

# ELECTROMAGNETICS LAB

(Core Subject)

<b>Course Code:</b>	10B17EC573	<b>Semester:</b>	5 <sup>th</sup> Semester, B. Tech (ECE)
<b>Credits:</b>	1	<b>Contact Hours:</b>	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
<b>Total Marks</b>	<b>100 Marks</b>

### **Text-Books:**

1. David M. Pozar, 'Microwave Engineering', 4<sup>th</sup>ed, John Wiley & Sons
2. Prof. Dr. Sunil Bhooshan, 'Fundamentals of Engineering Electromagnetics', Oxford University press, 2012.

