AMTC22 RF AND MICROWAVE ENGINEERING

UNIT-1 INTRODUCTION
1.1 What are Microwaves,
1.2 Characteristic Features of Microwaves,
1.3 Applications of Microwaves, Outline of Books

UNIT-2 TRANSMISSION STRUCTURES AND RESONATORS
2.1 Transmission Lines,
2.2 Waveguides,
2.3 Resonators.

UNIT-3 GENERATION OF MICROWAVES BY VACUUM TUBES
3.1 Limitations of Conventional Tubes,
3.2 Klystron Amplifiers, Relax Klystron Oscillator,
3.3 Magnetrons,
3.4 Traveling Wave Tubes (TWT).

UNIT-4 MICROWAVE SOLID STATE SOURCES
4.1 Bipolar Transistors, field Effect Transistors,
4.2 Transferred Electron Oscillators,
4.3 Avalanche Diode Oscillators.

UNIT-5 MICROWAVE NETWORK REPRESENTATION
5.1 Kirchhoff's Laws and Maxwell's Equations,
5.2 Voltages and Currents,
5.3 Waveguide Impedance,
5.4 Scattering Matrix Representation,
5.5 Scattering Matrices for some typical Networks.

UNIT-6 MICROWAVE MEASUREMENTS
6.1 Detection of Microwaves,
6.2 Microwave Power Measurement,
6.3 Impedance Measurement,
6.4 Measurement of Scattering Parameters,
6.5 Frequency Measurement.

UNIT-7 PASSIVE CIRCUIT COMPONENTS
7.1 Impedance Transformers,
7.2 Microwave Filters, Directional Couplers.

UNIT-8 FERRITE DEVICES
8.1 Introduction, Ferrites and Tensor Permeability,

8.2 Wave Propagation in a Ferrite Medium,

8.3 Faraday Rotation in Ferrites,

8.4 Isolator Circulators,

8.5 Faraday rotation Switch and Modulator,

8.6 Port Circulators, Resonance Absorption in Ferrites,

8.7 YIG Resonators.

UNIT-9 MICROWAVE CONTROL AND LOGIC COMPONENTS

9.1 PIN diodes, PIN diode Switches,

9.2 Phase Shifters, PIN Attenuators,

9.3 Modulators and Limiters,

9.4 Logic Circuits using transferred Electron Devices,

9.5 Logic Circuits using GaAs MESFETs.

UNIT-10 MICROWAVE INTEGRATED CIRCUITS

10.1 Planar Transmission Lines,

10.2 Technology of Hybrid MICs,

10.3 Advantages of MICs,

10.4 Difficulties with MICs.

UNIT-11 LUMPED ELEMENTS AT MICROWAVE FREQUENCIES

11. Design of Lumped Elements,

12. Fabrication of Lumped Elements,

13. Measurements on Lumped Elements,

14. Circuits using Lumped Elements.

UNIT-12 INDUSTRIAL APPLICATION

12.1 Industrial Control and Measurements,

12.2 Doppler Motion Sensors,

12.3Applications Based on Microwave Heating.

Reference Books:

1. Detlefsen J, Siart U (2009) Grundlagen der Hochfrequenztechnik. Oldenbourg.
2. Heuermann H (2009) Hochfrequenztechnik. Vieweg.
3. Pozar DM (2005) Microwave Engineering. John Wiley & Sons.
4. Dellsperger F (2010) Smith-Chart Tool http://www.fritz.dellsperger.net/downloads.htm.