of PSK	Chalk and talk
Day 25	Digital Modulation by QPSK	Quadrature Phase Shift Keying (QPSK)	Chalk and talk
Day 26	QPSK	QPSK Merits and Demerits	Chalk and talk
	Unit-4 : Characteristics / working of data transmission circuits		
Day 27	Data transmission circuits	Concept of data Transmission and Characteristics of data transmission circuits	Chalk and talk
Day 28	Characteristics of data transmission	bandwidth requirements	Chalk and talk
Day 29	Characteristics of data transmission	data transmission speeds	Chalk and talk
Day 30	Characteristics of data transmission	Effect of Noise in data transmission circuits	Chalk and talk
Day 31	Characteristics of data transmission	cross talk in data transmission circuits & reducing methods	Chalk and talk
Day 32	echo suppressors	Use of echo suppressors in data transmission circuits	Chalk and talk
Day 33	distortion	Types of distortion and its effect	Chalk and talk
Day 34	equalizers	Use of Equalizers and circuit equalization	Chalk and talk
	Unit-5 : Modems		
Day 35	Modems	Concept and Need of Modems	Chalk and talk
Day 36	Modems	Types of modems	Chalk and talk
Day 37	Modems	function of modems	
Day 38	Mode of operation	low speed	Chalk and talk
Day 39	Mode of operation	medium speed	Chalk and talk
Day 40	Mode of operation	high speed modems	Chalk and talk
Day 41	Modem interconnection	RS – 232 Modem interconnection	Chalk and talk
Day 42	Modem data transmission speed	Modem according to data transmission speed	Chalk and talk
Day 43	Modem modulation method.	Modem modulation method – Simplex, Half duplex and Full Duplex	Chalk and talk
Day 44	Modem modulation method	Analog and Digital Modulation	Chalk and talk
Day 45	Revision	Revision of above topics	
	Unit-6 : Digital telephone exchange		
Day 46	Digital exchange	Overview of digital exchange	Chalk and talk
Day 47	PBX exchange	Components and functions of PBX system	Chalk and talk
Day 48	digital exchange	block diagram and working of EPABX system, advantages & disadvantages	Chalk and talk
Day 49	Digital exchange SPC	Block diagram and working of Stored program control processor	Chalk and talk
Day 50	SPC	SPC applications in digital electronic exchanges.	Chalk and talk

	Unit-7 : Space and time switching		
Day 51	Switching	Switch, Types of switching	Chalk and talk
Day 52	Space switching	Working of Space switching	Chalk and talk
Day 53	Time switching	Working of time switching	Chalk and talk
Day 54	STS switching	Types and Working principle of STS switching.	Chalk and talk
Day 55	TST switching	Working principle of TST switching.	Chalk and talk
Day 56	Revision	Revision of above topics	Chalk and talk

	Name of Book	Author Name	Publication
Prescribed Books	Electronic Communication Systems	George Kennedy	Tata McGraw Hill Edition
	Electronics communication	K.S. Jamwal	Dhanpat Rai and Sons, Delhi
	Communication system	A.K. Gautam	S.K. Kataria Sons, Delhi
Reference Books	Data Communications and Networking	Behrouz A. Forouzan	Tata McGraw Hill Edition
	Advanced Electronic Communication Systems	Wayne Tomasi	PHI

Faculty in Charge

HOD 27/9/22

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

LESSON PLAN

Academic Year	**2022-23**
Semester	**V**
Subject Code	**N2017-5.3**
Subject Title	**OPTICAL FIBER COMMUNICATION**
Name of Faculty	**Nishant Sharma, Lecturer (ECE)**
Semester Start & End Dates	**01/09/2022 to 16/12/2022**

STUDY AND EVALUATION SCHEME

Sr. No.	Name of the Subject	Th	Pr	Internal Assessment			External Assessment					Total Marks
				Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
5.3	Optical Fiber Communication	4	2	30	20	50	100	4	50	2	150	200

Subject objectives:

