Satellite Communication

Course Code	23EC4501B	Year	III	Semester	II
Course Category	PE–II	Offering Branch	ECE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Analog Communications Digital communications Antennas and Wave Propagation
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	BL
CO1 Illustrate the basic concepts of satellite communication and different Frequency allocations for satellite services.	L2
CO2 Analyze the satellite orbits and link design for transmission & reception of signals	L4
CO3 Analyze various satellite subsystems and its functionality	L4
CO4 Choose appropriate multiple access technique for a given satellite communication application	L3

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2					1						1	1	
CO2	3	3				1	2					2	2	
CO3	3	3				2						2	2	
CO4	3					1						2	2	
Avg.	**2**	**3**				**1**	**2**					**2**	**2**	

Syllabus		
Unit No.	Contents	Mapped CO
1	**Introduction:** Historical Back-ground, Basic Concepts of Satellite Communications, Frequency allocations for Satellite Services, LEO, MEO, GEO, Introduction to GPS, Applications.	CO1
2	**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
3	**Satellite Subsystems:** Attitude and orbit control system, telemetry, tracking, Command and monitoring, power systems, communication subsystems, Satellite antenna Equipment reliability and Space qualification.	CO1, CO3

4	**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, CO2
5	**Multiple Access:** Frequency division multiple access (FDMA) Intermodulation, Calculation of C/N. Time division Multiple Access (TDMA) Frame structure, Examples. Satellite Switched TDMA On-board processing, DAMA, Code Division Multiple access (CDMA).	CO4

Learning Resources
Text Books
1. T. Pratt, C. Bostian and J. Allnutt, Satellite Communications, WSE, Wiley, 2nd Ed., 2020
2. W.L. Pritchard, R. A Nelson and H. G.Suyderhoud, Satellite Communications Engineering, Pearson, 2nd Ed., 2003.
Reference Books
1. Dennis Roddy, Satellite Communications –McGraw Hill, 2nd Ed., 1996
2. M. Richharia, Satellite Communications : Design Principles - BS Publications, 2nd Ed., 2003
3. D.C Agarwal, Satellite Communication - Khanna Publications, Mc.Graw Hill, 5th Ed., 2008.
e- Resources
1. www.nasa.gov
2. https://nptel.ac.in/courses/117/105/117105131/3.https://nptel.ac.in/courses/108/105/108105159/