



SWARNANDHRA

COLLEGE OF ENGINEERING & TECHNOLOGY

Accredited by National Board of Accreditation,
 AICTE, New Delhi, Accredited by NAAC with "A" Grade - 3.32 CGPA
 Recognized under 2(f) & 12(B) of UGC Act 1956, Approved by AICTE, New Delhi,
 Permanent Affiliation to JNTUK, Kakinada
 SEETHARAMPURAM, W.G.D.T., NARSAPUR-534280, (Andhra Pradesh)

Department : Electronics and Communication Engineering.

TEACHING PLAN

Course Code	Course Title	Semester	Branches	Contact Period /Week	Academic Year	Semester commencement date
19EC5T03	Antennas and Wave Propagation	V	ECE	5	2021-22	04-10-2021

COURSE OUTCOMES: At the end of the Course (Antennas and Wave Propagation) students will be able to

- 1 Describe different types of antenna parameters. (K1)
- 2 Solve the fields radiated by various types of antennas. (K3)
- 3 Explain various categories of antennas and antenna arrays. (K2)
- 4 Analyze and identify the characteristics of radio wave propagation.(K4)

Unit. No	Out Comes & Blooms Level	Topics/Activity	Text Book Reference	Contact Hours	Delivery Method	
1	CO 1: Describe different types of antenna parameters. (K1)	1.ANTENNA FUNDAMENTALS			Chalk & Talk , PPT and Tutorial.	
		1.1	Introduction,	T1,T2,R1		1
		1.2	Radiation Mechanism-single wire, two wire dipoles	T1,R1		1
		1.3	Current Distribution on a thin wire antenna,	T1, T2,R1		1
		1.4	Antenna Parameters- Radiation Patterns,	T1 ,R1		1
		1.5	Patterns in Principle planes Main Lobe and Side Lobes	T1,R1		1
		1.6	Beam Widths, Beam Area, Radiation Intensity	T1, T2		1
		1.7	Beam Efficiency, Directivity,	T1 R1		1
		1.8	Gain and Resolution	T1 R1		1
		1.9	Antenna Apertures, Aperture Efficiency	T1, T2,R1		1
		1.10	Effective Height	T1,T2,R1		1
		1.11	Related Problems	T1,T2,R1		1
Total				11		



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2.THIN LINEAR WIRE ANTENNAS

2	CO2 Solve the fields radiated by various types of antennas. (K3)	2.1	Retarded Potentials	T1,R1	1	Chalk & Talk , PPT and Tutorial.	
		2.2	Radiation from Small Electric Dipole	T2,R1	1		
		2.3	Half Wave Dipole	T1,R1	1		
		2.4	Evaluation of field components: Power Radiated,	T1,R1	1		
		2.5	Evaluation of field components: Power Radiated,	T1,R1	1		
		2.6	Radiation Resistance	T1,R1	1		
		2.7	Beam Widths, Directivity,	T1,R1	1		
		2.8	Effective Area	T1,R1	1		
		2.9	Effective Height	T1,R1	1		
		2.10	Reciprocity and Maximum power transfer theorem	T1,R1	1		
		2.11	Loop Antennas: small loops Directivity	T1,R1	1		
		2.12	radiation resistance for small loops	T1,R1	1		
		2.13	Problems	T1,T2,R1	1		
		Total					
3	CO 3 Explain various categories of antennas and antenna arrays. (K2)	3.ANTENNA ARRAYS					Chalk & Talk , PPT and Tutorial.
		3.1	2 element arrays –different cases,	T1,R1	1		
		3.2	Principle of Pattern Multiplication	T1,R1	1		
		3.3	N-element Uniform Linear Arrays-	T2,R1	1		
		3.4	Broadside Array	T1,R2	1		
		3.5	End fire Array	T1,R1	1		
		3.6	EFA With Increased Directivity	T2,R1	1		
		3.7	Derivation of their characteristics and comparison	T1,R1	1		
		3.8	Concept of Scanning Arrays	T1,R1	1		
		3.9	Binomial Arrays, Arrays with parasitic Elements,	T1,R1	1		
		3.10	Yagi-Uda Arrays	T2,R1	1		
		3.11	Folded dipole and their characteristics	T1,R1	1		
		3.12	Related problems	T1,T2,R2	1		
Total					12		



