AMCO-24 SATELLITE COMMUNICATION SYSTEM

UNIT-1 PRINCIPLES OF SATELLITE COMMUNICATIONS

1.1 Evolution and Growth of Communication Satellite, Synchronous Satellite,
1.2 International Regulation and Frequency Co-ordination,
1.3 Satellite Frequency Allocation and Bank Spectrum, General and Technical Characteristics of a Satellite Communication System, Advantages of Satellite Communication,
1.4 Active and Passive Satellite, Advent of Digital Satellite Communication,
1.5 Modem and Codec, Review Questions, Reference.

UNIT-2 DIGITAL SATELLITE TRANSMISSION

1.1 Advantages of Digital Communication, Byte, Baud , Elements of Digital Satellite Communication Systems, Digital Base band Signals, Digital Modulation Techniques,
1.2 Satellite Digital Link Design, Time Division Multiplexing, UST,
1.3 24 Channel System, Review Questions, Reference.

UNIT-3 MULTIPLE ACCESS TECHNIQUES:

3.1 Time Division Multiple Access (TDMA), TDMA, Frame Structures, TDMA Burst Structures, TDMA Frame Efficiency, TDMA Super frame,
3.2 TDMA Frame Acquisition and Synchronization, TDMA Compared to FDMA,
3.3 TDMA Burst Time Plan, Multiple Beam (Satellite Switched) TDMA Satellite Systems,
3.4 Beam Hopping (Transponder Hopping) TMDA, Code Division Multiple Access (CDMA) and Hybrid Access Techniques, Suggested References, Review Questions.

UNIT-4 DEMAND ASSIGNMENT MULTIPLE ACCESS TECHNIQUES:

4.1 Erlang call congestion (Blocking or B) Formula, Demand Assignment Control ,
4.2 DA FDMA (Spade) System,
4.3 Demand Assignment TDMA (DATDMA) Digital Speech Interpolation,
4.4 Review Questions, References.

UNIT-5 SPREAD SPECTRUM TECHNIQUE AND CODE DIVISION MULTIPLE ACCESS

5.1 Process Gain and Jam Margin, J/S Ratio and Antijam Margin,
5.2 Direct Sequence Spread Spectrum Techniques , PN Sequence, DS CDMA, Frequency
5.3 Hopping Spread Spectrum Communication System (FM-SS), Frequency Hopping Spread Spectrum Code Division Multiple Access (FH-SS-CDMA), Synchronization,
5.4 Application of Spread Spectrum Techniques, Hybrid Systems, Review Questions.

UNIT-6 SATELLITE ORBITS AND INCLINATION

6.1 Synchronous Orbit, Orbital Parameters, Satellite Location With Respect to the Earth ,
6.2 Look Angles, Earth Coverage and Slant Range, Eclipse Effects,
6.3 Satellite Placement in Geostationary Orbit, Station Keeping,
6.4 Satellite Stabilization, Review Questions, References.

UNIT-7 COMMUNICATION SATELLITE SUBSYSTEMS

7.1 Electric Power Supply, Attitude and Orbit Control , Propulsion Sub System,

7.2 Repeaters, Antenna Systems, Telemetry , Tracking and Command (TTC) Subsystem,

7.3 Thermal Control System, Structure Subsystem, Reliability of Satellite Subsystems, Review Questions, References.

UNIT-8 SATELLITE EARTH STATIONS

8.1 Earth Station Design Requirement, Earth Station Subsystems, Monitoring and Control,

8.2 Frequency Coordination , Small Earth Station, Very Small Aperture Terminals (VSATs),

8.3 Mobile and Transport Earth Stations, Earth Stations in Near Future,

8.4 TVRO Systems (Television Receive Only Systems), Review Questions, References.

UNIT-9 SATELLITE AND CABLE TRANSMISSION SYSTEMS

9.1 Cable Channel Frequencies, Head End Equipment, Distribution of the Signal ,

9.2 Important Cable Television Network Specifications, Network Architecture,

9.3 Optical Fiber CATV Systems, Indian Perspective,

9.4 Future of Cable TV Systems, Reference.

UNIT-10 SPEECH CODING TECHNIQUES

10.1 Some Facts about Speech, Digital Speech Quality and International Digital Telephony Standards, Basic Speech Coding Methods, Low Bit Rate Speech Coding,

10.2 Audio Coding, Hardware Technology in Speech Coding,

10.3 Speech Coder Performance. Semiconductor device and modeling

Reference books:

1. Satellite Communication by D C Agrawal and A K Maini
2. Satellite Communication by T Pratt and C W Bostiern
3. Satellite Communication System by M Richharia