ANNA UNIVERSITY, CHENNAI
AFFILIATED INSTITUTIONS
R - 2009
CURRICULUM I SEMESTER (FULL TIME)
M.E. COMPUTER AND COMMUNICATION
SEMESTER I

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**PRACTICAL**

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**TOTAL** 18 1 4 21

**LIST OF ELECTIVES**

M.E. COMPUTER AND COMMUNICATION

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<tr>
<th>SL. NO</th>
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<tr>
<td>1.</td>
<td>CU9221</td>
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UNIT I
SPECIAL FUNCTIONS
Bessel's equation – Bessel function – Recurrence relations - Generating function and orthogonal property for Bessel functions of first kind – Fourier-Bessel expansion.

UNIT II
MATRIX THEORY

UNIT III
ONE DIMENSIONAL RANDOM VARIABLES

UNIT IV
TWO DIMENSIONAL RANDOM VARIABLES
Joint distributions – Marginal and Conditional distributions – Functions of two dimensional random variables – Regression Curve – Correlation.

UNIT V
QUEUEING MODELS

REFERENCES

UNIT I
CONSTANT ENVELOPE MODULATION
Advantages of Constant Envelope Modulation; Binary Frequency Shift Keying-Coherent and Non-coherent Detection of BFSK; Minimum Shift Keying-; Gaussian Minimum Shift Keying; M-ary Phase Shift Keying; M-ary Quadrature Amplitude Modulation; M-ary Frequency Shift Keying.
UNIT II  OFDM  9
Generation of sub-carriers using the IFFT; Guard Time and Cyclic Extension; Windowing; OFDM signal processing; Peak Power Problem: PAP reduction schemes-Clipping, Filtering, Coding and Scrambling.

UNIT III  BLOCK CODED DIGITAL COMMUNICATION  9
Architecture and performance – Binary block codes; Orthogonal; Biorthogonal; Transorthogonal – Shannon’s channel coding theorem; Channel capacity; Matched filter; Concepts of Spread spectrum communication – Coded BPSK and DPSK demodulators – Linear block codes; Hamming; Golay; Cyclic; BCH ; Reed – Solomon codes.

UNIT IV  CONVOLUTIONAL CODED DIGITAL COMMUNICATION  9

UNIT V  EQUALIZATION TECHNIQUES  9

TOTAL : 45 PERIODS

REFERENCES

AP9211  ADVANCED DIGITAL SIGNAL PROCESSING  LT P C
3 0 0 3

UNIT I  DISCRETE RANDOM SIGNAL PROCESSING  9
UNIT II SPECTRAL ESTIMATION
Estimation of spectra from finite duration signals, Nonparametric methods - Periodogram, Modified periodogram, Bartlett, Welch and Blackman-Tukey methods, Parametric methods – ARMA, AR and MA model based spectral estimation, Solution using Levinson-Durbin algorithm

UNIT III LINEAR ESTIMATION AND PREDICTION
Linear prediction – Forward and Backward prediction, Solution of Prony’s normal equations, Least mean-squared error criterion, Wiener filter for filtering and prediction, FIR and IIR Wiener filters, Discrete Kalman filter

UNIT IV ADAPTIVE FILTERS

UNIT V MULTIRATE DIGITAL SIGNAL PROCESSING
Mathematical description of change of sampling rate – Interpolation and Decimation, Decimation by an integer factor, Interpolation by an integer factor, Sampling rate conversion by a rational factor, Polyphase filter structures, Multistage implementation of multirate system, Application to subband coding – Wavelet transform

TOTAL : 45 PERIODS

REFERENCES

CP9212 HIGH PERFORMANCE COMPUTER NETWORKS
UNIT I INTRODUCTION
Review of OSI, TCP/IP; Multiplexing, Modes of Communication, Switching, Routing. SONET – DWDM – DSL – ISDN – BISDN,ATM.

