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| **ECx535** | **Satellite Communication** | **L-T-P: 3-0-0; Total 42 Lectures** |

***Pre-requisite :*** Digital Communication, Antenna Basics

***Course Objectives:***

1. To understand the satellite communication system, satellite sub system and earth station.
2. To undertand the concept of satellite orbits and satellite launching
3. To design and evaluate the link design anlysis for satellite communication
4. To understand to Multiple access techniques to support satellite communication
5. To design the different application for satellite communication

***Course Contents:***

**Unit-I: Introduction-** Origin, History, Current Technology and Overview of Satellite Communication System, Kepler‘s Laws of motion, Orbital aspects of Satellite Communications, Look Angle and Orbit determinations, Orbital effects in communication system Performance.

**Unit-II: Space Craft Subsystems**- AOCS, TTC&M, Power system, Satellite transponder, spacecraft Antennas

**Unit-III: Satellite Link Design**- System Noise temperature and G/T ratio - Design of downlink, Uplink - Design of satellite links for specified C/N, Implementation of error Detection on satellite links.

**Unit-IV: Earth Station Technology-**Earth Station Design, Design of Large Antennas, Tracking, Small earth station Antennas, Equipment for earth station

**Unit-V: Multiple Access:** FDMA, TDMA, CDMA, SSMA, Demand Assignment Multiple Access, Digital Speech Interpolation and SPADE.

**Unit-VI: Satellite Packet Communications-** Message transmission by FDMA: The M/G/1 Queue, Message transmission by TDMA - Pure ALOHA: Satellite packet switching - slotted ALOHA - Packet Reservation - Tree algorithm.

**Unit-VII: Application of satellite-**Very Small Aperture Terminal (VSAT) Network, Direct Broadcast Satellite Systems, Global Positioning System.

***Text & Reference Books:***

1. “Satellite Communication”, T. Pratt, C.W. Bostian, John Willey and Sons
2. “Digital Satellite Communication”, Tri T. Ha , McGraw-Hill
3. “Satellite Communication”, Dennis Roddy, McGraw Hill.

***Course Outcomes (CO):***

At the end of this course, the students should be able to:

CO1: Understand the basic operational principle of satellite communication system

CO2: Design and analyzethe satellite link

CO3: Understand the various physical layer and network layer design issues of a satellite communication system

CO4: Demonstrate an understanding of satellite communication for various applications