

CONFORMAL ANTENNAS

Course Code	20EC6501C	Year	III	Semester	I
Course Category	Honors	Branch	ECE	Course Type	Theory
Credits	4	L-T-P	3-1-0	Prerequisites	Antennas & Propagation
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	Interpret the fundamental parameters of Conformal antennas in wireless communication.L2
CO2	Analyse the Characteristics & Shapes of conformal antennas. L4
CO3	Examine the single surface and double surface conformal antennas and its radiation patterns. L4
CO4	Utilize various feeding methods to improve performance the wireless communication system 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													
CO2		3				2								3
CO3		2				2								
CO4	2													2
Average* (Rounded to nearest integer)	2	3				2								3

Syllabus

Unit No.	Contents	Mapped CO
I	Introduction: The definition of a conformal antenna, why conformal antennas, history, metal radomes, sonar arrays.	CO1, CO2
II	The Shapes of Conformal Antennas: Introduction, 360° Coverage, 360° Coverage Using Planar Surfaces, 360° Coverage Using Curved Surface, Hemispherical Coverage, Hemispherical Coverage Using Planar Surfaces Half Sphere Cone Ellipsoid Paraboloid & Comparing Shapes.	CO1, CO2
III	Geodesics on Curved Surfaces Introduction, Definition of a Surface and Related Parameters, The Geodesic Equation, Solving the Geodesic Equation and the Existence of Geodesics,	CO1, CO3

	Singly Curved Surfaces, Doubly Curved Surfaces-The Cone, Rotationally Symmetric Doubly Curved Surfaces, and Properties of Geodesics on Doubly Curved Surfaces Geodesic Splitting.	
IV	Conformal Array Characteristics Introduction, Mechanical Considerations - Array Shapes, Element Distribution on a Curved Surface, Multifacet Solutions, Tile Architecture, & Static and Dynamic Stress. Radiation Patterns - Introduction, Grating Lobes, Scan-Invariant Pattern, & Phase-Scanned Pattern.	CO1, CO2, CO3
V	Beam Forming Introduction, A Note on Orthogonal Beams, Analog Feed Systems - Vector Transfer Matrix Systems, Switch Matrix Systems, Butler Matrix Feed Systems, RF Lens Feed Systems - The R-2R Lens Feed, The R-kR Lens, Feed Mode-Controlled Lenses, The Luneburg Lens, The Geodesic Lens, The Dome Antenna, & Digital Beam Forming.	CO1, CO4

Learning Resources

Text Books

1. Lars Josefsson, Patrik Persson- Conformal Array Antenna Theory–A Wiley-Inter science Publication 4th Ed., 2021.

Reference Books

1. R C Hansen - Conformal Antenna Array Design Handbook
2. Constantine A. Balanis–Antenna Theory and Applications, John Wiley & Sons, 4th Ed., 2021