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4	CO 3 Explain various categories of antennas and antenna arrays. (K2)	4. NON-RESONANT AND MICROWAVE RADIATORS			Chalk & Talk , PPT and Tutorial.	
		4.1	Introduction, Traveling Wave radiators	T2,R1		1
		4.2	Traveling Wave radiators basic concepts	T2,R1		1
		4.3	Long Wire Antennas- field strength calculations and patterns	T2,R1		1
		4.4	Micro strip antennas – introduction Geometry features, advantages and limitations	T2,R2		1
		4.5	Rectangular patch antenna: different feeds	T2,R1		1
		4.6	Broadband Antenna: Helical Antenna Geometry, basic properties	T2,R2		1
		4.7	Operational modes (axial mode and normal modes)	T2,R1		1
		4.8	Reflector Antennas :Flat Sheet	T2,R1		1
		4.9	Corner reflector	T2,R1		1
		4.10	Paraboloidal Reflectors	T2,R2		1
		4.11	Related problems	T2,R1		1
Content beyond Syllabus		4.12	Lens antenna with Zoning applications	T1,R1,R2	1	
Total				12		
5	CO 4 Analyze and identify the characteristics of radio wave propagation.(K4)	5. WAVE PROPAGATION			Chalk & Talk , PPT and Tutorial.	
		5.1	Concepts of Propagation- frequency ranges and types of Propagations,	T2,R1		1
		5.2	Ground Wave propagation- Characteristics	T2,R1		1
		5.3	Ground Wave propagation- Characteristics, Wave Tilt	T2,R1		1
		5.4	Sky Wave propagation- Formation of Ionosphere layers	T2,R1		1
		5.5	Sky Wave propagation- Formation of Ionosphere layers and their Characteristics	T2,R1		1
		5.6	Mechanism of Reflection and Refraction, Critical Frequency	T2,R1		1
		5.7	MUF & SKIP Distance-calculations for flat earth	T2,R1		1
		5.8	MUF & SKIP Distance- Calculations for spherical earth	T2,R1		1
		5.9	Space Wave Propagation- Mechanism,LOS and Radio	T2,R1		1



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		Horizon		
	5.10	Fundamental Equation for Free Space Propagation	T2,R1	1
	5.11	Field strength	T2,R1	1
	5.12	Duct Propagation	T2,R1	1
	5.13	Related problems	T2,R1	1
Total				13
CYCLE-II				
TOTAL NO. OF CLASSES PROPOSED PER PERIODs :				61

Text Books:

S.No.	AUTHORS/BOOK TITLE/EDITION(latest)/PUBLISHER/YEAR OF PUBLICATION
1	John D.Kraus and Ronald J.Marhefka Ahmad S Khan, "Antennas and wave propagation", 5 th edition, McGraw Hill Education private limited, 2018.
2	K.D.Prasad, Satya Prakashan, " Antennas and wave propagation", 4 th edition ,Tech India Publications, New Delhi,2005

Reference Books:

S.No.	AUTHORS/BOOK TITLE/EDITION(latest)/PUBLISHER/YEAR OF PUBLICATION
1	G.S.N.Raju, " Antennas and wave propagation ", 5 th edition, Pearson Education, South Asia 2007.
2	E.C.Jordan and K.G.Balmain , "Electromagnetic Waves and Radiating systems", 5 TH Edition, PHI publisher, 2004.

Web Details

1	Antennas https://onlinecourses.nptel.ac.in/noc20ee20/preview
2	Antenna Arrays www.nrao.edu (https://public.nrao.edu/telescopes/vla/)
3	Analysis and design Principles of Microwave Antennas NPTEL IIT Kharagpur https://nptel.ac.in/courses/108/105/108105114/

		Name	Signature with Date
i.	Faculty I	Mr. D.Sekhar	
ii.	Faculty II	Dr.N.K.Devi	
iii.	Course Coordinator	Mr.D.Sekhar	
iv.	Module Coordinator	Dr.B.Sada Siva Rao	
v.	Programme Coordinator	Dr.B.Subrahmanyeswara Rao	

Principal