UNIT II MULTIMEDIA NETWORKING APPLICATIONS
Streaming stored Audio and Video – Best effort service – protocols for real time interactive applications – Beyond best effort – scheduling and policing mechanism – integrated services – RSVP- differentiated services.
UNIT III ADVANCED NETWORKS CONCEPTS 10

UNIT IV TRAFFIC MODELLING 7
Little’s theorem, Need for modeling, Poisson modeling and its failure, Non-poission models, Network performance evaluation.

UNIT V NETWORK SECURITY AND MANAGEMENT 10

TOTAL : 45 PERIODS

REFERENCES
6. Fred Halsall and Lingana Gouda Kulkarni,Computer Networking and the Internet, fifth edition, pearson education

CP9213 SYSTEMS PROGRAMMING AND OPERATING SYSTEMS L T P C 3 0 0 3

UNIT I 9

UNIT II 9
Assemblers: Elements of assembly language programming, simple assembly scheme, pass structure of Assemblers, Design of two pass Assemblers. Macros and Macro Processor: Macro definition and call, Macro expansion, nested Macro calls, Advanced Macro facilities, Design of a Macro preprocessor.
UNIT III
Compilers and Interpreters: Aspects of Compilation, Memory allocation, Compilation of expressions, Compilation of control structures, Code optimization, Interpreters
Linkers: Relocation and Linking concept, design of a Linker, Self Relocating Programs

UNIT IV
Introduction to OS: Types of OS, I/O Structure, Storage structure, Network Structure, System calls.

UNIT V
I/O Systems- I/O hardware, Disk - Structure, Scheduling, Disk Management and swap space management.

REFERENCES

CP9217 COMPUTER AND COMMUNICATION LABORATORY I LTPC
0042
1. Simulation of Modulation and Coding in a AWGN Communication Channel using Simulation Packages.
2. Implementation of Linear and Cyclic Codes
3. Implementation of Adaptive Filters, periodogram and multistage multirate system in DSP Processor
4. Simulation of QMF using Simulation Packages.
5. System design using PIC Microcontroller
7. Implementation of Semaphores and monitors in classical problems of synchronization.
8. Usage of System Calls.

TOTAL : 60 PERIODS
UNIT I  THE WIRELESS CHANNEL
Overview of wireless systems – Physical modeling for wireless channels – Time and Frequency coherence – Statistical channel models – Capacity of wireless Channel - Capacity of Flat Fading Channel — Channel Distribution Information known – Channel Side Information at Receiver – Channel Side Information at Transmitter and Receiver – Capacity with Receiver diversity – Capacity comparisons – Capacity of Frequency Selective Fading channels.

UNIT II  PERFORMANCE OF DIGITAL MODULATION OVER WIRELESS CHANNELS

UNIT III  DIVERSITY

UNIT IV  MULTICARRIER MODULATION
Data Transmission using Multiple Carriers – Multicarrier Modulation with Overlapping Subchannels – Mitigation of Subcarrier Fading – Discrete Implementation of Multicarrier Modulation – Peak to average Power Ratio- Frequency and Timing offset – Case study IEEE 802.11a.

UNIT V  SPREAD SPECTRUM

TOTAL : 45 PERIODS

REFERENCES
UNIT II NOISE AND DISTORTION IN MICROWAVE CIRCUITS

Review of Random Process - Thermal noise – available noise power and noise voltage
– Auto correlation and Power spectral density in linear systems – Gaussian white noise

UNIT III FILTERS

Filter design by Insertion loss method, Butterworth and Tchebycheff Low pass filters. Impedance and frequency scaling for low pass filters – Band pass and band stop transformation – Design examples – Filters using transmission line stubs – stepped impedance low pass filters – Band pass filters using transmission line resonators – capacitively coupled quarter wave resonators-Micro strip filters-Coupled resonator band pass filters.

UNIT IV AMPLIFIERS

FET and Bipolar Transistor models, two port power gain. Derivation of stability circles and stability criteria – unconditionally stable configuration and simultaneous conjugate matching – Amplifier design using S parameters – constant Noise figure circles – Design for maximum gain power amplifiers,LNA Design.

