

ECE 222 : Microwave Engineering Lab**Programme:** B.Tech (ECE)**Year:** 2nd**Semester :** II**Course Type :** CORE**Credits :** 2**Hours :** 30**Course Context and Overview (100 words):**

The objective of the course is to make students understand applications of RF and Microwave components (active and passive) and their characteristics by measurement of parameters like VSWR, wavelength, frequency, Attenuation, directivity etc.

Prerequisites Course(s): Engineering Electromagnetic**Course outcomes(COs):****On completion of this course, the students will:**

CO1: Have hands on experience ,understand equipment/components for RF and Microwave communication systems from source to termination and able to plot characteristics of the component.

CO2: Understand major applications of RF and Microwave components used for measurement like Power, VSWR, wavelength, frequency, Attenuation, directivity etc. and able to set up the test bench for them.

CO3: Develop understanding about measurement techniques at high frequency and equipments like VSWR meter, Power meter, Frequency meter.

CO4: Be able to describe the characteristics of microwave passive components like isolators, directional couplers, circulators, and magic tees

Course Topics:

S.No	Experiments conducted in the Odd Semester
1.	Study of Microwave component & Instruments at X Band.
2.	Reflex Klystron Characteristics.
3.	Frequency and wavelength Measurement.
4.	Measurement of Unknown Load Impedance and VSWR
5.	Study of Attenuator characteristics
6.	Horn Antenna characteristics.
7.	Measurement of the characteristics of a Directional Coupler.
8.	Study of characteristics of circulator and Power Division in Magic TEE.
9.	Study of Gunn Oscillator.

Textbook :

Microwave Engineering, M.L Sisodia, V.L Gupta, New Age International Publishers, 1st Ed, 2005

Reference books:

1. *Microwave Devices and Circuits*, Samuel Y. Liao, Prentice Hall, 2nd ed.
2. David M. Pozar , "Microwave Engineering", Wiley, 4th ed.
3. A. W. Cross, "Experimental Microwaves", Sanders Electronics Ltd.
4. Dennis Roddy, "Microwave Technology" , Prentice Hall
5. Principles of Microwave Measurement”, J. H. Bryant.

Web Resources:

1. http://www.iitk.ac.in/mimt_lab/vlab/index.php#

Evaluation Methods:

Item		Weightage
Lab performance	Report (9*10)/4	22.5
	Daily Evaluation (9*10)/4	22.5
Quiz	(30 *1)/2	15
Mid Term Exam	0.5*[Circuit (10)+Result (10)+ Report (10)+Viva (10)]	20
End Term Exam	0.5*[Circuit (10)+Result (10)+ Report (10)+Viva (10)]	20

GRADING POICY

1. **Continuous Evaluation** **22.5 (25% of Sum of Nine experiment, 90)**
2. **Lab Report** **22.5 (25% of Sum of Nine experiment, 90)**
3. **Quiz** **15**
4. **Lab Exam Mid Term** **20**
5. **Lab Exam End Term** **20**

Marks	GRADE
>= 90	A
80-89	AB
70-79	B
60-69	BC
50-59	C
40-49	CD
<40	F

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