

## MICROWAVE ANTENNAS

<b>Course Code</b>	19EC4701D	<b>Year</b>	IV	<b>Semester</b>	I
<b>Course Category</b>	Program Elective IV	<b>Branch</b>	ECE	<b>Course Type</b>	Theory
<b>Credits</b>	3	<b>L-T-P</b>	3-0-0	<b>Prerequisites</b>	Nil
<b>Continuous Internal Evaluation:</b>	30	<b>Semester End Evaluation:</b>	70	<b>Total Marks:</b>	100

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## Course Outcomes

Upon successful completion of the course, the student will be able to

<b>CO1</b>	Infer microwaves and radio waves and identify the applications of microwaves (L2).
<b>CO2</b>	Explain different types of antennas designed for microwave frequency ranges (L2).
<b>CO3</b>	Develop Microwave antennas for various applications(L3)
<b>CO4</b>	Take part in the measurement of antenna parameters in the laboratory.(L4)

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## 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	3	3	3	2									3	
CO2	3	3	3	3									3	
CO3	3	3	3	3	3								3	
CO4	3	3	3	3	3				2	2			3	
<b>Average* (Rounded to nearest integer)</b>	3	3	3	3	3				2	2			3	

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## Syllabus

Unit No.	Contents	Mapped CO
I	<b>Introduction to microwave antennas:</b> Introduction, Microwave frequency bands, Applications of microwave antennas and advantages of microwaves. <b>Broadband antennas:</b> Biconical antenna, bow-tie and cylindrical dipole.	CO1 , CO2, CO3
II	Frequency independent antennas, antenna miniaturization: Introduction, theory, equiangular spiral antennas, log-periodic antennas, Aperture antennas-Rectangular apertures, circular apertures, Horn antennas-E-Plane, H-Plane, Pyramidal and conical horn antennas and lens antennas-Introduction ,Geometry of Non-metallic Dielectric lenses. Zoning, Applications.	CO1 , CO2, CO3
III	<b>Reflector antennas:</b> Introduction, Flat Sheet and Corner Reflectors, Paraboloid Reflectors – Geometry, Pattern Characteristics, Feed Methods, Reflector Types	CO1 , CO2, CO3

IV	<b>Micro strip antennas:</b> Introduction, Features, Advantages and Limitations, Rectangular Patch Antennas – Geometry and Parameters, Characteristics of Micro strip Antennas. Rectangular patch, circular patch antennas-Geometry and parameters	CO1 , CO2, CO3
V	<b>Antenna Measurements:</b> Introduction, Antenna ranges, radiation patterns, gain measurements, directivity measurements, radiation efficiency, impedance measurements, current and polarization measurements.	CO4

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### Learning Resources

#### Text Books

1. Contantine A. Balanis, Antenna Analysis and Design, 3/e, Wiley Publications, 2009.
2. A.R. Harish, M. Sachidananda, Antennas and Wave Propagation, 1/e, Oxford University Press, 2007.

#### Reference Books

1. E. C. Jordan and K. G. Balmain, Electromagnetic Waves and Radiation Systems, Prentice Hall of India, 2012
2. Rajeswari Chatterjee, Antenna Theory and Practice, 2/e, New Age International Publishers, 2004.
3. F. E. Terman, Electronic and Radio Engineering, McGraw Hill, 1947

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