# M.E. Computer Science and Engineering

## Semester I

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**No of Lab Courses** : 04
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ANNA UNIVERSITY CHENNAI :: CHENNAI 600 025
REGULATIONS - 2009
CURRICULUM I TO VI SEMESTERS (PART TIME)
M.E. COMPUTER SCIENCE AND ENGINEERING

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UNIT I QUEUEING MODELS

Poisson Process – Markovian Queues – Single and Multi-server Models – Little’s
formula – Machine Interference Model – Steady State analysis – Self Service Queue.

UNIT II ADVANCED QUEUEING MODELS

Non- Markovian Queues – Pollaczek Khintchine Formula – Queues in Series – Open
Queueing Networks – Closed Queueing networks.

UNIT III SIMULATION

Discrete Even Simulation – Monte Carlo Simulation – Stochastic Simulation –
Applications to Queueing systems.

UNIT IV LINEAR PROGRAMMING

Formulation – Graphical solution – Simplex method – Two phase method –
Transportation and Assignment Problems.

UNIT V NON-LINEAR PROGRAMMING

Lagrange multipliers – Equality constraints – Inequality constraints – Kuhn – Tucker
conditions – Quadratic Programming.

L + T: 45+15 = 60

TEXT BOOKS

2003.

REFERENCES

1. Robertazzi. T.G. “Computer Networks and Systems – Queuing Theory and
UNIT I  FUNDAMENTALS

UNIT II  HEAP STRUCTURES

UNIT III  SEARCH STRUCTURES

UNIT IV  MULTIMEDIA STRUCTURES

UNIT V  ALGORITHMS

REFERENCES
UNIT I PIPELINING AND ILP  9

UNIT II ADVANCED TECHNIQUES FOR EXPLOITING ILP  9

UNIT III MULTIPROCESSORS  9

UNIT IV MULTI-CORE ARCHITECTURES  9

UNIT V MEMORY HIERARCHY DESIGN  9
Introduction - Optimizations of Cache Performance - Memory Technology and Optimizations - Protection: Virtual Memory and Virtual Machines - Design of Memory Hierarchies - Case Studies.

TOTAL - 45

REFERENCES

UNIT I  CLASSICAL PARADIGM
System Concepts – Project Organization – Communication – Project Management

UNIT II  PROCESS MODELS

UNIT III  ANALYSIS
Requirements Elicitation – Use Cases – Unified Modeling Language, Tools – Analysis Object Model (Domain Model) – Analysis Dynamic Models – Non-functional requirements – Analysis Patterns

UNIT IV  DESIGN

UNIT V  IMPLEMENTATION, DEPLOYMENT AND MAINTENANCE

REFERENCES
UNIT I  FOUNDATIONS OF NETWORKING


UNIT II  QUALITY OF SERVICE

Traffic Characteristics and Descriptors – Quality of Service and Metrics – Best Effort model and Guaranteed Service Model – Limitations of IP networks – Scheduling and Dropping policies for BE and GS models – Traffic Shaping algorithms – End to End solutions – Laissez Faire Approach – Possible improvements in TCP – Significance of UDP in inelastic traffic

UNIT III  HIGH PERFORMANCE NETWORKS


UNIT IV  HIGH SPEED NETWORKS


UNIT V  NETWORK MANAGEMENT


REFERENCES

1. Implementation of multi-dimensional structures such as matrices, triangular matrices, diagonal matrices, etc into a one dimensional array (atleast any two)

2. Implementation of any two of the following Heap structures
   - Deaps (Insertion, Delete Min, Delete Max)
   - Leftist Heap (All Meldable Priority Queue operations)
   - Skew Heap (All Meldable Priority Queue operations)
   - Fibonacci Heap (All Meldable Priority Queue operations)

3. Implementation of any two of the following Search Structures
   - AVL Trees (Insertion, Deletion and Search)
   - Splay Trees (Insertion, Deletion and Search)
   - Tries for any specified alphabet (Insertion, Deletion and Search)
   - B-Trees (Insertion, Deletion and Search)

