

Course Type	Course Code	Name of Course	L	T	P	Credit
DE	ECD401	Antenna and Wave Propagation	3	0	0	9

Course Objective
The objective of the course is to provide an overall concept on antenna theory and propagation with an emphasis on basic antenna geometries, theorems, measurement, and wave propagation.
Learning Outcomes
<p>Upon successful completion of this course, students will be:</p> <ul style="list-style-type: none"> familiar to basic antenna theorems, antenna parameters, and antenna operation. familiar to different kinds of antennas, such as, wire antennas, aperture antennas, reflector antennas and antenna array. able to measure different antenna parameters in laboratory and characterize an antenna. able to understand how the radiated field propagates between the antenna terminals.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Unit 1: Introduction to antenna, Network Theorems and their application to antennas, Antenna parameters, Friis transmission equation and radar range equation, radiation mechanism from dipole.	10	Students will be familiar to basic antenna theorems, antenna parameters, and antenna operation.
2	Unit 2: Potential function and EM field, Radiation from quarter wave monopole and half wave dipole, broadband dipoles, Helical antenna, Loop antenna.	9	Students will be familiar to different kinds of wire antennas
3	Unit 3: Two element array, Linear array, Multiplication of pattern, Antenna impedance, Mutual coupling in arrays.	6	Students will be familiar to array formation and array characteristics of antenna elements
4	Unit 4: Spiral antenna, Log-periodic antenna, Yagi-Uda antenna.	6	Students will be familiar to different kinds of broadband antennas.
5	Unit 5: Horn antenna, Microstrip antenna, Reflector antenna, Antenna measurement.	6	Students will be familiar to different kinds of aperture and reflector antennas. They will also understand how different antenna parameters, described in unit 1, can be measured in laboratory.
6	Unit 6: Effects of Atmosphere on Propagation, Ground Wave and Sky Wave Propagation, Space Wave Propagation, Scattering propagation, Duct Propagation.	5	Students will understand how the radiated field propagates between the antenna terminals.

Text Books:

- Antenna Theory-Analysis and design, C. A. Balanis, Wiley Student Edition.
- Electromagnetic waves and radiating Systems, E. C. Jordan and K. G. Balmain, Prentice-hall of India Pvt. Ltd.

Reference Books:

- Antenna and wave propagation, A. R. Harish and M. Sachidananda, Oxford University press.
- Antenna and wave propagation, J. D. Kraus, R. J. Marhefka and A. S. Khan, Mc Graw Hill.