

Course Number and Name												
BEC704 - ANTENNA AND WAVE PROPAGATION												
Credits and Contact Hours												
3 and 45												
Course Coordinator's Name												
Dr E.Kanniga												
Text Books and References												
<ol style="list-style-type: none"> 1. John D Kraus, Ronald J Marhefka, Ahmad S Khan, "<i>Antenna and Wave Propagation</i>", Tata McGraw Hill, 4th Edition, 2010. 2. R.L.Yadava, "<i>Antennas and Wave Propagation</i>", PHI, 2011 3. Constantine A.Balanis, "<i>Antenna Theory: Analysis and Design</i>", Third Edition, John Wiley and Sons, 2012. 4. G.S.N. Raju, "<i>Antennas and wave propagation</i>", 1st Edition Pearson Education, 2012. 5. Robert S. Elliott, "<i>Antenna Theory and Design</i>", John Wiley and Sons, Revised Edition, 2007. 6. www.studynama.com/.../229-Antenna-wave-propagation-(AWP)-pdf-eb. 												
Course Description												
<ul style="list-style-type: none"> • Students will be introduced to antennas, their principle of operation • Antenna analysis and their applications. • Introduce the student to wave propagation over ground, through troposphere and ionosphere; diversity principles, • Propagation effects in microwave systems, satellite, space, and radar links 												
Prerequisites						Co-requisites						
Electromagnetic Fields and waves.						Nil						
required, elective, or selected elective (as per Table 5-1)												
Required												
Course Outcomes (COs)												
CO1 Define various antenna parameters CO2 Analyze radiation patterns of antennas CO3 Evaluate antennas for given specifications. CO4 Illustrate techniques for antenna parameter measurements CO5 To understand the various applications of antennas CO6 Discuss radio wave propagation												
Student Outcomes (SOs) from Criterion 3 covered by this Course												
	COs/SOs	a	b	c	d	e	f	g	h	i	j	k
	CO1	H					M			H		M
	CO2	M	M	H	M	M					L	
	CO3	M		M	H			M		M		
	CO4	M		M	M	H		M				H
	CO5		L								M	
	CO6		M				L					

List of Topics Covered

UNIT I BASIC ANTENNA CONCEPTS

9

Radiation Patterns, Beam solid angle, radiation intensity, Directivity, effective aperture, Antenna field zones, Polarization, impedance, cross field, Poynting vector. Friis Transmission formula, Duality of Antennas, Antenna and Transmission line, Radiation from a dipole antenna, Antenna temperature System temperature.

UNIT II POINT SOURCES

9

Definition, Power patterns, Array of two point sources – Pattern multiplication, Broad side array, End fire array, n-isotropic array, Evaluation of null directions and maxima, Amplitude distributions. Concept of Phased arrays, Adaptive array, Basic principle of antenna Synthesis- Binomial array

UNIT III SMALL ANTENNAS:

9

Halfwave dipole antenna radiated fields of short dipole, small loop and helical Antenna, monofilar- multifilar helix. Radiation resistance, Directivity and Design Feature. Half wave dipole: radiated fields and other feature. Numerical tool for antenna analysis

UNIT IV SPECIAL ANTENNAS

9

Yagi uda Antenna, Tumstile antenna, Principle of frequency independent antennas –Spiral antenna, Helical antenna, Log periodic. Modern antennas- Reconfigurable antenna, Active antenna, Dielectric antennas, rhombic antenna, Horn antenna, Reflector antennas and their feed systems, Micro strip antenna, Impedance and antenna measurements;

UNIT V WAVE PROPOGATION

9

Ground wave propagation, Troposphere wave, wave- tilt of the surface wave, Ionosphere propagation – effective permittivity and Conductivity of ionized gas, Reflection – Refraction of waves from ionosphere, regular – irregular variation of Ionosphere, earth magnetic field, Faraday rotation, wave propagation in the Ionosphere. Duct propagation, Critical frequency and Space propagation,