

4/4 B.Tech - SEVENTH SEMESTER

EC 7T5B

Microstrip Antennas

Credits: 3

Lecture : 3 periods/week

Internal assessment: 30 marks

Tutorial: 1 period /week

Semester end examination: 70 marks

Prerequisites: Microwave Engineering (EC6T3)

Course Objectives:

- To analyse the concepts of micro strip radiators.
- To design and analyse different types of antennas.
- To explore different antenna feeding techniques for real time implementation

Learning Outcomes:

Student will be able to

- Conceptualize Microstrip radiators.
- Design and Analyse different types of antennas.
- Use different antenna feeding techniques.

UNIT-I

Microstrip Radiators-I: Definition, Advantages and Disadvantages, Applications of Micro strip Antenna, Radiation Mechanism of Microstrip antenna. Radiation Fields- Vector Potentials and Radiation field formulation, Micro strip antenna characteristics, and calculations.

UNIT-II

Microstrip Radiators-II: Various Microstrip antenna configurations- Microstrip Patch antenna, Printed Slot antenna, Printed Dipole antenna, Microstrip Traveling wave antenna. Surface Wave Phenomena

UNIT-III

Rectangular Microstrip Antennas: Transmission Line Model- Fringing effects, effective length, resonant frequency, Effective width, Design.

UNIT-IV

Circular Patch Antennas: Electric and Magnetic fields, Resonant Frequencies, Design, Equivalent Current densities and Fields Radiated, Conductance and Directivity, Resonant Input Resistance.

UNIT-V

Microstrip Antenna Feeds: Introduction, Coupling to Micro strip Patches- Co-planar Coupling to a single patch, Series array to Co-planar coupling, probe coupling, Aperture Coupling, Electromagnetic Coupling. Parallel and Series Feed Systems- Parallel feeds for one and two dimensions, series feed for one dimension.

Learning Resources

Text Books:

1. Micro strip Antenna Design Hand Book – Ramesh Garg, Prakash Bhartia, Inder Bahl, Apisak Ittipiboon, Artech House, second edition 2001
2. Antenna Theory –Constantine A. Balanis, Second Edition, John Wiley& Sons.2001.

References:

1. Hand book of Microstrip Antennas, J.R. James and P.S.Hall, peter peregrinus Ltd.,London, 1st ed.,1989
2. Microwave Engineering using Microstrip Circuits- E.H.Fooks, .Zakarevicius, Prentice Hall, first edition, 1990.

Web Resources:

1. <https://rze-falbala.rz.e-technik.fh-kiel.de/~splitt/html/Mstrip40LabManual.pdf>
2. <http://elearning.vtu.ac.in/16/ENotes/Antenna%20&%20Propogation/E-Notes4AP/Unit3-HVK.pdf>
3. www.iaeng.org/publication/WCE2011/WCE2011_pp1013-1016.pdf