

# SATELLITE COMMUNICATION SYSTEMS

## Module – I

(12 Hours)

**Introduction to state of satellite communication:** Orbital mechanics and parameters, look angle determination, Launches and Launch vehicle, Orbital effects in communication system performance. Attitude and orbit control system(AOCS), TT&C , Description of spacecraft System – Transponders,

**Equipment reliability and space qualification.**

**Satellite Link Design:** Basics of transmission theory, system noise temperature and G/T ratio, Uplink and Downlink design, design of satellite links for specified (C/N) performance.

## Module – II

(10 Hours)

**Analog telephone and television transmission:** Energy dispersal, digital transmission

**Multiple Access:** Multiplexing techniques for satellite links, Comprehensive study on FDMA, TDMA and CDMA. Spread Spectrum Transmission and Reception. Estimating Channel requirements, SPADE, Random access

**Application of Satellite communication:** Network distribution and direct broad casting TV, fundamentals of mobile communication satellite

## Module – III

(12 Hours)

**Propagation on satellite:** Earth paths and influence on link design: Quantifying attenuation and depolarization, hydrometric & non hydrometric effects, ionosphere effects, rain and ice effects

**Satellite Antennas:** Types of antenna and relationships , Basic Antennas Theory – linear, rectangular & circular aperture. Gain, pointing loss,

**Earth station Technology:** Earth station design, Design of large antennas – Cassegrain antennas, optimizing gain of large antenna, antenna temperature, feed system for large cassegrain antennas,

**Design of small earth station antennas:** Front fed paraboloid reflector antennas, offset fed antennas, beam steering, Global Beam Antenna, equipment for earth station

### Text Books:

1. Satellite Communication by T. Pratt, C. Bostian. 2nd Edition, John Wiley Co.

### Reference Books:

1. Digital Communication with Satellite and Fiber Optic Application, Harlod Kolimbins, PHI
2. Satellite Communication by Robert M. Gagliardi, CBS Publishers