UNIT V OSCILLATORS AND MIXERS


TOTAL : 45 PERIODS

REFERENCES

AP9251 DIGITAL IMAGE PROCESSING LT P C 3 0 0 3

UNIT I DIGITAL IMAGE FUNDAMENTALS

Elements of digital image processing systems, Vidicon and Digital Camera working principles, Elements of visual perception, brightness, contrast, hue, saturation, Mach Band effect, Image sampling, Quantization, Dither, Two dimensional mathematical preliminaries.
UNIT II  IMAGE TRANSFORMS  9
1D DFT, 2D transforms - DFT, DCT, Discrete Sine, Walsh, Hadamard, Slant, Haar, KLT, SVD, Wavelet transform.

UNIT III  IMAGE ENHANCEMENT AND RESTORATION  9
Histogram modification, Noise distributions, Spatial averaging, Directional Smoothing, Median, Geometric mean, Harmonic mean, Contra-harmonic and Yp mean filters. Design of 2D FIR filters.

UNIT IV  IMAGE SEGMENTATION AND RECOGNITION  9
Image segmentation - Edge detection, Edge linking and boundary detection, Region growing, Region splitting and Merging, Image Recognition - Patterns and pattern classes, Matching by minimum distance classifier, Matching by correlation., Neural networks-Backpropagation network and training, Neural network to recognize shapes.

UNIT V  IMAGE COMPRESSION  9
Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, Vector Quantization, Block Truncation Coding, Transform coding, JPEG standard, JPEG 2000, EZW, SPIHT, MPEG.

TOTAL : 45 PERIODS

REFERENCES
UNIT I BASIC LEARNING ALGORITHMS

UNIT II RADIAL-BASE FUNCTION NETWORKS AND SUPPORT VECTOR MACHINES :RADIAL BASIS FUNCTION NETWORKS
Cover’s Theorem on the Separability of Patterns - Exact Interpolator – Regularization Theory – Generalized Radial Basis Function Networks - Learning in Radial Basis Function Networks - Applications: XOR Problem – Image Classification. Support Vector Machines:

UNIT III COMMITTEE MACHINES

NEURODYNAMICS SYSTEMS

UNIT IV ATTRACTOR NEURAL NETWORKS

ADAPTIVE RESONANCE THEORY
UNIT V  SELF ORGANISING MAPS  9

PULSED NEURON MODELS:

REFERENCES

TOTAL: 45 PERIODS

VL9261  ASIC DESIGN  LT P C  3 0 0 3

UNIT I  INTRODUCTION TO ASICS, CMOS LOGIC AND ASIC LIBRARY DESIGN  9
Types of ASICs - Design flow - CMOS transistors CMOS Design rules - Combinational Logic Cell – Sequential logic cell - Data path logic cell - Transistors as Resistors - Transistor Parasitic Capacitance- Logical effort –Library cell design - Library architecture.

UNIT II  PROGRAMMABLE ASICS, PROGRAMMABLE ASIC LOGIC CELLS AND PROGRAMMABLE ASIC I/O CELLS  9
Anti fuse - static RAM - EPROM and EEPROM technology - PREP benchmarks - Actel - Xilinx LCA –Altera FLEX - Altera MAX DC & AC inputs and outputs - Clock & Power inputs - Xilinx I/O blocks.

UNIT III  PROGRAMMABLE ASIC INTERCONNECT, PROGRAMMABLE ASIC DESIGN SOFTWARE AND LOW LEVEL DESIGN ENTRY  9

UNIT IV  LOGIC SYNTHESIS, SIMULATION AND TESTING  9
Verilog and logic synthesis -VHDL and logic synthesis - types of simulation -boundary scan test - fault simulation - automatic test pattern generation.
UNIT V  ASIC CONSTRUCTION, FLOOR PLANNING, PLACEMENT AND ROUTING
System partition - FPGA partitioning - partitioning methods - floor planning - placement - physical design flow –global routing - detailed routing - special routing - circuit extraction - DRC.