Day	Unit & Topic of Discussion	Topic objectives	Delivery Method
	Unit-1 : Introduction		
Day 1	Introduction	Historical perspective, basic optical fibre communication systems, optical frequency range	Chalk & Talk
Day 2	Advantages, disadvantages & applications.	Advantages & Disadvantages of optical fiber communication, application of fiber optic communication	Chalk & Talk
Day 3	Electromagnetic spectrum	Frequency range and low loss windows	Chalk & Talk
Day 4	Principle of light penetration	Principle of OFC (TIR Condition), reflection	Chalk & Talk
Day 5	Principle of light penetration	Concept of critical incidence angle and critical propagation angle and concept of acceptance angle & numerical aperture	Chalk & Talk
Day 6	Critical angle & acceptance angle	Concept of critical incidence angle and critical propagation angle and concept of acceptance angle & numerical aperture	Chalk & Talk
	Unit-2 : Optical Fiber & Cables		
Day 7	Optical fibers	Constructional details of various optical fibers	Chalk & Talk
Day 8	Types of OFC	Multimode and Mono-mode fibers,	Chalk & Talk
Day 9	step index and graded index fibers	Step index and Graded index fibers	
Day 10	Types of OFC		
Day 11	Optical fiber cables	Types of optical fiber cables	Chalk & Talk
Day 12	Optical fiber cables	Types of optical fiber cables	Chalk & Talk
	Optical Fibers cable connectors	Connectors used in OFC	Chalk & Talk
Day 13	Slicing techniques	Techniques for joining fibers (Mechanical splicing)	Chalk & Talk
Day 14	Splicing techniques	Techniques for joining fibers (Fusion splicing)	
	Unit-3 : Losses in Optical Fiber Cable		

	Unit-3 : Losses in Optical Fiber Cable		
Day 15	Concept of Optical Loss and Introduction	Various loss in optical fiber	Chalk & Talk
Day 16	Absorption Losses	Concept of Absorption Losses	Chalk & Talk
Day 17	Scattering Losses	Concept of Scattering Losses	Chalk & Talk
Day 18	Radiation losses	Concept of Radiation losses	Chalk & Talk
Day 19	Connector losses	Concept of Connector losses	Chalk & Talk
Day 20	Bending loses.	Concept of Bending loses.	Chalk & Talk
Day 21	Dispersion	Introduction	
Day 22	Dispersion	Types of Dispersion: intermodal and intramodal	
Day 23	OTDR	Testing of losses using OTDR	
	Unit-4 : Optical Sources		Chalk & Talk
Day 24	Optical Sources	Characteristics of light used in optical communication	Chalk & Talk
Day 25	LED	Principle of operation of LED	Chalk & Talk
Day 26	LED structures	Different types of LED structures used and their brief description	Chalk & Talk
Day 27	LED structures	Different types of LED structures used and their brief description	Chalk & Talk
Day 28	Injection laser diode	Injection laser diode Introduction and working principle	Concept of ILD & principle of operation
	Injection laser diode	Different injection laser diodes	Chalk & Talk
Day 29	Injection laser diode	Different injection laser diodes	
Day 30	LED and ILD.	Comparison of LED and ILD	
	Unit-5 : Optical Detectors		
Day 31	Introduction of Optical detector	Characteristics of photo detectors	Chalk & Talk
Day 32	Types of Optical detector	Characteristics of photo detectors	Chalk & Talk
Day 33	Photo detectors	Characteristics of photo detectors used in optical communication	Chalk & Talk
	PIN diode	Basics of pn photodiode	
Day 34	PIN diode		Chalk & Talk
Day 35	Avalanche photo diode	Principle of operationAPD photodiode	Chalk & Talk
Day 36	Noise in detectors	Noise in detectors	Chalk & Talk
Day 37	Noise in detectors	Noise in detectors	Chalk & Talk
	Unit-6 : Optical Amplifiers		Chalk & Talk
Day 38	Optical amplifiers	Concept of optical amplifiers	Chalk & Talk
Day 39	Functional types	Pre, Post & In-line Amplifiers	Chalk & Talk
Day 40	Semiconductor & fiber optical amplifiers	Concept of SOA	Chalk & Talk
Day 41	Semiconductor & fiber optical amplifiers	Principal of operation of SOA	Chalk & Talk
Day 42	Types of SOA	Concept of FPA	Chalk & Talk
Day 43	Types of SOA	Concept of TWA	Chalk & Talk
Day 44	Semiconductor & fiber optical amplifiers	Applications, advantages & Drawbacks of SOA	Chalk & Talk
	EDFAS	Concept of EDFA	Chalk & Talk
Day 45	EDFAS	Concept of EDFA	Chalk & Talk
Day 46	Raman amplifiers	Concept of Raman amplifiers	Chalk & Talk
Day 47	Raman amplifiers	Types of Raman Amplifiers	Chalk & Talk
	Unit-7 : Optical Fiber System Application		Chalk & Talk
Day 48	Fiber to the x (FTTx)	Role of OFC in Fiber to the x (FTTx)	Chalk & Talk

