CU5003 ADVANCED ANTENNA DESIGN

DETAILED SYLLABUS

OBJECTIVES

- To understand the antenna radiation characteristics and arrays.
- To enhance the student knowledge in the area of various antenna design.
- To enhance the student knowledge in the area of antenna for practical applications.

UNIT I ANTENNA FUNDAMENTALS AND ARRAYS

Review of Electromagnetic Wave equations, Radiation integrals, Radiation from surface and line current distributions – dipole, monopole, loop antenna, Antenna parameters, linear array theory, frequency scanned arrays, phased arrays-Retro directive and self-phased arrays. Introduction to numerical techniques.

UNIT II MICRO STRIP ANTENNA

Radiation Mechanism from patch; transmission line model based analysis, cavity model, Excitation techniques; Microstrip dipole; Rectangular patch, Circular patch, Microstrip Yagi antenna, Microstrip array, Gain improvement techniques in microstrip antenna.

UNIT III APERTURES AND REFLECTOR ANTENNAS

Field equivalence principle, Radiation from Rectangular and Circular apertures, Uniform aperture distribution on an infinite ground plane, Babinets principle, Slot antenna; Horn antenna; Reflector antenna, aperture blockage, and design consideration, Design of C band and Ku band reflector antenna.

UNIT IV MODERN ANTENNA STRUCTURES

Frequency independent antenna, spiral antenna, active antenna, dielectric antenna, Leaky wave antenna, Plasma antenna, wearable antenna, reconfigurable antenna, meta material, EBG antenna, Frequency selective structures, Broad band and multi band antenna, Antenna for cellular base stations, MIMO antennas.

UNIT V ANTENNA FOR SPECIAL APPLICATIONS

Antenna for EMI/EMC testing, Antenna for EM issues in medical diagnosis and treatment, Antenna for MRI systems, Antenna for 60 GHz applications, RFID antenna, Antenna for wireless charging systems, Antenna for automobile radar, Terahertz antennas, antenna for sensor applications.

REFERENCES

1. Balanis.A, “Antenna Theory Analysis and Design”, John Wiley and Sons, New York, 1982.
2. Hubregt.J.Visser “Antenna Theory and Applications” 1st Edition, John Wiley & Sons
3. Ltd, Newyork,2012.
4. John D Krauss, Ronald J Marhefka and Ahmad S. Khan, "Antennas and Wave Propagation: Fourth Edition, Tata McGraw-Hill, 2006.
5. Zhijun Zhang” Antenna Design for Mobile Devices” 1st Edition, John Wiley & Sons (Asia) Ltd, Newyork, 2011.