TOTAL : 45 PERIODS

REFERENCES
UNIT V  SYSTEM DESIGN TECHNIQUES  
TOTAL : 45 PERIODS

REFERENCES:

CP9253  HIGH SPEED SWITCHING ARCHITECTURES

UNIT I  LAN SWITCHING TECHNOLOGY  
Switching Concepts, switch forwarding techniques, switch path control, LAN Switching, cut through forwarding, store and forward, virtual LANs. 

UNIT II  ATM SWITCHING ARCHITECTURE  

UNIT III  QUEUES IN ATM SWITCHES  
Internal Queueing -Input, output and shared queueing, multiple queueing networks – combined Input, output and shared queueing - performance analysis of Queued switches.

UNIT IV  PACKET SWITCHING ARCHITECTURES  
Architectures of Internet Switches and Routers- Bufferless and buffered Crossbar switches, Multi-stage switching, Optical Packet switching; Switching fabric on a chip; Internally buffered Crossbars.

UNIT V  IP SWITCHING  
Addressing model, IP Switching types - flow driven and topology driven solutions, IP Over ATM address and next hop resolution, multicasting, Ipv6 over ATM.

TOTAL : 45 PERIODS
REFERENCES


CP9266 NONLINEAR FIBER OPTICS LT P C
3 0 0 3

UNIT I FIBER NONLINEARITIES 9

UNIT II GROUP VELOCITY DISPERSION AND PHASE MODULATION 10

UNIT III OPTICAL SOLITONS AND DISPERSION MANAGEMENT 9
Soliton Characteristics - Soliton Stability - Dark Solitons – Other kinds of Solitons - Effect of Birefringence in Solitons - Solitons based Fiber Optic Communication System (Qualitative treatment) – Demerits - Dispersion Managed Solitons (DMS).

UNIT IV SOLITON LASERS 8

UNIT V APPLICATIONS OF SOLITONS 9

TOTAL : 45 PERIODS
REFERENCES

VL9264 DIGITAL SPEECH SIGNAL PROCESSING LT P C 3 0 0 3

UNIT I MECHANICS OF SPEECH 8

UNIT II TIME DOMAIN METHODS FOR SPEECH PROCESSING 8

UNIT III FREQUENCY DOMAIN METHOD FOR SPEECH PROCESSING 9
Short Time Fourier analysis – Filter bank analysis – Formant extraction – Pitch Extraction – Analysis by Synthesis- Analysis synthesis systems- Phase vocoder—Channel Vocoder.

HOMOMORPHIC SPEECH ANALYSIS:

UNIT IV LINEAR PREDICTIVE ANALYSIS OF SPEECH 10

UNIT V APPLICATION OF SPEECH SIGNAL PROCESSING 10

TOTAL : 45 PERIODS
REFERENCES

CU9257 COMMUNICATION NETWORK SECURITY LT P C
3 0 0 3

UNIT I INTRODUCTION ON SECURITY 9

UNIT II SYMMETRIC & ASYMMETRIC KEY ALGORITHMS 9
Substitutional Ciphers, Transposition Ciphers, Stream and Block Ciphers, Data Encryption Standards (DES), Advanced Encryption Standard (AES), RC4, principle of asymmetric key algorithms, RSA Cryptosystem

UNIT III INTEGRITY, AUTHENTICATION AND KEY MANAGEMENT 9

UNIT IV NETWORK SECURITY, FIREWALLS AND WEB SECURITY 9

UNIT V WIRELESS NETWORK SECURITY 9

TOTAL: 45 PERIODS

REFERENCES

NE9254 SOFTWARE ENGINEERING METHODOLOGIES

UNIT I 9
Definition – systems approach – modeling the process and lifecycle – meaning of process – software process models – tools and techniques – practical process modeling – information systems – planning and managing the project – tracking project – project personnel – effort estimation – risk management – project plan – process models and project management