	Fiber to the x (FTTx)	Role of OFC in Fiber to the x (FTTx)	Chalk & Talk
50	NGN (Next Generation Network)	Concept of NGN (Next Generation Network)	Chalk & Talk
ay 51	NGN (Next Generation Network)	Concept of NGN (Next Generation Network)	Chalk & Talk
Day 52	NFS(Need for Spectrum)	Concept of NFS(Need for Spectrum)	Chalk & Talk
Day 53	IOT(Internet of Things)	Concept of IOT(Internet of Things)	Chalk & Talk
Day 54	Revision of Unit 1 to Unit 2	Previous year question paper revision	
Day 55	Revision of Unit 3 to Unit 4	Previous year question paper revision	
Day 56	Revision of Unit 5 to Unit 7	Previous year question paper revision	

	Name of Book	Author Name	Publication
Prescribed Books	Optical Fiber Communication	John M. Senior	Prentice Hall of India
	Optical Fiber Communication	Gerd Keiser	McGraw Hill International Edition
Reference Books	Optical Fiber Communication	J.Gower	Prentice Hall of India
	Fiber Optic Communication Technology	Djafar K. Mynbaev Lowell L. Scheiner	Pearson

Faculty in Charge

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GOVERNMENT POLYTECHNIC FOR WOMEN
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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

LESSON PLAN

Academic Year	**2022**
Semester	**V**
Subject Code	**N-2017- 5.4**
Subject Title	**Microwave and Radar Engineering**
Name of Faculty	**Jaspal (Lect. ECE)**
Semester Start & End Dates	**01.09.2022 to 20.12.2022**

STUDY AND EVALUATION SCHEME

Sr. No.	Name of the Subject	Th	Pr	Internal Assessment			External Assessment					Total Marks
				Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
5.4	Microwave and Radar Engineering	4	2	30	20	50	100	3	50	3	150	200

Subject objectives: The Microwave and Radar Engineering, though complex but is essentially required to be taught for the studentds of Electronics and Communication Engineering. This subject includes an exposure to microwaves engineering, radar systems, fiber optics and satellite communication. In microwaves industry, job opportunities are available in of assembly, production, installation, repair and maintenance of microwave transmitters and receivers. The knowledge of radar systems allows opportunities with civil and defence organizations dealing with air craft and shipping. Fiber optics is the latest thrust area in communication with vast opportunities in the private sector.

Day	Unit & Topic of Discussion	Learning Outcome	Delivery Method
1. Introduction to Microwaves			
Day 1	Introduction to microwaves and its applications	LO-1. Explain the meaning of the term Microwave, frequency range of microwave. LO-2 Explain Various applications of Microwaves and microwave devices.	Chalk & Black Board Assig : To list various applications of microwaves (pictures)
Day 2 Day 3	Classification on the basis of its frequency bands (HF, VHF, UHF, L, S, C, X, KU, KA, mm, SUB mm).	LO -1 Explain the various frequency bands of microwaves. LO -2 Classify the applications of microwaves on the bases of bands. LO -3 Explain the design of waveguides on the bases of frequency bands	Chalk & Black Board Assignment: Classify the applications of microwaves on the bases of bands
Day 4 Day 5	Block diagram and working principles of microwave communication link Frequency Spectrum	LO- 1 Explain the various components of microwave link. LO -2 Demonstrate working of microwave communication link	Chalk & Black Board Lab Experiment :To measure electronics and mechanical tuning range of reflex klystron

