

3rd Semester

SATELLITE COMMUNICATION MMW 601

Evolution of Satellite Technology, Communication Satellites, Satellite frequency Bands.

Satellite Channel analysis, cross-links, Carrier to Noise ratios, Frequency reuse with spot beams. Multiple beams.

Satellite front end, Front-end noise. Noise temperature Front end filters.

Satellite multiple access methods. FDMA, TDMA, CDMA Systems, DS-SS and frequency hopped CDMA, Satellite jamming, Code acquisition and tracking.

Satellite applications. Data Communication and VSAT network. Mobile satellite services (GEO and NONGEO).

Books :

1. The Satellite Communication applications handbook. By Brauce. R. Elbert.
2. Electronic Communication Systems by Wayne Tomas.
3. Satellite Communication by Robert M. Gagliardi.

OPTICAL COMMUNICATION MMW 602

Introduction To optical communication, principles of light Transmission, optical fiber modes and configurations, Mode. Theory for circular wave-guides, Single mode fibers multi-mode fibers, Numerical Aperture, Mode field Diameter, V-number, Fiber materials, Fiber fabrication Techniques.

Optical Sources, LED'S LASER Diodes, Modal reflection Noise, Power launching and coupling, population Inversion, Fiber splicing, optical connectors, Photodetectors, PIN, Avalanche, Detector Response Time, Avalanche Multiplication Noise.

Signal Degradation in optical fibers, attenuation, losses, Signal distortion in optical waveguide, Material Dispersion waveguide Dispersion, chromatic Dispersion, Intermodol Distortion, pulse broadening in graded index fiber, Mode coupling, Advance fiber designs: Dispersion shifted, Dispersion flattened, Dispersion Compensating fiber, Design optimization of single mode fibers.

Coherent optical fiber communication, modulation techniques for Homodyne and Heterodyne systems. Optical fiber link design: Rise Time Budget and Link Power Budget, Long – Haul Systems, Bit error rate, Line coding: NRZ, RZ Block codes, Eye pattern.

Advance Systems and Techniques, Wavelength Division Multiplexing, optical Amplifiers: Semi conductor Amplifier, EDFA, optical Amplifier: Gain, Bandwidth: Photonic Switching, Optical Networks : Optical fiber Bus, Ring Topology, STAR Architectures, FDDI, SONET.

Books :-

1. D.F. Mynbaev and L. Scheiner “ Fiber Optic Communication Technology, “ Pearson Elocution.
2. G. Keiser “ Optical Fiber Communication (3rd Edition)”, McGraw Hill International.
3. A. Ghatak and K. Thyagrajan, “ Int. To Fiber Optics”, Cambridge Univ. Press.

ELECTIVE- III: 1. MOBILE COMMUNICATION
MMW 611

An overview of wireless communication systems. First generation analog cellular systems, second generation digital cellular systems, third generation systems standards for wireless communications systems. GSM, IMT-2000, UMTS. Mobile Satellite Communication – GEO, LEO, MEO, Terrestrial mobile system.

Cellular communication fundamentals. Cellular systems. Geometry of a Hexagonal Cell. Cochannel interference ratio. Cellular system design in worst case with an omnidirectional antenna, cochannel interference reduction with use of directional antenna. Cell splitting. Frequency and spectrum management and handoffs Access Techniques.

GSM architecture and interfaces. GSM frequency bands, GSM PLMN, GSM PLMN Services, GSM interfaces. The Radio interface MS to BTS. Abis interface (BTS to MSC). Interface BSC to MSC.

Radio Propagation and cellular engineering concept. Propagation characteristics. Multipath faded radio signals. Radio link design. Receiver sensitivity and link budget.

Data services in GSM. GSM GPRS. Privacy and security in GSM

Books :

1. Wireless Digital Communication- Feher 1991, PHI.
2. Principles & applications of GSM – Vijay K. Garg, and J.E. Wilkes 1999 – Prentice hall PTR.
3. Telecom Transmission handbook 4th ed Roger L. Freeman 1998 John Wiley & Sons. Inc. New York.
4. Mobile Cellular Telecomm. Lee 1995 Mc Graw Hill Inc.

ELECTIVE III: 2. . **DIGITAL IMAGE PROCESSING**
MMW 612

Introduction to Image Processing System:

Digital Image Fundamentals:

Image model, Relationship between pixels, Imaging Geometry, Camera model.

Manipulation on Images:

Images Transformation : Introduction to FT, DFT & FFT, 2D-DFT, DLT, KLT, DWT, Slant, Harr, Walsh transformation, Hadamard transformation, Hotelling transformation, Histogram, Sub-band coding.

Image Smoothing:

Neighborhood averaging, Median filtering lowpass filters, average of multiple images, Image sharpening by differentiation technique, High pass filtering.

Image Restoration:

Degradation models for continuous function, effect of diagonalization. On degradation, Algebraic approach to restoration. Interactive restoration, gray level interpolation.

Image Encoding & Segmentation:

Encoding : Mapping, Quantizer, Coder

Segmentation: Detection of discontinuation by point detection, line detection, edge detection.

Edge linking & boundary detection: Local analysis, Global by graph theoretic techniques.

Thresholding: Definition, Global thresholding

Filtering: Median, Gradient

Simple Method of representation signatures, Boundary Segments, Skeleton of region

Image compression:

Lossy and lossless techniques, standards of image compression, video compression, standards of video compression, motion compensation.

Books:

1. Digital Image Processing : Gonzalez & Wood, Addison-Wisley Publisher Comp. 1993.
2. Digital Image Processing : A.K Jain, PHI, Edition 1995.

ELECTIVE III: 3. INTERNET AND INTRANET
MMW 613

Development of Internet, Designing principles of Internet, Internetworking architecture
Internetworking issues.

Network layer structure, Internet protocol standards, Internet IP, Ipv6 The ISO Internet
protocol , ISO routing protocols.

The world wide web : Web fundamentals, URL , Web protocols- HTTP, SSL , Services
HTTP other web tools, FTP, HTML, Java , VRML, Jargon IRC, WAIS.

Net components: Internet terminology , provider, client & browser, services, viewers,
Gateway and Routers.

Net applications : e mail, Netnews, Telnet, e commerce Network security firewalls,
Digital Signature.

Intranet and extranet.

Books:

1. Data Communication, Computer Network and Open system: F Halshal, Addison
Wesley.
2. Internetworking with TCP/IP: Volume I: Comer, PHI.
3. Launching Business on the Web: David Cook, PHI