4. Implementation of any two of the following multimedia structures
   - 2-d Trees (Insertion, Deletion and Range Queries)
   - Point Quad-Trees (Insertion, Deletion and Range Queries)
   - Segment Trees (Insertion, Deletion – Show list of nodes where in insertion and deletion took place)

5. Finding Convex-hull.
UNIT I    OVERVIEW

UNIT II    FILE SUBSYSTEM

UNIT III    SYSTEM CALLS FOR THE FILE SYSTEM

UNIT IV    PROCESSES

UNIT V    MEMORY MANAGEMENT AND I/O

TOTAL = 45

TEXT BOOKS

REFERENCES
UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V
Case Studies – Sun Compilers for SPARC – IBM XL Compilers – Alpha compilers – PA –RISC assembly language – COOL – (Classroom Object oriented language) - Compiler testing tools – SPIM

TOTAL ; 45

TEXT BOOKS:
2. Keith D Cooper and Linda Torczon, “ Engineering a Compiler, Elsevier Science, India,

REFERENCES
CP9123 ADVANCED DATABASE TECHNOLOGY

UNIT I PARALLEL AND DISTRIBUTED DATABASES 9

UNIT II OBJECT AND OBJECT RELATIONAL DATABASES 9

UNIT III XML DATABASES 9

UNIT IV MOBILE DATABASES 9
Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management - Location Dependent Data Distribution - Mobile Transaction Models - Concurrency Control - Transaction Commit Protocols- Mobile Database Recovery Schemes

UNIT V MULTIMEDIA DATABASES 9

TOTAL = 45

REFERENCES


CP9124 PARALLEL ALGORITHMS

UNIT I

UNIT II

UNIT III

Unit IV

UNIT V

TOTAL : 45

REFERENCES

UNIT I  
9

Wireless networks—emerging technologies—Blue tooth, WiFi, WiMAX, 3G, WATM.—Mobile IP protocols—WAP push architecture-Wml scripts and applications.

UNIT II  
8

Mobile computing environment—functions-architecture-design considerations, content architecture-CC/PP exchange protocol, context manager. Data management in WAE-Coda file system—caching schemes—Mobility QOS. Security in mobile computing.

UNIT III  
8

Handoff in wireless mobile networks—reference model-handoff schemes. Location management in cellular networks—Mobility models—location and tracking management schemes—time, movement, profile and distance based update strategies. ALI technologies

UNIT IV  
10

Pervasive Computing—Principles, Characteristics—interaction transparency, context aware, automated experience capture. Architecture for pervasive computing—Pervasive devices-embedded controls.— smart sensors and actuators—Context communication and access services

UNIT V  
10


REFERENCES

1. Use of Unix/Linux – User Commands – Editors - Shell programming

2. C/C++ programming on Unix/Linux – use of make, version control

3. Use of system calls – files – processes – I/O – IPC

4. Experiments using C of mini unix systems (such as Minix) – File system – Processes – Memory Management – Drivers

5. Unix / Linux sources – build, run kernel – small modifications
UNIT I  INTRODUCTION & MATHEMATICAL FOUNDATION  
Beginning with a simple communication game – wresting between safeguard and attack – Probability and Information Theory - Algebraic foundations – Number theory.

UNIT II  ENCRYPTION – SYMMETRIC TECHNIQUES  

UNIT III  ENCRYPTION – ASYMMETRIC TECHNIQUES & DATA INTEGRITY TECHNIQUES  

UNIT IV  AUTHENTICATION  

UNIT V  SECURITY PRACTICES

REFERENCES
UNIT I    INTRODUCTION

UNIT II  JAVA COMPONENT TECHNOLOGIES

UNIT III  CORBA TECHNOLOGIES

UNIT IV  COM AND .NET TECHNOLOGIES

UNIT V  COMPONENT FRAMEWORKS AND DEVELOPMENT

Total = 45

REFERENCES
UNIT I 9

UNIT II 9

UNIT III 9
Markovian FIFO Queuing Systems – M/M/1 – M/M/a – M/M/∞ - M/G/1 – M/M/m/m and other Markov-Non-Markovian and self-similar models – Network of Queues – Burke’s Theorem – Jackson’s Theorem.