2. Microwave Devices			
Day 6 Day 7	Basic concepts of thermionic emission and vacuum tubes,	LO – 1 Explain types of electron emission LO – 2 Explain the concept of thermionic emission	Chalk & Black Board Show videos on various types of electron emission techniques
Day 8 Day 9 Day 10 Day 11	Effects of inter electrode capacitance Lead Inductance and Transit time on the high frequency performance of conventional vacuum tubes, and steps to extend their high frequency operations.	LO – 1 Explain the high frequency limitations of conventional tubes LO – 2 Explain the effect of inter-electrode capacitance LO – 2 Explain the effect of lead inductance. LO – 4 Explain the effect of transit time LO – 5 Explain the steps to extend high frequency operations of vacuum tubes.	Chalk & Black Board Show videos on the relevant topics Lab Experiment: To measure VSWR of a given load
Day 12 Day 13	Construction, characteristics, operating principles and typical applications of Multi cavity Klystron	LO – 1 Explain the concept of velocity modulation. LO – 2 Demonstrate the working and tuning of Klystron	Chalk & Black Board Show videos on the construction and application of klystron
Day 14	Construction, characteristics, operating principles and typical applications of Reflex Klystron -	LO – 1 Explain the construction and working principles of reflex klystron LO – 2 Demonstrate the working and tuning of reflex klystron.	Chalk & Black Board Lab Experiment: To measure the Klystron frequency by slotted section method
Day 15 Day 16	Construction, characteristics, operating principles and typical applications of Multi-cavity magnetron -	LO – 1 Explain the construction and working principles of Multi-cavity magnetron. LO – 2 List the application of Magnetron	Chalk & Black Board
Day 17 Day 18	Construction, characteristics, operating principles and typical applications of Traveling wave tube -	LO – 1 Explain the construction and working principles of Traveling wave tube LO – 1 List the application of TWT	Chalk & Black Board Group disscussion on the Multi cavity Klystron - Reflex Klystron - Multi-cavity magnetron - Traveling wave tube - Gunn diode and - Impatt diode
Day 19 Day 20	Construction, characteristics, operating principles and typical applications of Gunn diode	LO – 1 Explain the construction and working principles of Gunn diode LO – 2 List the application of Gunn diode	
Day 21 Day 22	Construction, characteristics, operating principles and typical applications of Impatt diode	LO – 1 Explain the construction and working principles of Impatt diode LO – 2 List the application of impatt diode	Chalk & Black Board Quiz competition on microwave devices.
3. Waveguides			
Day 23	Rectangular and circular wave guides and their applications.	LO – 1 Explain construction criteria of rectangular and circular wave guides. LO – 2 List the applications of wave guides	Chalk & Black Board Demonstrate the various waveguides in LAB
Day 24	Mode of waveguide;	LO – 1 Explain the various modes of wave guide propagation.	Chalk & Black Board Show videos

Day 25 Day 26 Day 27	Propagation constant of a rectangular wave guide, cut off wavelength, guide wavelength and their relationship with free space wave length	LO – 1 Explain the propagation of TE, TM modes in waveguides. LO – 2 Calculate the cut off wavelength of wave guide.	Demonstrate in LAB to calculate the cutoff wavelength of wave guide.
Day 28 Day 29	Impossibility of TEM mode in a wave guide.	LO – 1 Explain the TEM mode in wave guide.	Chalk & Black Board Show videos
4. Microwave Components			
Day 30	Constructional features, characteristics and application of tees	LO – 1 Explain the construction and working of TEE LO – 2 Demonstrate the functioning and connection to TEE and Magic TEE	Chalk & Black Board Lab experiment : To verify the properties of magic tee
Day 31	Constructional features, characteristics and application of bends	LO – 1 Explain the construction of bends. LO – 2 Demonstrate the connection of E-Plane and H- Plane bends	Chalk & Black Board Lab demonstration
Day 32	Constructional features, characteristics and application of matched termination and twists,	LO – 1 Explain the construction of matched termination and twists. LO – 2 List the application of matched termination and twists.	Chalk & Black Board Lab demonstration
Day 33	Constructional features, characteristics and application of detector	LO – 1 Explain the construction and working detector. LO – 2 List the application of detector	Chalk & Black Board Lab demonstration
Day 34	Constructional features, characteristics and application of mount	LO – 1 Explain the construction and working of mounts LO – 2 List the application of mount	Chalk & Black Board Lab demonstration
Day 35	Constructional features, characteristics and application of slotted section	LO – 1 Explain the construction and working of slotted section. LO – 2 Demonstrate the use of slotted section.	Chalk & Black Board Lab demonstration
Day 36	Constructional features, characteristics and application of directional coupler	LO – 1 Explain the construction and working of directional coupler LO – 2 Demonstrate the use of direction coupler	Chalk & Black Board Lab experiment : To measure the directivity and coupling factor of a directional coupler
Day 37	Constructional features, characteristics and application of fixed and variable attenuator	LO – 1 Explain the construction and working principles of Impatt diode LO – 2 List the application of impatt diode.	Group activity in game for setting up of microwave link. Seminar on microwave components.
Day 38	Constructional features, characteristics and application of isolator, circulator and duplex	LO – 1 Explain the construction and working of isolator, circulator and duplexer. LO – 2 List the application of isolator, circulator and duplexer.	
Day 39	coaxial to waveguide adapter	LO – 1 Explain the connection of coaxial to waveguide.	

