

SATELLITE COMMUNICATIONS

Course Code	19EC4701A	Year	IV	Semester	I
Course Category	Program Elective IV	Branch	ECE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Analog and Digital communications
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	Demonstrate an understanding on orbital and functional principles of satellite Communication and Satellite sub system (L2)
CO2	Interpret and select appropriate technologies for implementation of specified Satellite communication systems (L5)
CO3	Analyse a satellite link and suggest enhancements to improve the link Performance (L4)
CO4	Choose appropriate multiple access technique for a given satellite communication application (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	2	-	-	-	2	2	-	-	-	-	2	-	-
CO2	1	3	-	-	-	2	2	-	-	-	-	2	-	-
CO3	2	3	2	-	-	1	1	-	-	-	-	1	-	2
CO4	1	2	2	-	-	2	2	-	-	-	-	2	-	2
Average* (Rounded to nearest integer)	2	3	2			2	2					2		2

Syllabus

Unit No.	Contents	Mapped CO
I	INTRODUCTION: Introduction, Frequency allocation to satellite services, INTELSAT	CO1
II	ORBITAL MECHANICS AND LAUNCHERS: Orbital Mechanics, Look Angle determination, Orbital perturbations, Orbit determination, launches and launch vehicles, Orbital effects in communication systems performance.	CO1, CO2
III	SATELLITE SUBSYSTEMS: Attitude and orbit control system, telemetry, tracking, Command and monitoring, power systems, communication subsystems, Satellite antenna Equipment reliability and Space qualification.	CO1, CO2

IV	SATELLITE LINK DESIGN: Basic transmission theory, system noise temperature and G/T ratio, Design of down links, up link design, Design of satellite links for specified C/N, System design example.	CO1, CO3
V	MULTIPLE ACCESS: Frequency division multiple access (FDMA). Time division Multiple Access (TDMA), TDMA Frame Structure, Transmitter Power in TDMA Networks, Satellite Switched TDMA, Onboard Processing, Baseband Processing Transponders, Satellite Switched TDMA with Onboard Processing, Demand Access Multiple Access (DAMA), Code Division Multiple access (CDMA).	CO1, CO4

Learning Resources

Text Books

1. Satellite Communications – Timothy Pratt, Charles Bostian and Jeremy Allnutt, WSE, Wiley Publications, 2nd Edition, 2003.
2. Satellite Communications – Dennis Roddy, McGraw Hill, 2nd Edition, 1996.

Reference Books

1. Satellite Communications: Design Principles – M. Richharia, BS Publications, 2nd Edition, 2003.
2. Satellite Communication - D.C Agarwal, Khanna Publications, 5th Ed.
3. Fundamentals of Satellite Communications – K.N. Raja Rao, PHI, 2004

e- Resources & other digital material

1. <https://nptel.ac.in/courses/117/105/117105131/3>.<https://nptel.ac.in/courses/108/105/108105159/>
