GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. Wireless Communication Technology (EC)

Semester: I

Subject Name: **Advanced Radiation Systems (Major Elective-I)**
Subject Code: **714405**

Sr. No	Course Content
1	**BASICS CONCEPTS OF RADIATION** Radiation from surface current and current line current distribution, Basic antenna parameters, Radiation mechanism-Current distribution of an Antennas, Impedance concept-Balanced to Unbalanced transformer
2	**RADIATION FROM APERTURES** Field equivalence principle, Rectangular and circular apertures, Uniform distribution on an infinite ground plane, Aperture fields of Horn antenna-Babinets principle, Geometrical theory of diffraction, Reflector antennas, Design considerations - Slot antennas
3	**SYNTHESIS OF ARRAY ANTENNAS** Types of linear arrays, current distribution in linear arrrays, Phased arrays, Optimization of Array patterns, Continuous aperture sources, Antenna synthesis techniques
4	**MICRO STRIP ANTENNAS** Radiation mechanisms, Feeding structure, Retangular patch, Circular patch, Ring antenna. Input impedance of patch antenna, Microstrip dipole, Microstrip arrays
5	**EMI S/EMC/ANTENNA MEASUREMENTS** Log periodic, Bi-conical, Log spiral ridge Guide, Multi turn loop, Travelling Wave antenna, Antenna measurement and instrumentation , Amplitude and Phase measurement, Gain, Directivity. Impedance and polarization measurement, Antenna range, Design and Evaluation
6	**MATERIAL FOR ANTENNA:** Material selection for antenna to be designed, understanding the Specifications – errors responses – corrections methods.
7	**SPECIAL TOPICS FOR ANTENNA DESIGN and MEASUREMENT** Techniques to miniaturize an antenna for wireless LAN and Blue tooth applications, Wide-band and multi-band antennas, Mobile antennas and antenna diversity, Reconfigurable antennas, Practical consideration in designing antennas for wireless communications
8	**PRACTICAL ANTENNA DESIGN:** Measurement of various antenna parameters necessarily needed for practical antennas, Understanding the working and design of anechoic chamber

Text Books:

1. Kraus.J.D.,"Antennas"John wiley and Sons ,1997
2. Balanis C A, Antenna Theory: design and applications, Wiley

Reference Books:

1. Hohnson R C and H Jasik, Antenna Engineering Handbooks, McGraw Hill
2. Sadiku N O Mathew, Elements of Electromagnetics, Oxford Univ Press
3. Harrington R F, Time harmonic Electromagnetic Fields, McGraw Hill
4. Collin.R.E. and Zucker.F.,"Antenna Theory"Part I,Mc Graw Hill,New York,1969