5. Microwave antennas			
Day 40 Day 41 Day 42	Structural characteristics and typical applications of Horn antenna	LO – 1 Explain the characteristics of Horn antenna. LO – 2 List the application of Horn antenna	Chalk & Black Board Lab demonstration
Day 43 Day 44 Day 45	Structural characteristics and typical applications of Dish antenna	LO – 1 Explain the characteristics of Dish antenna. LO – 2 List the application of Dish antenna.	Chalk & Black Board Lab demonstration
6. Radar System.			
Day 46 Day 47 Day 48	Introduction to radar, its various applications, radar range equation (no derivation) and its applications	LO – 1 Explain the need and operation of radar LO – 2 Explain the radar range equation LO – 3 List the applications of radars.	Chalk & Black Board Show videos Assignment : paste pictures of various radars.
Day 49 Day 50 Day 51 Day 52	Block diagram and operating principles of basic pulse radar. Concepts of ambiguous range, radar area of cross-section and its dependence on frequency.	LO – 1 Draw and Explain the Basic block diagram of radar. LO – 2 Explain the ambiguos range in radars LO – 3 Explain the relationship between frequency and radar cross-section area.	Chalk & Black Board Show videos Lab Experiment : To carry out installation of a dish antenna
Day 53 Day 54 Day 55 Day 56	Block diagram and operating principles of FMCW radars, and their applications	LO – 1 Draw and Explain the Basic block diagram of FMCW radar. LO – 2 List the applications of FMCW radar	

	Name of Book	Author Name	Publication
Prescribed Books	Microwave Devices and Components by,	Samuel Y Liao	Prentice Hall of India, New Delhi P
	Electronics Communication	Roddy and Coolen	Tata McGraw Hill
	Electronics Communication System	KS Jamwal	Dhanpat Rai & Sons, Delhi
	Microwave Engineering	M Kulkarni	---
	Microwave and Radar Engineering	Rajesh Dhiman	S. K Kataria and Sons

Faculty in Charge (ECE)

HOD(ECE) 23/8/22

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

LESSON PLAN

Academic Year	**2022-23**
Semester	**V**
Subject Code	**N-2017- 5.5.3**
Subject Title	**SATELLITE COMMUNICATION**
Name of Faculty	**Neha Badhan Lecturer (ECE)**
Semester Start & End Dates	**01.09.2022-20.12.2022**

STUDY AND EVALUATION SCHEME

Sr. No.	Name of the Subject	Th	Internal Assessment		External Assessment			Total Marks
			Th	Total	Th	Hrs	Total	
5.5.3	SATELLITE COMMUNICATION	4	50	50	100	3	150	150

Subject objectives: To understand the basics of satellite communications, different satellite communication orbits, the satellite segment and earth segment and provide an in-depth treatment of satellite communication systems operation and planning. It aims to analyze the various methods of satellite access, Link budgets & planning.. Aims to learn Digital audio/video broadcasting using satellites and understand various applications of satellite communications.

Day	Unit & Topic of Discussion	Topic objectives	Delivery Method
	Unit-1 : Introduction to Satellite Communication		
Day 1	Introduction to Satellite Communication	Historical background, ,	Chalk & Talk
Day 2	Introduction to Satellite Communication	Basic concepts of Satellite Communications	Chalk & Talk
Day 3	Introduction to Satellite Communication	Orbital and Spacecraft problems,	Chalk & Talk
Day 4	Introduction to Satellite Communication	Orbital and Spacecraft problems,	Chalk & Talk
Day 5	Introduction to Satellite Communication	Growth of Satellite communications.	Chalk & Talk
	Unit- 2 : Orbits and Launching Methods		
Day 6	Introduction	Introduction,	Chalk & Talk
Day 7	Kepler's Law	Kepler's First Law, Kepler's Second Law,	Chalk & Talk
Day 8	Kepler's Law	Kepler's Second Law, Kepler's Third Law,	Chalk & Talk
Day 9	Definitions of Terms for Earth	Orbiting Satellites, Orbital Elements	Chalk & Talk
Day 10	Definitions of Terms for Earth	Apogee and Perigee Heights, Atmospheric drag	Chalk & Talk

