

# Satellite Communications

B.E. Sem. VIII [EXTC]

(Elective – II)

---

---

## EVALUATION SYSTEM

	Time	Marks
<b>Theory Exam</b>	3 Hrs.	100
<b>Practical Exam</b>	–	–
<b>Oral Exam</b>	–	25
<b>Term Work</b>	–	25

## SYLLABUS

- **Objective:** To understand the concept of satellite launching and its operations.

### 1. Introduction

General background, frequency allocations for satellite services, basic satellite system, system design considerations, applications.

#### Satellite Orbits

Introduction, laws governing satellite motion, antenna look angles, antenna mount, limits of visibility, Earth eclipse of satellite, inclined orbits, sun-synchronous orbit, launching of geostationary satellites.

### 2. Wave Propagation and Polarization

Introduction, atmospheric losses, ionospheric effects, rain attenuation, other impairments, antenna polarization, polarization of satellite signals, cross polarization discrimination, ionospheric depolarization, rain depolarization, ice depolarization.

### 3. Communication Satellites

Introduction, design considerations, lifetime and reliability, spacecraft sub systems, spacecraft mass and power estimations, space segment cost estimates.

#### Satellite Antenna

Antenna basics, aperture antennas, parabolic reflectors, offset feed, double reflector antenna shaped reflector systems.

### 4. Link Design

Introduction, transmission losses, link power budget equation, system noise, carrier to noise ratio for uplink and downlink, combined uplink and downlink carrier to noise ratio, intermodulation noise.

### 5. Earth Stations

Introduction, design considerations, general configuration and characteristics.

### 6. Multiple Access Techniques

Introduction, FDMA, TDMA, FDMA/DMA, operation in a multiple beam environment, CDMA, multiple access examples

### Reference Books:

1. Satellite Communication (*A.K.Maini; Varsha Agrawal*) Wiley India
2. Satellite Communications (*Dennis Roddy*) 3<sup>rd</sup> edition, Mc-Graw Hill publication
3. Satellite Communications systems (*M. Richharia*) 2<sup>nd</sup> edition, Mc Millan publication.
4. Satellite Communication (*Pratt T*) John Wiley.

