

AMEC24 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 Band 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) TDMA, 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 (FH-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