

ELECTROMAGNETICS LAB

(Core Subject)

Course Code:	10B17EC573	Semester:	5 th Semester, B. Tech (ECE)
Credits:	1	Contact Hours:	2

Course Objectives

After the successful completion of the lab, student should be able to know about the different types of devices and their usage in x-band frequencies, know about the wave propagation and, know about the behavior of distributed elements at higher frequencies.

Course Outcomes

After studying this course the students would gain enough knowledge After the successful completion of the course, student should be able to:

1. To acquire the knowledge about the transmission lines (co-axial cable) and performing basic measurements.
2. To acquire the knowledge of x-band microwave test bench components and their properties.
3. To perform basic measurements on x-band microwave test bench.
4. To know how to perform the measurements at higher frequencies
5. To acquire a detailed knowledge of how to note down the observations and performing analysis on the data observed so that the experiments can be verified.

List of Experiments

1. To measure the frequency and wavelength of TE_{10} mode in a rectangular waveguide.
2. To measure the VSWR for different loads.
 - a. Low VSWR(Matched load)
 - b. Medium VSWR
 - c. High VSWR
3. To measure the unknown load impedance using the smith chart in a rectangular wave guide setup.
4. To match unknown impedance to characteristic impedance using stubs (with the help of slide-screw tuner).
5. To derive the fundamental and derived (secondary) parameters of a coaxial transmission line.

- a. Finding R, L, G and C using LCR meter.
 - b. Finding the attenuation constant as a function of frequency.
6. To find the reflection coefficient on a co-axial transmission line with different terminations.
 - a. Matched load
 - b. Open circuit
 - c. Short Circuit
 - d. $Z_L > Z_0$
 - e. $Z_L < Z_0$
 - f. Determining the dielectric constant of the coaxial cable used.
7. To study the behavior of a short transmission line as a reactive element. (Stub matching and input impedance measurement).
 - a. A small coaxial cable (electrically small) with open circuit.
 - b. A small coaxial cable (electrically small) with short circuit.

Evaluation Scheme

1. Mid Sem Evaluation	20 Marks
2. End Sem Evaluation	20 Marks
3. Attendance	15 Marks
4. Class response	30 Marks
5. File	15 Marks
Total Marks	100 Marks

Text-Books:

1. David M. Pozar, 'Microwave Engineering', 4thed, John Wiley & Sons
2. Prof. Dr. Sunil Bhooshan, 'Fundamentals of Engineering Electromagnetics', Oxford University press, 2012.

