

# **AMET 22 RF & Microwave Engineering**

## **1. INTRODUCTION**

What are Microwaves, Characteristic Features of Microwaves, Applications of Microwaves, Outline of Books

## **2. TRANSMISSION STRUCTURES AND RESONATORS**

Transmission Lines, Waveguides, Resonators.

## **3. GENERATION OF MICROWAVES BY VACUUM TUBES**

Limitations of Conventional Tubes, Klystron Amplifiers, Relax Klystron Oscillator, Magnetrons, Traveling Wave Tubes (TWT).

## **4. MICROWAVE SOLID STATE SOURCES**

Bipolar Transistors, field Effect Transistors, Transferred Electron Oscillators, Avalanche Diode Oscillators.

## **5. MICROWAVE NETWORK REPRESENTATION**

Kirchhoff's Laws and Maxwell's Equations, Voltages and Currents, Waveguide Impedance, Scattering Matrix Representation, Scattering Matrices for some typical Networks.

## **6. MICROWAVE MEASUREMENTS**

Detection of Microwaves, Microwave Power Measurement, Impedance Measurement, Measurement of Scattering Parameters, Frequency Measurement.

## **7. PASSIVE CIRCUIT COMPONENTS**

Impedance Transformers, Microwave Filters, Directional Couplers.

## **8. FERRITE DEVICES**

Introduction, Ferrites and Tensor Permeability, Wave Propagation in a Ferrite Medium, Faraday Rotation in Ferrites, Isolator Circulators, Faraday rotation Switch and Modulator, Port Circulators, Resonance Absorption in Ferrites, YIG Resonators.

## **9. MICROWAVE CONTROL AND LOGIC COMPONENTS**

PIN diodes, PIN diode Switches, Phase Shifters, PIN Attenuators, Modulators and Limiters, Logic Circuits using transferred Electron Devices, logic Circuits using GaAs MESFETs.

## **10. MICROWAVE INTEGRATED CIRCUITS**

Planar Transmission Lines, Technology of Hybrid MICs, Advantages of MICs, Difficulties with MICs.

## **11. LUMPED ELEMENTS AT MICROWAVE FREQUENCIES**

Design of Lumped Elements, Fabrication of Lumped Elements, Measurements on Lumped Elements, Circuits using Lumped Elements.

## **12. INDUSTRIAL APPLICATION**

Industrial Control and Measurements, Doppler Motion Sensors, Applications Based on Microwave Heating.