	Unit- 3 : The Geostationary Orbit		
Day 11	The Geostationary Orbit	Introduction	Chalk & Talk
Day 12	The Geostationary Orbit	Near Geostationary Orbits	Chalk & Talk
Day 13	The Geostationary Orbit	Earth Eclipse of Satellite	Chalk & Talk
Day 14	The Geostationary Orbit	Sun Transit Outage	Chalk & Talk
Day 15	The Geostationary Orbit	Launching Orbits	Chalk & Talk
	Unit-4 : The Space Segment		
Day 16	The Space Segment	Introduction	Chalk & Talk
Day 17	The Space Segment	The Power Supply	Chalk & Talk
Day 18	The Space Segment	Attitude Control	Chalk & Talk
Day 19	The Space Segment	Spinning satellite stabilization	
Day 20	The Space Segment	Momentum wheel stabilization, Station Keeping,	Chalk & Talk
Day 21	The Space Segment	Thermal Control	Chalk & Talk
Day 22	The Space Segment	TT&C Subsystem	
Day 23	The Space Segment	Transponders	Chalk & Talk
Day 24	The Space Segment	The wideband receiver	
Day 25	The Space Segment	The input demultiplexer, The power amplifier	Chalk & Talk
Day 26	The Space Segment	The Antenna Subsystem.	Chalk & Talk
	Unit-5 : The Earth Segment		
Day 27	The Earth Segment	Introduction	Chalk & Talk
Day 28	The Earth Segment	Receive-Only Home TV Systems,	Chalk & Talk
Day 29	The Earth Segment	Receive-Only Home TV Systems,	Chalk & Talk
Day 30	The Earth Segment	The outdoor unit, The indoor unit for analog (FM) TV	Chalk & Talk
Day 31	The Earth Segment	The outdoor unit, The indoor unit for analog (FM) TV	Chalk & Talk
Day 32	The Earth Segment	Transmit- Receive Earth Stations	Chalk & Talk
Day 33	The Earth Segment	Transmit- Receive Earth Stations	Chalk & Talk
	Unit-6 : The Space Link		
Day 34	The Space Link	Introduction	Chalk & Talk
Day 35	The Space Link	Equivalent Isotropic Radiated Power	Chalk & Talk
Day 36	The Space Link	Transmission Losses	Chalk & Talk
Day 37	The Space Link	Free-space transmission	Chalk & Talk
Day 38	The Space Link	Feeder losses	Chalk & Talk
Day 39	The Space Link	Antenna misalignment losses	Chalk & Talk
Day 40	The Space Link	Fixed atmospheric losses	Chalk & Talk
Day 41	The Space Link	Ionospheric losses	Chalk & Talk
Day 42	The Space Link	The Link- Power Budget Equation	Chalk & Talk
Day 43	The Space Link	System Noise	Chalk & Talk
Day 44	The Space Link	Carrier-to-Noise Ratio	Chalk & Talk
Day 45	The Space Link	The Uplink	Chalk & Talk

Day 46	The Space Link	Saturation flux density	Chalk & Talk
Day 47	The Space Link	Input backoff	Chalk & Talk
Day 48	The Space Link	Downlink	Chalk & Talk
Day 49	The Space Link	Output back-off	Chalk & Talk
Day 50	The Space Link	Combined Uplink and Downlink C/N Ratio.	Chalk & Talk
Day 51	The Space Link	Combined Uplink and Downlink C/N Ratio.	Chalk & Talk
	Unit-7 : The Space Link		
Day 52	Various access methods in satellite communication	Single Access	Chalk & Talk
Day 53	Various access methods in satellite communication	Preassigned FDMA	Chalk & Talk
Day 54	Various access methods in satellite communication	Preassigned TDMA	Chalk & Talk
	Unit-8 : VSAT		
Day 55	VSAT	Introduction to VSAT	Chalk & Talk
Day 56	VSAT	VSAT feature & applications	Chalk & Talk

	Name of Book	Author Name	Publication
Prescribed Books	Satellite Communication Systems Engineering	Wilbur L. Pritchard, Henri G. Suyderhoud, Robert A. Nelson (Second Edition),	Pearson
	Satellite Technology, Principles and Applications	Anil K. Maini, Varsha Agarwal (Second Edition)	Wiley
	Satellite Communication	Timothy Pratt, Charles Bostian, Jeremy Allnutt(Second Edition),	John Wiley & Sons.
Reference Books	Satellite Communication	Sapna Katiyar	Katosn books
	Satellite Communication	Dennis Roddy (Fourth edition)	McGraw Hill

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