

Introduction

- Microwave engineering is an advanced course in electronics where the Kirchhoff laws fail. This happens as operating at smaller wavelengths will lead to changes in behavior of circuit components with their dimensions.
- Maxwell equations which are more generalized laws than Kirchhoff laws are used to study, analyze, design and test microwave devices and circuits.

Scope of the Lab

- During the course the student will learn how to use various microwave equipment and components.
- They will determine and plot the characteristics of Gunn Oscillator, Reflex klystron and other passive microwave components.
- They will also learn how to use various simulation software to design various microwave devices with desired characteristics, scattering parameters and field patterns.

List of experiments

- Familiarization of Microwave Lab Components and Equipment.
- Study of Gunn Diode Characteristics.
- Characterization of Reflex Klystron.
- Frequency Measurement .
- Determination of VSWR and Reflection Coefficient.
- Study of Microwave components-I
 - (i) Attenuator &
 - (ii) Directional Coupler.
- Study of Microwave components-II
 - (i) E Plane Tee
 - (ii) H Plane Tee &
 - (iii) Magic Tee.
- Study of Circulator Characteristics
 - (i) T Circulator &
 - (ii) Y Circulator.
- Impedance measurement.
- Study and Characterization of Horn Antennas.
- Design of Waveguides using ANSYS HFSS.
- Design of Microstrip Antenna using ANSYS HFSS.
- Design of Microstrip Quadrature Hybrid using ANSYS HFSS.
- Design of Ring Hybrid using ANSYS HFSS.

Lab Equipment and Components



X-band Microwave Test Bench

Simulation Software

- ANSYS Academic Teaching High Frequency (Perpetual) HFSS
- CST STUDIO SUITE (Perpetual), Bio models, Antenna magus.
- AWR Office
- Console
- Mathcad
- OriginPro 2022
- ADS software

Application Areas

- Radar
- Broadband wireless communications
- Remote sensing
- Transmission lines
- Satellite communications.
- Extraterrestrial communications

Contact Details

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