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.DT., NARSAPUR-534280, (Andhra Pradesh)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

TEACHING PLAN

Course Code	Course Title	Semester	Branch	Contact Period /Week	Academic Year	Semester commencement date
23EC6E02	Satellite Communications (R-23)	VI	ECE	5	2025-26	25-11-2019

COURSE OUTCOMES

After completion of the course student are able to

1	Analyze the concepts, applications and subsystems of Satellite communications (K3).
2	Solve the expression for G/T ratio and to solve so mean analytical problems on satellite link design (K3).
3	Analyze the various types of multiple access techniques and architecture of earth station design (K4).
4	Inspect the concepts of GPS and its architecture (K4).

Unit No	Out Come/Bloom's Level		Topics/Activity	Reference Text book	Contact Periods	Delivery Method
1	**CO1:** Analyze the concepts, applications and subsystems of Satellite communications (K3).		**INTRODUCTION**			Chalk & Talk, PPT & Tutorial.
		1.1	Origin of Satellite Communications	T1, T2, R1	1	
		1.2	Historical Back-ground	T1, T2, R1	1	
		1.3	Basic Concepts of Satellite communications.	T1, T2, R1	1	
		1.4	Frequency allocations for Satellite Services	T1, T2, R1	1	
		1.5	Need of satellite communications	T1, T2, R1	1	
		1.6	Applications.	T1, T2, R1	1	
		1.7	Future Trends of Satellite Communications.	T1, T2, R1	1	
			ORBITAL MECHANICS AND LAUNCHERS			
		1.8	Orbital Mechanics	T1, T2	1	
		1.9	Look Angle determination	T1, T2	1	
		1.10	Orbital perturbations,	T1, T2	1	
		1.11	Types of perturbations	T1, T2	1	
		1.12	Orbit determination	T1	1	
		1.13	launches and launch vehicles.	T1, T2	1	
		1.14	Launching steps	T1	1	
		1.15	Orbital effects in communication systems performance.	T1, T2	1	

		Class Test-1			1	
		TOTAL			***16***	
2	**CO1:** Analyze the concepts, applications and subsystems of Satellite communications (K3).		**SATELLITE SUBSYSTEMS**			Chalk & Talk, PPT & Tutorial
		2.1	Attitude and orbit control system	T1, T2	1	
		2.2	AOCS block diagram		1	
		2.3	Telemetry, tracking, Command and monitoring.	T1, T2	1	
		2.4	Power systems		1	
		2.5	Communication subsystems	T1, T2	1	
		2.6	Satellite antenna	T1, T2	1	
		2.7	Equipment reliability and Space qualification.	T1, T2	1	
		Class Test-2			1	
		TOTAL			***8***	
3	**CO2:** Solve the expression for G/T ratio and to solve so mean analytical problems on satellite link design (K3).		**SATELLITE LINK DESIGN**			Chalk & Talk, PPT & Tutorial
		3.1	Basic transmission theory	T1, T2	1	
		3.2	Link equation	T1, T2	1	
		3.3	C/N ratio	T1, T2	1	
		3.4	System noise temperature and G/T ratio.	T2	1	
		3.5	Design of Down links	T1, T2	1	
		3.6	Up-link design.	T1, T2	1	
		3.7	Design of satellite links for specified C/N	T1, T2	1	
		3.8	System design example.	T1, T2	1	
		Class Test-3			1	
		TOTAL			***9***	
4	**CO3:** Analyze the various types of multiple access techniques and architecture of earth station design (K4).		**MULTIPLE ACCESS**			
		4.1	Frequency division multiple access (FDMA) Inter modulation,	T1	1	
		4.2	Calculation of C/N.	T1, T2	1	
		4.3	Carrier to Noise ratio	T1, T2	1	
		4.4	Time division Multiple Access (TDMA); Frame structure, examples	T1, T2	1	
		4.5	Code Division Multiple access (CDMA).	T1, T2	1	
		4.6	Spread spectrum transmission and reception.	T1, T2	1	

			EARTH STATION TECHNOLOGY			
		4.7	Introduction.	T1, T2	1	
		4.8	Basic Architecture	T1, T2	1	
		4.9	Transmitters	T1, T2	1	
		4.10	Receivers	T2	1	Chalk & Talk, PPT & Tutorial
		4.11	Antennas	T1, T2	1	
		4.12	Tracking systems.	T2	1	
		4.13	Terrestrial interface	T1, T2	1	
		4.14	Primary power test methods.	T1	1	
	Content beyond Syllabus		Noise power and G/T		1	
		Class Test-4			1	
			TOTAL		***16***	
			LOW EARTH ORBIT AND GEOSTATIONARY SATELLITE SYSTEMS			
		5.1	Orbit consideration	T1, T2	1	
		5.2	Coverage and frequency considerations	T1, T2	1	
		5.3	Delay and throughput considerations	T2	1	
		5.4	System considerations	T1, T2	1	
		5.5	Operational NGSO constellation designs	T1, T2	1	
			GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS)			
5	**CO4:** Inspect the concepts of GPS and its architecture (K4).	5.6	Introduction	T2	1	Chalk & Talk, PPT & Tutorial
		5.7	Various GNSS: GPS, GLONASS, GALILEO, BeiDou, QZSS, IRNSS.	T1, T2	1	
		5.8	GPS location Principle	T1, T2	1	
		5.9	GPS Navigation message	T1, T2	1	
		5.10	GPS Receiver Operation	T2	1	
		5.11	Differential GPS	T1, T2	1	
		5.12	IRNSS Satellites, constellation, configuration, Services	T1	1	
		5.13	Navigation data	T1, T2	1	

		5.14	Applications of IRNSS	T2	1	
		5.15	Multi GNSS	T1, T2	1	
		Class Test-5			1	
		TOTAL			***16***	
				TOTAL HOURS	***65***	

Text Books:

S. No.	AUTHORS/BOOK TITLE/EDITION (latest)/PUBLISHER/YEAR OF PUBLICATION
1	Satellite Communications – Timothy Pratt, Charles Bostian and Jeremy Allnutt. 2nd edition, TMH, 2006
2	Satellite Communications Engineering – Wilbur L. Pritchard, Robert A Nelson and Henri G. Suyderhoud. 3rd edition, PEA, 2005

Reference Books:

S. No.	AUTHORS/BOOK TITLE/EDITION (latest)/PUBLISHER/YEAR OF PUBLICATION
1	Satellite Communications: Design Principles – M. Richharia, 4th edition, John Wiley, 2003.
2	Satellite Communication - D.C Agarwal, 2nd edition, TMH, 2008.
3	Fundamentals of Satellite Communications – K.N. Raja Rao, 6th edition, PEA, 2002.
4	Satellite Communications – Dennis Roddy, 3rd edition, John Wiley, 2005.

Web Details

1	www.nptel.ac.in
2	www.slideshare.net
3	https://youtu.be/Z-Hw3CpPVj0

		Name	Signature with Date
i.	Faculty	Dr. Srilali Siragam	11.12.15
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