MICROWAVE ANTENNAS

Course Code	20EC4701C	Year	IV	Semester	I
Course Category	PE-III	Branch	ECE	Course Type	Theory
Credits	4	L-T-P	3-0-0	Prerequisites	
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Explain the concepts of broadband and high frequency antennas. L2
CO2	Develop broadband compact antennas with different materials. L3
CO3	Analyse broadband compact antennas made of different materials.L4
CO4	Design compact antennas for multi-frequency operations L3

Mapping of course outcomes with Program outcomes (CO/ PO/PSO Matrix)

Note: 1- Weak correlation 2-Medium correlation 3-Strong correlation

* - Average value indicates course correlation strength with mapped PO

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2				2							2		
CO2	3				3								2	3
CO3		2			2									
CO4	2				2								2	2
Average* (Rounded to nearest integer)	3	2			3							2	2	3

Syllabus		
Unit No.	**Contents**	**Mapped CO**
I	**Traveling wave and Broad band Antennas -** Introduction to microwaves, Frequency- Range, Bands, applications of microwaves, Traveling wave and broad band dipoles-Biconical antenna, Bow –Tie, cylindrical dipoles. Frequency independent antennas-equiangular spiral antenna and log-periodic antennas.	CO1, CO2
II	**Reflector Antennas:** Introduction, Plane Reflector, Corner Reflector – 90^o Corner reflector, Parabolic Reflector – Types of feeding systems, Cassegrain feed, Off-set feed.	CO1, CO2
III	**Lens Antennas:** Introduction, Non-metallic dielectric lens antennas, Fermat's Principle, Artificial Dielectric lens, E-plane Metal-Plate lens antennas H-plane Metal-Plate lens antennas.	CO1, CO3
IV	**Microstrip Antennas**: Introduction, advantages, limitations, feeding techniques, applications of microstrip antennas. Design of Rectangular and Circular microstrip antennas. Fractal antennas-Types, Minkowski Island, Koch loop, Pascal Triangle, Sierpinski gasket and fractal dipole geometries	CO1, CO2, CO3
V	**Dielectric Resonant Antennas**: Introduction, excitation methods applied to the DRA, analyses of the DRA- cylindrical DRA, hemispherical DRA, rectangular DRA, broad band DRAs, DRA arrays.	CO1, CO4

Learning Resources
Text Books
1. C.A. Balanis, Antenna Theory Analysis and design - John Wiley & Sons, 3rd Ed., 2005 2. J.D Kraus, R.J Marhefka & A.S.Khan - Antennas and Wave Propagation –TMH, 4th Ed., 2010.
Reference Books
1. JKwai-Man Luk, Kwok-Wa Leung; Dielectric Resonator Antennas- Research Studies Press England, 2003
e- Resources & other digital material
1. http://anlage.umd.edu/HFSSv10UserGuide.pdf 2. https://www.youtube.com/watch?v=kUDlCVOPlvY