

PEOPLE'S UNIVERSITY, BHOPAL

PROGRAMME: M Tech (Digital Communication)

SEM: I

Subject Title	Subject Code
DIGITAL IMAGE PROCESSING	MTDC-201

Unit	Contents (Theory)
I	Introduction – Image as a 2D data, Image representation – Gray scale and Color images, image sampling and quantization. Frequency domain processing – Two dimensional orthogonal transforms: DFT, FFT, WHT, Haar transform, KLT, DCT.
II	Image enhancement – filters in spatial and frequency domains, histogram-based processing, Homomorphic filtering. Edge detection – non parametric and model based approaches, LOG filters, localization problem.
III	Image restoration – PSF, circulant and block circulant matrices, deconvolution, restoration using inverse filtering, Wiener filtering and maximum entropy- based methods.
IV	Mathematical morphology – binary morphology, dilation, erosion, opening and closing duality relations, gray scale morphology; Image communication – JPED, JPEG 2000, MPEGs and H.26x standards packet video, error concealment.
V	Image texture analysis co-occurrence matrix, measures of textures, statistical models for textures, principal component analysis. Misc. topic such as – Hough Transform, boundary detection, chain coding, and segmentation, thresholding methods.

Reference Books:

- R. Gonzalez and E. Woods, Digital Image Processing, PHI
A. K. Jain, Fundamentals of digital image processing, Prentice Hall of India.
W. K. Pratt, Digital image processing, Prentice Hall
A. Rosenfeld and A. C. Kak, Digital image processing, Vol 1 & 2, Prentice Hall.

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PROGRAMME: M Tech (Digital Communication)

SEM: .

Subject Title	Subject Code
DATA COMMUNICATION & COMPUTER NETWORK	MTDC-202

Unit	Contents (Theory)
I	Review of synchronous and asynchronous transmission, circuit switching, message switching, packet switching and their comparison, various detector techniques, parity check, vertical and longitudinal redundancy check and CRC code and their error detecting capabilities. RS-232 C and X.21 standards, modern operation, null model.
II	Data link control, point-to-point and multi-point links, flow control, sliding window protocol, various ARQ technique for error control and their comparison and performance analysis, HDLC as a bit oriented link control protocol.
III	Communication Network:- Virtual circuit and datagram, routing algorithm, dijkstra and Bellman ford least cost, algorithm, various routing protocol, congestion control technique, deadlock and its avoidance.
IV	Local Area network:- Various topologies and medium access control schemes such as contention, polling, token parsing and performance analysis, various IEEE standards for LAN, UBS LANs, FDDI.
V	Introduction to WAN packet switching technologies such as ATM and Frame relay. Introduction to TCP / IP protocols.

Reference Books:-

1. Data And Computer Communication By W. Stalling Phi
2. Computer Networks Y Tanenebaum Phi
3. Telecommunication Network, Protocols, Modelings And Analysis By M. Schwartz
4. Local Area Network By Keiser Tmh

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PROGRAMME: M Tech (Digital Communication)

SEM: II

Subject Title	Subject Code
VLSI DESIGN	MTDC-203

Unit	Contents (Theory)
I	Introduction: Basic concept of integrated circuits and manufacturing, Design fundamental for digital CMOS circuits, Design Abstraction and circuit Validation.
II	CMOS circuit and Logic Design: CMOS Logic gate design, Basic Physical design, CMOS Logic structure, I/O Structure, Power and Delay consideration
III	System Design: CMOS Chip Design, standard cells, Programmable gate array, Design Capture, Simulation and Verification.
IV	Subsystem Design: Data Operation, CMOS Sub System Design, Memory and Control Strategies, PLA and ROM Implementation
V	CAD system and Algorithms: CAD systems, Layout Analysis, Placement and Routing Algorithms, Timing Analysis, Optimization, Logic Synthesis and Simulation, Testability Issues.

Reference Books:

1. Principal Of Cmos Design: A System Prospective By Waste And Eshraghin
2. Vlsi Design: System On Silicon, Pearson Education
- 3 Vlsi Technology By Sze S.M. Tmh
- 4 Basic Vlsi Design, System And Circuits By Pucknil D.A. Phi
- 5 Vhdl Primer By Bhaskar Star Galax Pub.



