

Course Type	Course Code	Name of Course	L	T	P	Credit
DE	ECD419	Satellite Communication	3	0	0	9

Course Objective

The objective of the course is to develop an understanding of the basic aspects of Satellite Communication. These concepts are needed in designing the communication link in between satellite and earth station.

Learning Outcomes

Upon successful completion of this course, students will:

- acquire a basic knowledge of the techniques of communication in between satellite and earth station.
- develop the understanding of different challenges to establish the satellite link.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Principles of Satellite Communication: Satellite frequency allocation & Band spectrum, Advantages of satellite communication, Active & Passive satellite,	6	Acquire an information of basics of Satellite Communication
2	Satellite Link Design: Introduction, General link design equations, System noise temperature, C/N & G/T ratio, Atmospheric & Ionospheric effects on link design, Earth station parameters.	8	Develop an understanding about link design between satellite and earth station
3	Multiple Access Techniques: Introduction, TDMA, TDMA-Frame structure, TDMA-Burst structure, TDMA-Frame efficiency, TDMA-super frame, TDMA-Frame acquisition & Synchronization, TDMA compared to FDMA, TDMA Burst Time Plan, Multiple Beam (Satellite switched) TDMA satellite system, Beam Hopping (Transponder Hopping) TDMA, CDMA & hybrid access techniques.	8	Learn the different multiple access techniques used in satellite communication
4	Laser Satellite Communication: Introduction, Link analysis, Optical & satellite link transmitter, Optical satellite link receiver, Satellite Beam Acquisition, Tracking & Positioning, Deep Space Optical Communication Link.	8	Get an idea about the use of optical signal in satellite communication
5	Satellite Orbits & Inclination: Introduction, Synchronous orbit, Orbital parameters, Satellite location with respect to earth, Look angles, Earth coverage & slant range, Eclipse effect, Satellite placement in geostationary orbit, station keeping, Satellite stabilization	6	Develop the concepts of orbital motions of satellites.
6	Special Purpose Communication Satellites: BDS, INMARSAT, INTELSAT, VSAT (data broadband satellite), MSAT (Mobile Satellite Communication technique), Sarsat (Search & Rescue satellite) & LEOs (Lower earth orbit satellite),	6	Acquire an information of different satellites used for communication purpose

Textbook:

1. Satellite Communication by Timothy Pratt, Charles Bostian, and Jeremy Allnutt, Wiley India Pvt. Ltd.

Reference Books:

1. Satellite Communications Systems by G. Maral and M. Bousquet, John Wiley & Sons.