ECMC1T5A: Planer Transmission Lines & Microwave Integrated Circuits

Unit – I : Review of Transmission Line Theory:

Basic characteristics of homogeneous transmission lines, parallel plate lines & co-axial transmission lines.

Unit - II Transmission Line Structures for Microwave Integrated Circuits (MIC):

Strip lines, Microstrip Lines, suspended & inverted microstrip lines, coplanar lines, slot line, fin-line and their analysis methods & applications.

Unit – III : Analysis of Microstrip Lines:

Analysis of Microstrip lines, coupled microstrip, Even and odd modes, Branch line couplers, Design and fabrication of lumped elements for MICs, Comparison with distributed circuits.

Unit – IV : Introduction to Microwave Integrated Circuits (MICs):

Introduction, Types of MICs and their technology, Propagating models, Analysis of MIC by conformal transformation, Numerical method, Hybrid mode analysis, Losses in microstrip, Introduction to slot line and coplanar waveguide.

Unit – V : Passive Components in Microwave Integrated Circuits (MICs):

Primary lumped elements - capacitors, inductors, resistors; terminations, resonators, Attenuators, discontinuities, use of Discontinuities in MIC, methods of discontinuity analysis, discontinuities in other transmission lines.

Unit – VI: Microwave Integrated Circuits (MIC) Active Components:

Ferrimagnetic substrates and inserts, Microstrip circulators, Phase shifters, Microwave transistors, Parametric diodes and amplifiers, PIN diodes, Transferred electron devices, Avalanche diodes, IMPATT, BARITT devices.

Unit – VII : Microwave Integrated Circuits (MIC) High & Low Power Circuits:

Introduction, Impedance transformers, Filters, High power circuits, Low power circuits, MICs in Radar and satellite.

Unit – VIII : Monolithic Microwave Integrated Circuits (MMICS) Technology:

Fabrication process of MMIC, Hybrid MMICs, Dielectric substances, Thick film and thin film technology and materials, Testing methods, Encapsulation and mounting of devices.

Text Books:

1. Gupta K.C and Amarjit Singh, "Microwave Integrated Circuits", John Wiley, New York, 1975
2. Hoffman R.K "Hand Book of Microwave Integrated Ciruits", Artech House, Boston, 1987

Reference Books:

1. Leo G. Maloratskyv “Passive RF & Microwave Integrated Circuits”. Newnes.
2. Harvey Lehpamer “Microwave Transmission Networks” TMH edition.
3. Peter A RIZZI “Microwave Engineering Passive circuits” PHI.
4. I.Kneppo , J.Fabian & M.Pavel “Microwave Integrated Circuits” Springer international edition.