

| 18ECPE706 | | ADVANCED RADIATING SYSTEM | | L | T | P | C |
|---|---|--|--|----------|----------|----------|---|
| | | | | 3 | 0 | 0 | 3 |
| Course Objectives: | | | | | | | |
| 1. | To understand the fundamentals in antenna design | | | | | | |
| 2. | To understand radiation from apertures, array and microstrip antennas. | | | | | | |
| 3. | To understand EMC and antenna measurement techniques. | | | | | | |
| Unit I | ANTENNA FUNDAMENTALS | | | 9 | + | 0 | |
| Antenna fundamental parameters Radiation integrals - Radiation from surface and line current distributions: Dipole, Monopole - Loop antenna - Mobile phone antenna - Base station - Hand set antenna - Reciprocity theorem - Broadband antennas and matching techniques - Balance to unbalance transformer - Introduction to numerical techniques . | | | | | | | |
| Unit II | RADIATION FROM APERTURES | | | 9 | + | 0 | |
| Field equivalence principle - Radiation from Rectangular and Circular apertures - Uniform aperture distribution on an infinite ground plane - Slot antenna - Horn antenna - Reflector antenna - Aperture blockage and design consideration. | | | | | | | |
| Unit III | ARRAY ANTENNA | | | 9 | + | 0 | |
| Uniform array - Phased array, beam scanning - Grating lobe - feed network, Linear array synthesis techniques - Binomial and Chebyshev distributions - Super Directivity - Planar array- Circular array - Design problems. | | | | | | | |
| Unit IV | MICRO STRIP ANTENNA: | | | 9 | + | 0 | |
| Radiation Mechanism and Excitation techniques : Microstrip dipole - Patch - Rectangular patch - Circular patch - and Ring antenna – Radiation analysis from cavity model - Input impedance of rectangular and circular patch antenna - Microstrip array and feed network - Applications of Microstrip array antenna. | | | | | | | |
| Unit V | EMC ANTENNA AND ANTENNA MEASUREMENTS | | | 9 | + | 0 | |
| Concept of EMC measuring antenna – Transmission and Receiving antenna factors - Log periodic dipole - Bi-conica - Ridge guide- Multi turn loop - Antenna measurement and Instrumentation: Gain, Impedance and antenna factor measurement - Antenna test range Design. | | | | | | | |
| Total (L+T)= 45 Periods | | | | | | | |
| Course Outcomes: | | | | | | | |
| Upon completion of this course, the students will be able to: | | | | | | | |
| CO1 | : | Solve and design basic problems antennas | | | | | |
| CO2 | : | Analyse radiation from aperture, array and microstrip antennas | | | | | |
| CO3 | : | Understand EMC for any electronic equipments | | | | | |
| CO4 | : | Use measurement techniques to study radiation pattern. | | | | | |
| Text Books: | | | | | | | |
| 1. | Balanis A, "Antenna Theory Analysis and Design", John Wiley and Sons, New York, 2009 | | | | | | |
| 2. | Robert S Elliot " Antenna Theory and Design" , Wiley Publisher , 2015 | | | | | | |
| Reference Books: | | | | | | | |
| 1. | Krauss J D, " Antennas", John Wiley and sons, New York, 2009. | | | | | | |
| 2. | Bahl I J and Bhartia P, " Microstrip Antennas", Artech House, Inc., 1980 | | | | | | |
| 3. | Stutzman W L and Thiele G A, " Antenna Theory and Design", John Wiley and Sons Inc., 1998. | | | | | | |
| 4. | R.E.Collins, " Antrennas and Radio Propagation", McGraw-Hill, 1987. | | | | | | |
| E-References: | | | | | | | |
| 1. | https://onlinecourses.nptel.ac.in/noc18_ee13/preview | | | | | | |
| 2. | https://www.edx.org/course/electricity-and-magnetism-maxwells-equations | | | | | | |
| 3. | https://nptel.ac.in/courses/117107035/ | | | | | | |