EC8094 SATELLITE COMMUNICATION

DETAILED SYLLABUS

OBJECTIVES:

The student should be made to:

- Understand the basics of satellite orbits
- Understand the satellite segment and earth segment
- Analyze the various methods of satellite access
- Understand the applications of satellites
- Understand the basics of satellite Networks

UNIT I SATELLITE ORBITS

Kepler's Laws, Newton's law, orbital parameters, orbital perturbations, station keeping, geo stationary and non-Geo-stationary orbits – Look Angle Determination- Limits of visibility – eclipse-Sub satellite point –Sun transit outage-Launching Procedures - launch vehicles and propulsion.

UNIT II SPACE SEGMENT

Spacecraft Technology- Structure, Primary power, Attitude and Orbit control, Thermal control and Propulsion, communication Payload and supporting subsystems, Telemetry, Tracking and command-Transponders-The Antenna Subsystem.

UNIT III SATELLITE LINK DESIGN

Basic link analysis, Interference analysis, Rain induced attenuation and interference, Ionospheric characteristics, Link Design with and without frequency reuse.

UNIT IV SATELLITE ACCESS AND CODING METHODS

Modulation and Multiplexing: Voice, Data, Video, Analog – digital transmission system, Digital video Broadcast, multiple access: FDMA, TDMA, CDMA, DAMA Assignment Methods, compression – encryption, Coding Schemes.

UNIT V SATELLITE APPLICATIONS

INTELSAT Series, INSAT, VSAT, Mobile satellite services: GSM, GPS, INMARSAT, LEO, MEO, Satellite Navigational System. GPS Position Location Principles, Differential GPS, Direct Broadcast satellites (DBS/DTH).

TEXT BOOKS:

1. Dennis Roddy, —Satellite Communication‖, 4th Edition, Mc Graw Hill International, 2006.

2. Timothy, Pratt, Charles, W. Bostain, JeremyE.Allnutt,"SatelliteCommunication‖,2nd Edition, Wiley Publications,2002

REFERENCES:

1. Wilbur L. Pritchard, Hendri G. Suyderhoud, Robert A. Nelson, —Satellite Communication Systems Engineering‖, Prentice Hall/Pearson, 2007.

2. N. Agarwal, —Design of Geosynchronous Space Craft‖, Prentice Hall, 1986.

3. Bruce R. Elbert, —The Satellite Communication Applications‖, Hand Book, Artech House Bostan London, 1997.

4. Tri T. Ha, —Digital Satellite Communication‖, II nd edition, 1990.

5. Emanuel Fthenakis, —Manual of Satellite Communications‖, Mc Graw Hill Book Co., 1984.

6. Robert G. Winch, —Telecommunication Trans Mission Systems‖, Mc Graw-Hill Book Co., 1983.

7. Brian Ackroyd, —World Satellite Communication and earth station Design‖, BSP professional Books, 1990.

8. G.B. Bleazard, —Introducing Satellite communications—, NCC Publication, 1985.

9. M. Richharia, —Satellite Communication Systems-Design Principles‖, Macmillan 2003.