UNIT II 9

UNIT III 8

UNIT IV 9
UNIT V

TOTAL : 45 PERIODS

REFERENCES


CS 9257 XML AND WEB SERVICES L T P C 3 0 0 3

UNIT I XML TECHNOLOGY FAMILY 9

UNIT II ARCHITECTING WEB SERVICES 9

UNIT III WEB SERVICES BUILDING BLOCK 9

UNIT IV IMPLEMENTING XML IN E-BUSINESS 9

UNIT V XML AND CONTENT MANAGEMENT 9

TOTAL: 45 PERIODS
TEXT BOOK

REFERENCES

CS9221 DATABASE TECHNOLOGY LT P C 3 0 0 3

UNIT I DISTRIBUTED DATABASES 5

UNIT II OBJECT ORIENTED DATABASES 10

UNIT III EMERGING SYSTEMS 10
Enhanced Data Models - Client/Server Model - Data Warehousing and Data Mining - Web Databases – Mobile Databases.

UNIT IV DATABASE DESIGN ISSUES 10

UNIT V CURRENT ISSUES 10
Rules - Knowledge Bases - Active And Deductive Databases - Parallel Databases – Multimedia Databases – Image Databases – Text Database

TOTAL : 45 PERIODS
REFERENCES:


CU9222  MULTIMEDIA COMPRESSION TECHNIQUES  LT P C
3 0 0 3

UNIT I  INTRODUCTION

UNIT II  TEXT COMPRESSION

UNIT III  AUDIO COMPRESSION

UNIT IV  IMAGE COMPRESSION

UNIT V  VIDEO COMPRESSION

TOTAL: 45 PERIODS
REFERENCES

CP9259 WIRELESS SENSOR NETWORKS LT P C
3 0 0 3

UNIT I OVERVIEW OF WIRELESS SENSOR NETWORKS 8

UNIT II ARCHITECTURES 9

UNIT III NETWORKING OF SENSORS 10

UNIT IV INFRASTRUCTURE ESTABLISHMENT 9
Topology Control, Clustering, Time Synchronization, Localization and Positioning, Sensor Tasking and Control.

UNIT V SENSOR NETWORK PLATFORMS AND TOOLS 9

TOTAL : 45 PERIODS
REFERENCES

CP9260 OPERATING SYSTEM DESIGN LT P C 3 0 0 3

UNIT I OPERATING SYSTEMS OVERVIEW

UNIT II PROCESS MANAGEMENT

UNIT III STORAGE MANAGEMENT

UNIT IV I/O SYSTEMS
UNIT V CASE STUDY


TOTAL: 45 PERIODS

TEXT BOOKS


REFERENCES


CP9267 VISUAL PROGRAMMING LT P C

3 0 0 3

UNIT I WINDOWS PROGRAMMING


UNIT II VISUAL BASIC PROGRAMMING


UNIT III VISUAL C++ PROGRAMMING

UNIT IV CONTROLS

UNIT V ADVANCED CONCEPTS

TOTAL :45 PERIODS

TEXT BOOKS

REFERENCES
3. Herbert Sheildt, “MFC from the Ground Up”.

CS9263 AD-HOC NETWORKS

UNIT I AD-HOC MAC

UNIT II AD-HOC NETWORK ROUTING & TCP

UNIT III WSN -MAC
UNIT IV  WSN ROUTING, LOCALIZATION & QOS  9

UNIT V  MESH NETWORKS  9

TOTAL : 45 PERIODS

REFERENCES
UNIT V  CASE STUDIES  8
Distributed Object-Based System – CORBA – COM+ – Distributed Coordination-Based System – JINI.

REFERENCES


CP9262  OBJECT ORIENTED SYSTEM DESIGN  LT P C  TOTAL: 45 PERIODS

UNIT I  10

UNIT II  8

UNIT III  9

UNIT IV  9
Patterns – Analysis and Design patterns – GoF Patterns - Mapping designs to code – Test Driven development and refactoring – UML Tools and UML as blueprint

UNIT V  9
More Patterns – Applying design patterns – Architectural Analysis – Logical Architecture Refinement – Package Design – Persistence framework with patterns

TOTAL : 45 PERIODS
REFERENCES