

Lesson Plan

Name of Faculty : Arshad Jamal
Discipline : Electronics & Comm. Eng.
Semester : 6th
Subject : MICROWAVE AND RADAR ENGINEERING
Lesson Plan Duration : 16 weeks

Work load (Lecture /Practical) per week (in hours): Lectures—03, Practical—03

	Lecture Day	Topic (Including Assignment/ Test	Practical Day	Topic
1 st	1	Introduction to microwaves and its applications,	1 st	General idea's for lab Equipment's
	2	Classification on the basis of its frequency bands (HF, VHF, UHF, L, S, C, X, KU, KA, mm, SUB, mm)		
	3	Rectangular and circular wave guides and their applications		
2 nd	4	Mode of wave Guide	2 nd	To measure the electronics and mechanical tuning range of a reflex klystron
	5	Propagation constant of a rectangular wave guide		
	6	cut off wavelength, guide wavelength and their relationship with free space wavelength (no mathematical derivation)		
3 rd	7	Impossibility of TEM mode in a wave guide	3 rd	To measure the electronics and mechanical tuning range of a reflex klystron
	8	REVISION /Assignment		
	9	Constructional features, characteristics and application of tees, bends		
4 th	10	Constructional features, characteristics and application of matched termination & twists	4 th	To measure VSWR of a given load.
	11	Constructional features, characteristics and application of detector, mount, slotted section		
	12	Constructional features, characteristics and application of directional coupler		
5 th	13	Constructional features, characteristics and application of fixed and variable attenuator	5 th	To measure VSWR of a given load.
	14	Constructional features, characteristics and application of isolator, circulator		
	15	Constructional features, characteristics and application of duplex, coaxial to		

		wave guide adapter		
6 th	16	Assignment/ Test	6 th	To measure the Klystron frequency by slotted section method
	17	Basic concepts of thermionic emission and vacuum tubes		
	18	Effects of interelectrode capacitance, Lead Inductance and Transit time on the high frequency performance of conventional vacuum tubes		
7 th	19	steps to extend their high frequency operations	7 th	To measure the Klystron frequency by slotted section method
	20	Construction, characteristics, operating principles and typical applications of Multi cavity klystron		
	21	Construction, characteristics, operating principles and typical applications of Reflex klystron		
8 th	22	Construction, characteristics, operating principles and typical applications of Multi-cavity magnetron	8 th	Revision
	23	Construction, characteristics, operating principles and typical applications of Traveling wave tube		
	24	Construction, characteristics, operating principles and typical applications of Gunn diode and Impatt diode		
9 th	25	Revision	9 th	To measure the directivity and coupling of a directional coupler.
	26	Expert Lecture/ Quiz		
	27	General Trams and views for microwayse antennas		
10 th	28	Structure characteristics and typical applications of Horn antennas	10 th	To measure the directivity and coupling of a directional coupler.
	29	Structure characteristics and typical applications of Dish antennas		
	30	Revision / Quiz /expert Lecture		
11 th	31	Block diagram and working principles of microwave communication link.	11 th	To plot radiation pattern of a horn antenna in horizontal and vertical planes.
	32	Troposcatter Communication Troposphere and its properties		
	33	Troposcatter Communication Troposphere and its properties		
12 th	34	Tropospheric duct formation and propagation	12 th	To plot radiation pattern of a horn

	35	Tropospheric duct formation and propagation		antenna in horizontal and vertical planes.
	36	Roposcatter propagation.		
13 th	37	Assignment	13 th	To verify the properties of magic tee.
	38	Revision		
	39	Introduction to radar, its various applications		
14 th	40	radar range equation (no derivation) and its applications	14 th	To verify the properties of magic tee.
	41	Block diagram and operating principles of basic pulse radar		
	42	Concepts of ambiguous range, radar area of cross-section and its dependence on frequency		
15 th	43	Block diagram and operating principles with application of CW (Doppler radar)	15 th	Revision/ viva
	44	Block diagram and operating principles with application of FMCW radar		
	45	Block diagram and operating principles of MTI radar.		
16 th	46	Radar display- PPI	16 th	Revision/ viva
	47	Introduction to VSAT transponders multiple access techniques		
	48	VSAT and its features		

