4/4 B.Tech - EIGHTH SEMESTER

EC 8T1 **TV & Satellite Communications** **Credits: 3**

Lecture: 3 periods/week **Internal assessment: 30 marks**
Tutorial: 1 period /week **Semester end examination: 70 marks**

Prerequisites: Digital Communications (EC6T4), Antennas and Wave Propagation (EC5T4)

Course Objectives:

- To describe the basics of TV and Satellite Communications.
- To Explore the fundamental aspects of Digital TV
- To understand the orbital mechanics, its effects in communication system performance, launch vehicles and details of various satellite subsystems.

Learning Outcomes:

Students will be able to

- Analyze the effects of scanning and interlacing on composite video signal
- Conceptualize digital television.
- Acquaint with fundamentals of orbital mechanics in communication satellites.
- Design satellite subsystems and satellite antenna equipment.

UNIT –I

Basics of Television: Historical Background, The Eye-Brain Mechanism, The Scanning Standards, The Resolution Concept, The Composite Video Signal, The Spectrum of the Video Signal, Transmission Standards and Constraints.

UNIT- II

Digital Video Fundamentals: The Typical Black Box Digital Device, Sampling the Signal, Quantizing the Sampled Values, The Dynamic Range and the Head room Concept, The Quantizing error, The D/A Conversion.

UNIT-III

The Component Digital Standards: The sampling rates, The Coded Signals, The Sampling Frequencies, The Quantizing Range and the Implications
Digital Audio Fundamentals: Digital Audio Concepts, Digital Audio Interface Implementation, Audio Synchronization, Digital Audio Recording

UNIT-IV

Orbital Mechanics: Origin of Satellite Communications, Frequency allocations for Satellite Services, Orbital Mechanics, Look Angle determination, Orbital perturbations, Orbit determination, Orbital effects in communication systems performance.

UNIT-V

Satellite Launchers: launchers and launch vehicles, Polar Satellite Launching Vehicle (PSLV)
Satellite Subsystems: Attitude and orbit control system, telemetry, tracking, Command and monitoring, power systems, communication subsystems, Spacecraft antennas

Learning Resources

Text Books:

1. Digital Television Fundamentals; Michael Robin and Michel Poulin, Mc Graw Hill, Second Edition,2000
2. Satellite Communications – Timothy Pratt, Charles Bostian and Jeremy Allnutt, WSE, Wiley Publications, 2nd Edition, 2003.

References:

1. Digital Television: A Practical Guide for Engineers, Walter Fischer and H. von Renouard, Springer-Verlag,2004
2. Satellite Communications Engineering – Wilbur L. Pritchard, Robert A Nelson and Henri G.Suyderhoud, 2nd Edition, Pearson Publications, 2003.

Web Resources:

1. http://nptel.ac.in/courses/117105081/
2. http://nptel.ac.in/syllabus/syllabus.php?subjectId=117106103
3. http://nptel.ac.in/syllabus/syllabus.php?subjectId=117107036