## THIRD YEAR

Antenna Theory and Design	COE303
Prerequisite : COE208	(3-2-1-2)

Fundamental Concepts: Physical concept of radiation, Radiation pattern, near- and far-field regions, reciprocity, directivity and gain, effective aperture, polarization, input impedance, efficiency, Friis transmission equation, radiation integrals and auxiliary potential functions. Radiation from Wires and Loops: Infinitesimal dipole, finite-length dipole, linear elements near conductors, dipoles for mobile communication, small circular loop. Aperture Antennas: Huygens' principle, radiation from rectangular and circular apertures, design considerations, Babinet's principle, Radiation from sectoral and pyramidal horns, design concepts. Broadband Antennas: Broadband concept, Log-periodic antennas, frequency independent antennas. Microstrip Antennas: Basic characteristics of microstrip antennas, feeding methods, methods of analysis, design of rectangular and circular patch antennas. Antenna Arrays: Analysis of uniformly spaced arrays with uniform and non-uniform excitation amplitudes, extension to planar arrays. Basic Concepts of Smart Antennas: Concept and benefits of smart antennas, Fixed weight beam forming basics, Adaptive beam forming.

**Practical part:** Basics and Introduction. Far field, Standing Wave Ratio, Polarization, Radiation Pattern for different antennas, Gain calculations, Antenna arrays, Smart antennas.