

Year & Sem:	Course Code: EC3508	Course Name: Satellite Communication Systems	No. of Credits: 4	L 2	T&PS 2	P 0
UNIT - I: Introduction Importance of Satellite Communication, A Brief History of Satellite Communications and its evolution. Evolution of Indian Space communication. UNIT-II: Orbital Mechanics and Launchers Developing the Equations of the Orbit, Kepler's Three Laws of Planetary Motion, Describing the Orbit of a satellite, Locating the in the Orbit, Locating the Satellite with Respect to the Earth. Orbital Elements, Look Angle Determination, The Subsatellite Point, Elevation and Azimuth angle Calculations, Specialization to Geostationary Satellites, Visibility Test, Orbital Perturbations, Orbit Determination, Launches and Launch Vehicles, Doppler Shift, Range Variations, Solar Eclipse, Sun Transit Outage. UNIT-III: Satellite Subsystems Attitude and Orbit Control System, Telemetry, Tracking, Command and monitoring, Power Systems, Communication Subsystems, Transponders, Satellite Antennas, Equipment Reliability and Space Qualification, Redundancy. UNIT-IV: Satellite Link Design Introduction, Basic Transmission Theory, System Noise Temperature and G/T Ratio, Noise Figure and Noise Temperature, G/T Ratio for Earth stations. Design of Downlinks, Link Budgets, Uplink Design, Designs for Specified C/N Ratios. UNIT-V: Multiple Access Introduction, FDMA, TDMA, CDMA, Intermodulation ,Calculation of C/N with Intermodulation TDMA Frame Structure, Demand Access Multiple Access(DAMA), Spread Spectrum Transmission and Reception UNIT-VI :Propagation Effects and their Impact on Satellite-Earth Links Introduction, Quantifying Attenuation and Depolarization, Atmospheric Absorption, Cloud Attenuation, Tropospheric Scintillation and Low Angle Fading, Faraday Rotation in the atmosphere, Ionospheric Scintillation, Rain and Ice Effects, Antenna Noise, Propagation Impairment Countermeasures. References/Text Books: 1. Satellite Communications 2nd Edition, by T Pratt, C.W.Bostain, J.E Allnutt. John Willey sons 2003. 2. Satellite communications systems: Systems, Techniques, and Technology 5th Edition by G Maral, M.Bousquet, Z.Sun ., John Willy Sons 3. Gary D Gordon and Watler L Morgan, Principles of Communication satellites, John Wiley & Sons, 1993. Lecture Plan: Unit-I & -II syllabus for MID-I, Unit-III & -IV syllabus for MID-II and Unit-V & -VI syllabus for MID-III examinations. Video Lectures (Web Links): 1. http://nptel.ac.in/courses/117105131/						