

## TV & SATELLITE COMMUNICATIONS

**Course Code:13EC1128**

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<b>4</b>	<b>1</b>	<b>0</b>	<b>3</b>

### Pre requisites:

Analog Signal Characteristics, Communication Principles, Digital Modulation Techniques, Orbital Mechanics and Geography.

### Course Outcomes:

At the end of the course the student will be able to

- CO 1** Explain the basic principles of satellite &T.V.
- CO 2** Recap geography with reference to satellite orbits.
- CO 3** Comprehend the satellite subsystems.
- CO 4** Configure the satellite multiple access techniques.
- CO 5** Analyze the existing satellite communication applications.

### UNIT-I (12 Lectures)

#### PRINCIPLES OF TV & BROADCASTING:

Gross Structure, Image Continuity, Scanning, Flicker, Interlaced Scanning, Number Of Scanning Lines, Fine Structure, Tonal Gradation. Video Signal Dimensions, Horizontal Synchronization Details, Vertical Synchronization Details, Scanning Sequence Details, Functions Of Vertical Pulse Train, Channel Bandwidth, Vestigial Side Band Transmission, Bandwidth Allocations For Colour Transmission.

### UNIT-II (10 Lectures)

#### SATELLITE ORBITS:

Kepler's Laws, Newton's Law, Orbital Parameters, Orbital Perturbations, Station Keeping, Geo Stationary And Non Geo-Stationary Orbits, Look Angle Determination, Limits Of Visibility, Eclipse, Sub Satellite Point, Sun Transit Outage, Launching

Procedures, Launch Vehicles And Propulsion.

### UNIT-III

(14 Lectures)

#### SPACE SEGMENT AND SATELLITE LINK DESIGN:

Spacecraft Structure, Primary Power, Attitude and Orbit Control, Thermal Control and Propulsion, Communication Payload and Supporting Subsystems, Telemetry, Tracking and Command, Satellite Uplink and Downlink Analysis and Design, Link Budget,  $E_b/N_0$  Calculation, Performance Impairments, System Noise, Intermodulation And Interference, Propagation Characteristics And Frequency Considerations- System Reliability And Design Lifetime.

### UNIT-IV

(12 Lectures)

#### SATELLITE ACCESS:

Modulation and Multiplexing: Voice, Data, Video, Analog – Digital Transmission Systems, Digital Video Broadcast, Multiple Access: FDMA, TDMA, CDMA, Assignment Methods, Spread Spectrum Communication, Compression – Encryption.

#### EARTH SEGMENT:

Earth Station Technology— Terrestrial Interface, Transmitter and Receiver, Antenna Systems TVRO, MATV, CATV, Test Equipment Measurements on G/T, C/No, EIRP, Antenna Gain.

### UNIT-V

(12 Lectures)

#### SATELLITE APPLICATIONS:

INTELSAT Series, INSAT, VSAT, Mobile satellite services: GSM, GPS, INMARSAT, LEO, MEO, Satellite Navigational System. Direct Broadcast satellites (DBS) - Direct to home Broadcast (DTH), Digital audio broadcast (DAB)- World space services, Business TV(BTV), GRAMSAT, Specialized services – E –mail, Video conferencing, Internet.

#### TEXT BOOKS:

1. R R Gulati, “*Monochrome and Colour Television*”, New Age International, 2007
2. Dennis Roddy, ‘*Satellite Communication*’, McGraw Hill International, 4<sup>th</sup> Edition, 2006.

**REFERENCES:**

1. Bruce R. Elbert, "*The Satellite Communication Applications*" Hand Book, Artech House, London, 1997.
2. Tri T. Ha, "*Digital Satellite Communication*", IInd Edition, 1990.
3. C. Dharma Raj, "*Satellite Communication*", I.K International Publishing House Pvt. Ltd.
4. Brian Ackroyd, '*World Satellite Communication and earth station Design*', BSP professional Books, 1990.
5. M. Richharia, "*Satellite Communication Systems-Design Principles*", Macmillan 2003
6. Wilbur L. Pritchard, Hendri G. Suyderhoud, Robert A. Nelson, "*Satellite Communication Systems Engineering*", Prentice Hall/Pearson, 2007.

