



# 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
<b>COURSE OUTCOMES</b>						
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).		<b>INTRODUCTION</b>			
		1.1	Origin of Satellite Communications	T1, T2, R1	1	Chalk & Talk, PPT & Tutorial.
		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	
			<b>ORBITAL MECHANICS AND LAUNCHERS</b>			
		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	



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





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			<b>EARTH STATION TECHNOLOGY</b>			Chalk & Talk, PPT & Tutorial
		4.7	Introduction.	T1, T2	1	
		4.8	Basic Architecture	T1, T2	1	
		4.9	Transmitters	T1, T2	1	
		4.10	Receivers	T2	1	
		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		
	Class Test-4				1	
<b>TOTAL</b>					<b>16</b>	
5	CO4: Inspect the concepts of GPS and its architecture (K4).		<b>LOW EARTH ORBIT AND GEOSTATIONARY SATELLITE SYSTEMS</b>			Chalk & Talk, PPT & Tutorial
		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	
			<b>GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS)</b>			
		5.6	Introduction	T2	1	
		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	



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	5.14	Applications of IRNSS	T2	1	
	5.15	Multi GNSS	T1, T2	1	
		Class Test-5		1	
		<b>TOTAL</b>		<b>16</b>	
			<b>TOTAL HOURS</b>	<b>65</b>	

### Text Books:

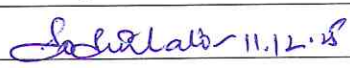
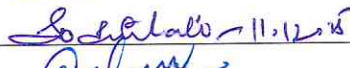
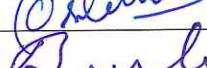
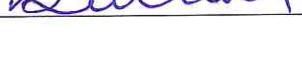
S. No.	AUTHORS/BOOK TITLE/EDITION (latest)/PUBLISHER/YEAR OF PUBLICATION
1	Satellite Communications – Timothy Pratt, Charles Bostian and Jeremy Allnutt. 2 <sup>nd</sup> edition, TMH, 2006
2	Satellite Communications Engineering – Wilbur L. Pritchard, Robert A Nelson and Henri G. Suyderhoud. 3 <sup>rd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

### Reference Books:

S. No.	AUTHORS/BOOK TITLE/EDITION (latest)/PUBLISHER/YEAR OF PUBLICATION
1	Satellite Communications: Design Principles – M. Richharia, 4 <sup>th</sup> edition, John Wiley, 2003.
2	Satellite Communication - D.C Agarwal, 2 <sup>nd</sup> edition, TMH, 2008.
3	Fundamentals of Satellite Communications – K.N. Raja Rao, 6 <sup>th</sup> edition, PEA, 2002.
4	Satellite Communications – Dennis Roddy, 3 <sup>rd</sup> 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	 11.12.18
ii. Course Coordinator	Dr. Srilali Siragam	 11.12.18
iii. Module Coordinator	Dr. Sekhar Didde	
iv. Programme Coordinator	Dr. B. S. Rao	

  
**Principal**  
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