UNIT IV 9
Multi-User Uplinks/Downlinks - Capacity Regions - Opportunistic Scheduling for Stability and Max Throughput - Multi-Hop Routing - Mobile Networks - Throughput Optimality and Backpressure

UNIT V 9

TEXT BOOKS

REFERENCES
UNIT I  INTRODUCTION


UNIT II  RESOLUTION AND REASONING


UNIT III  REPRESENTATION


UNIT IV  DEFAULTS, UNCERTAINTY AND EXPRESSIVENESS


UNIT V  ACTIONS AND PLANNING


REFERENCES

UNIT I VISUALIZATION
Introduction – Issues – Data Representation – Data Presentation - Interaction

UNIT II FOUNDATIONS FOR DATA VISUALIZATION
Visualization stages – Experimental Semiotics based on Perception Gibson’s Affordance theory – A Model of Perceptual Processing – Types of Data.

UNIT III COMPUTER VISUALIZATION

UNIT IV MULTIDIMENSIONAL VISUALIZATION

UNIT V CASE STUDIES
Small interactive calendars – Selecting one from many – Web browsing through a key hole – Communication analysis – Archival analysis

TOTAL = 45

TEXT BOOKS


REFERENCES

UNIT I  IT ORGANIZATION

Metrics that matter - Interpreting the metrics – Collecting the data – Managing the data – Obstacles to acquiring IT metrics information – Old data versus new graphical analysis – Core of software planning – Measuring the core metrics (Product, Quality, Process, Productivity, Time, Effort) – Estimating and controlling with the core metrics – Work output measurements.

UNIT II  MEASUREMENT PROGRAM APPROACHES

EDS Brazil metrics program – Measurement program implementation approaches – Bench marking – Data definition framework for defining software measurements.

UNIT III  SOFTWARE METRICS

Functional points as part of measurement program – Estimation of software reliability – Establishing central support for software sizing activities – Using metrics to manage projects – Tracking software progress – Effectively utilizing software metrics.

UNIT IV  SOFTWARE ESTIMATION


UNIT V  KNOWLEDGE MANAGEMENT

Quality information and knowledge – Why quality information and knowledge – Define information quality – Create organizational knowledge – Manage knowledge as assets – Create customized solution – Network knowledge infrastructure.

REFERENCES

TOTAL = 45
UNIT I  INTRODUCTION

Human–Computer Interface – Characteristics Of Graphics Interface –Direct Manipulation

UNIT II  HUMAN COMPUTER INTERACTION

User Interface Design Process – Obstacles –Usability –Human Characteristics In Design
– Human Interaction Speed –Business Functions –Requirement Analysis – Direct –
Indirect Methods – Basic Business Functions – Design Standards – General Design
Principles – Conceptual Model Design – Conceptual Model Mock-Ups

UNIT III  WINDOWS

Characteristics– Components– Presentation Styles– Types– Managements–
Characteristics– Screen – Based Controls — Human Consideration In Screen Design –
Structures Of Menus – Functions Of Menus– Contents Of Menu– Formatting – Phrasing
The Menu — Selecting Menu Choice– Navigating Menus– Graphical Menus. Operate
Control – Text Boxes– Selection Control– Combination Control– Custom Control–
Presentation Control.

UNIT IV  MULTIMEDIA

Text For Web Pages – Effective Feedback– Guidance & Assistance–
Internationalization– Accessibility– Icons– Image– Multimedia – Coloring.

UNIT V  EVALUATION

Design Evaluation

Total = 45

TEXT BOOKS:

2. Deborah Mayhew, The Usability Engineering Lifecycle, Morgan Kaufmann,

REFERENCES:

UNIT I  INTRODUCTION


UNIT II  SPEECH SIGNAL REPRESENTATION AND CODING


UNIT III  SPEECH RECOGNITION


UNIT IV  SPEECH SYNTHESIS


UNIT V  SPOKEN LANGUAGE UNDERSTANDING


TOTAL = 45

TEXT BOOKS:


REFERENCES:

UNIT I  INTRODUCTORY CONCEPTS  9
The Central Dogma – The Killer Application – Parallel Universes – Watson's Definition –
Top Down Versus Bottom up – Information Flow – Convergence – Databases – Data
Networks – Geographical Scope – Communication Models – Transmissions Technology
Implementation – Management.

