SATELLITE COMMUNICATION (THEORY) EE-447

Pre-requisite: Communication Systems
Credit Hours 03
Contact Hours 48

RECOMMENDED BOOKS

Satellite Communications 2nd Edition By Pratt, Botian, Allutt

REFERENCE BOOKS

Satellite Communications 4th Edition By Dennis Roddy

OBJECTIVE OF COURSE

The objective is to motivate the students to excel in the domain of satellite communication. The students shall be introduced to the different aspects of satellite communications which include performance evaluation, link budget analysis, communication and radio wave propagation aspect etc. Practical examples shall make this course even more interesting for students where they will take into account the practical consideration regarding transmission and reception of satellite signals.

S.NO	CLO/PLOS MAPPING	DOMAIN	PLO
01	**Describe** the basics of orbital mechanics, the types of satellite orbits, the location of ground stations, the look angles from ground stations to the satellite, satellite launch and reliability and space qualification.	C1	01
02	Use of link budget equations to provide sufficient margin for performance. This includes **examining** the various types of modulation, error correcting codes, and encryption.	C3	01
03	**Design** a communications satellite system to meet specified objectives for signal to noise ratio (S/N) in an analog baseband or BER in a digital link using appropriate multiple access techniques	C5	03

COURSE CONTENTS

Overview of Satellite Systems

- Basic Definitions and terminologies

Orbital Mechanics and Launching Methods

- Kepler‟s 3 laws of planetary motion, Locating a satellite, Orbital Elements, Look angles calculation, Azimuth and Elevation angle, Orbital perturbations, Effect of Communication, Satellite launch

Satellite Subsystems

- Satellite Sub systems AOCS, TT&C, power System, Communication Subsystem, Satellite antennas, Equipment Reliability and Space qualification,

Link Analysis

- Equivalent Isotropic Radiated Power, Received Signal Power, Noise Power at receiver input, The Uplink, The Downlink, Station-to-station link,complete 2 way link budget , Link Budget for Leo Satellites.

Satellite Multiple Access

- Multiple access techniques: Power sharing in FDMA, TDMA and CDMA. Modulation and Error control codes used in Satellite Communications. Applications such as VSAT and GPS

Satellite Services

- Broadcasting Satellite Services (DBS, DVB-S), Integrated Services Digital Broadcasting – Satellite, Fixed Satellite Services (INTELSAT, VSAT), Navigational Satellite Services (NAVSTAR GPS), Earth Resource Satellite Services (Radarsat, NOAA), Mobile Satellite Services, International Space Station