SATELLITE COMMUNICATION
B.E., VII Semester, Electronics & Communication Engineering
[As per Choice Based Credit System (CBCS) Scheme]

Course Code	17EC755	**CIE Marks**	40
Number of Lecture Hours/Week	03	**SEE Marks**	60
Total Number of Lecture Hours	40 (8 Hours / Module)	**Exam Hours**	03

CREDITS – 03

Course Objectives: This course will enable students to

- Understand the basic principle of satellite orbits and trajectories.
- Study of electronic systems associated with a satellite and the earth station.
- Understand the various technologies associated with the satellite communication.
- Focus on a communication satellite and the national satellite system.
- Study of satellite applications focusing various domains services such as remote sensing, weather forecasting and navigation.

Module-1

Satellite Orbits and Trajectories: Definition, Basic Principles, Orbital parameters, Injection velocity and satellite trajectory, Types of Satellite orbits, Orbital perturbations, Satellite stabilization, Orbital effects on satellite's performance, Eclipses, Look angle, Azimuth angle, Elevation angle. **L1, L2**

Module-2

Satellite subsystem: Power supply subsystem, Attitude and Orbit control, Tracking, Telemetry and command subsystem, Payload.

Earth Station: Types of earth station, Architecture, Design considerations, Testing, Earth station Hardware, Satellite tracking. **L1, L2**

Module-3

Multiple Access Techniques: Introduction, FDMA (No derivation), SCPC Systems, MCPC Systems, TDMA, CDMA, SDMA.

Satellite Link Design Fundamentals: Transmission Equation, Satellite Link Parameters, Propagation considerations. **L1, L2, L3**

Module-4

Communication Satellites: Introduction, Related Applications, Frequency Bands, Payloads, Satellite vs Terrestrial Networks, Satellite Telephony, Satellite Television, Satellite radio, Regional satellite Systems, National Satellite Systems. **L1, L2**

Module-5

Remote Sensing Satellites: Classification of remote sensing systems, orbits, Payloads, Types, Images: Image Classification, Interpretation, Applications.

Weather Forecasting Satellites: Fundamentals, Images, Orbits, Payloads, Applications.

Navigation Satellites: Development of Satellite Navigation Systems, GPS system, Applications. L3

Course Outcomes: At the end of the course, the students will be able to:
- Describe the satellite orbits and its trajectories with the definitions of parameters associated with it
- Describe the electronic hardware systems associated with the satellite subsystem and earth station.
- Describe the various applications of satellite with the focus on national satellite system.
- Compute the satellite link parameters under various propagation conditions with the illustration of multiple access techniques.

Text Book:

Anil K. Maini, Varsha Agrawal, Satellite Communications, Wiley India Pvt. Ltd., 2015, ISBN: 978-81-265-2071-8.

Reference Books:

1. Dennis Roddy, Satellite Communications, 4th Edition, McGraw- Hill International edition,
2. Timothy Pratt, Charles Bostian, Jeremy Allnutt, Satellite Communications, 2nd Edition, Wiley India Pvt. Ltd , 2017, ISBN: 978-81-265-0833-4