PVP 22

MICROWAVE NETWORKS

22ECMC2T3   **Credits: 4**
Lecture: 4 periods/week   **Internal assessment: 40 marks**
                                                    Semester end examination: 60 marks

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Prerequisites: Transmission lines &Wave guides, Microwave Engineering

Course Outcomes:

At the end of the course Student will be able to

- Apply different two port network parameters to microwave networks (L3)
- Analyze impedance matching networks using S matrix (L4)
- Apply various Excitation techniques to waveguides, and cavities (L3)
- Design various microwave filters (L4)

UNIT I
Introduction to Circuit Concepts: The Network concept, One-port network, Two-port network, Impedance and Equivalent voltages and currents, Impedance and Admittance Matrices, The Transmission (ABCD) Matrix-relation to Impedance Matrix, Equivalent circuits for two port networks, Parameter conversion, Signal flow graphs

UNIT II
Scattering Matrix and Matching Networks: Formulation for N-port network, S-Matrix for Reciprocal and Lossless junctions, shift in Reference plane, Generalized S-Matrix, conversion of S-parameters to other network parameters. Matching Networks: Matching with Lumped elements (L Networks), The Quarter wave Transformer, Single-stub tuning, Double-stub tuning

UNIT III
Excitation of Waveguides &Cavities: Waveguide Feeds, Excitation of waveguides-Electric and Magnetic current, Aperture coupling. Basics of Rectangular and Cylindrical cavities. Equivalent circuits for cavities-Aperture coupled cavity, Loop coupled cavity. Field expansion in a general cavity, Excitation of cavities

UNIT IV
Filters: Introduction, Filter Design- Image parameter and Insertion Loss methods. Filter Transformations, Filter Implementation (Richard's Transformation and Kuroda's Identities)

Learning Resources

Text Books

1. Robert E. Collin, Foundations for Microwave Engineering", 2nd Ed., Tata McGraw Hill.
2. David M. Pozar, Microwave Engineering, 2nd Ed., Wiley student Edition.

References

1. Jerome L. Altman, Microwave Circuits, The Von Nostrad Series.

E – Resources
   1. https://nptel.ac.in/courses/108103141