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PROGRAMME: M Tech (Digital Communication)

SEM:

Subject Title	Subject Code
WIRELESS & MOBILE COMMUNICATION	MTDC-204


Unit	Contents (Theory)
I	Introduction to mobile communication. Past, present and Future wireless- Mobile technology. Introduction to GSM and CDMA Technology. GSM system architecture, overview, call management and system operation. CDMA based cellular system.
II	Cellular radio system design, frequency assignment, frequency reuse channels, Concept of cell splitting. Handover in cellular systems. Handoff algorithms.
III	Radio wave propagation, propagation models, reflection, scattering, fading, shadowing multipath effects Path loss over hilly and flat terrain, Power prediction over flat and hilly terrain.
IV	RF design, received signal phase and envelope characteristic. Simulation of wireless channel.
V	Bandwidth and power spectral density, pulse shaping techniques, BPSK, QPSK, QPPSK, MSK, GMSK


Reference Books:

1. William C. Y. Lee, Mobile Communication Engineering, Theory and Applications, McGraw Hill.
2. Raj Pandya, Mobile and Personal Communication Systems and Services, PHI
3. Theodore S. Rappaport, Wireless Communications Principles and Practice, PE India.
4. WCY Lee, Mobile Cellular Telecommunications, McGraw Hill International Edition.
5. Raymond Steele, Mobile Radio Communications, IEEE Press, New York.
6. AJ Viterbi, CDMA: Principles of Spread Spectrum Communications, Addison Wesley, New York.
7. VK Garg, and JE Wilkes, Wireless and Personal Communication Systems, Prentice Hall.


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PROGRAMME: M Tech (Digital Communication)

SEM: II

Subject Title	Subject Code
ANTENNA ENGINEERING & DESIGN	MTDC-205

Unit	Contents (Theory)
I	INTRODUCTION TO ANTENNAS: Review the fundamental theory of antennas: Reciprocity theorem, Antenna equivalent circuit, Classification of antennas, Brief understanding of special types of Antennas. Gain a thorough understanding of the important concepts: Radiation Impedance, Radiation Pattern, Antenna Impedance, Bandwidth, Directivity, Gain, Antenna efficiency, Radiation Efficiency, Antenna Polarization, Antenna Apertures
II	ANTENNA SYNTHESIS, ANALYSIS and OPTIMIZATION TECHNIQUES: Introduction to various methods of antenna synthesis such as Schelkunoff Polynomial, Fourier transform, Woodward Lawson. Introduction to antenna analysis methods: Integral equation method, Moment method, Finite Difference Time Domain methods; Applications of these methods to the practical antennas such as dipole, loop, helical, microstrip patch, and PIFA.
III	ANTENNA DESIGN: Various impedance matching techniques such as Quarter wavelength transformer, T-match, Gamma Match, Omega match, Baluns and Transformers. Analytical comparative study of wire type and aperture type, narrow band and wide band, element and antenna array antennas.
IV	SPECIAL TOPICS FOR ANTENNA DESIGN and MEASUREMENT: Techniques to miniaturize an antenna for wireless LAN and Blue tooth applications, Wideband and multi-band antennas, Mobile antennas and antenna diversity, Reconfigurable antennas, Practical consideration in designing antennas for wireless communications (such as the interaction between mobile antenna and human body).
V	Measurement of various antenna parameters necessarily needed for practical antennas. Understanding the working and design of anechoic chamber, practical difficulties, types and applications

Reference Books:


1. Balanis C A, Antenna Theory: design and applications, Wiley
2. Hohnson R C and H Jasik, Antenna Engineering Handbooks, McGraw Hill
3. Sadiku N O Mathew, Elements of Electromagnetics, Oxford Univ Press
4. Harrington R F, Time harmonic Electromagnetic Fields, McGraw Hill


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Subject Title	Subject Code
LAB-1II	MTDC-206

With help of MATLAB programming solve the problem related to Digital Image Processing.


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PROGRAMME: M Tech (Digital Communication)

SEM: II

Subject Title	Subject Code
LAB -IV	MTDC-207


With help of EM 3D Simulator IE3D/HFSS/FEKO, design and simulate different types of antenna and Microstrip antenna according to their frequency band.


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