UNIT II  SEARCH ENGINES AND DATA VISUALIZATION  9
The search process – Search Engine Technology – Searching and Information Theory –
Computational methods – Search Engines and Knowledge Management – Data
Visualization – sequence visualization – structure visualization – user Interface –
Animation Versus simulation – General Purpose Technologies.

UNIT III  STATISTICS AND DATA MINING  9
Statistical concepts – Microarrays – Imperfect Data – Randomness – Variability –
Approximation – Interface Noise – Assumptions – Sampling and Distributions –
Hypothesis Testing – Quantifying Randomness – Data Analysis – Tool selection
statistics of Alignment – Clustering and Classification – Data Mining – Methods –
Selection and Sampling – Preprocessing and Cleaning – Transformation and Reduction
– Data Mining Methods – Evaluation – Visualization – Designing new queries – Pattern

UNIT IV  PATTERN MATCHING  9
Pairwise sequence alignment – Local versus global alignment – Multiple sequence
alignment – Computational methods – Dot Matrix analysis – Substitution matrices –
Dynamic Programming – Word methods – Bayesian methods – Multiple sequence
alignment – Dynamic Programming – Progressive strategies – Iterative strategies –
Tools – Nucleotide Pattern Matching – Polypeptide pattern matching – Utilities –
Sequence Databases.

UNIT V  MODELING AND SIMULATION  9
Drug Discovery – components – process – Perspectives – Numeric considerations –
Algorithms – Hardware – Issues – Protein structure – AbInitio Methods – Heuristic
methods – Systems Biology – Tools – Collaboration and Communications – standards -

REFERENCES
   2003.
2. T.K.Attwood and D.J. Perry Smith, “Introduction to Bio Informatics, Longman Essen,
   1999.
UNIT I INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS 9
Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics

UNIT II GENETIC ALGORITHMS 9
Introduction to Genetic Algorithms (GA) – Applications of GA in Machine Learning - Machine Learning Approach to Knowledge Acquisition.

UNIT III NEURAL NETWORKS 9

UNIT IV FUZZY LOGIC 9

UNIT V NEURO-FUZZY MODELING 9

TOTAL = 45

TEXT BOOKS:

REFERENCES:
UNIT I  INTRODUCTION


UNIT II  INFORMATION RETRIEVAL


UNIT III  TEXT MINING

Categorization – Extraction based Categorization- Clustering- Hierarchical Clustering- Document Classification and routing- finding and organizing answers from Text search – use of categories and clusters for organising retrieval results – Text Categorization and efficient Summarization using Lexical Chains – Pattern Extraction.

UNIT IV  GENERIC ISSUES


UNIT V  APPLICATIONS


TOTAL = 45

TEXT BOOKS:

REFERENCES:

UNIT I  INTRODUCTION

UNIT II  KNOWLEDGE MODELS

UNIT III  TECHNIQUES OF KNOWLEDGE MANAGEMENT
Knowledge Elicitation Techniques – Modeling Communication Aspects – Knowledge Management and Organizational Learning.

UNIT IV  KNOWLEDGE SYSTEM IMPLEMENTATION

UNIT V  ADVANCED KM

TOTAL = 45

TEXT BOOKS:

REFERENCES:
2. http://www.epistemics.co.uk
UNIT I  INTRODUCTION TO VLSI DESIGN

UNIT II  ASIC TECHNOLOGY
ASIC Library Design – Cell Design – Architecture – Gate Array Design – Plds And Fpgas – ASIC Families – Actel ACT– Xilinx LCA – Altera MAX – Altera FLEX.

UNIT III  DESIGN AUTOMATION TOOLS

UNIT IV  ALGORITHMS

UNIT V  TESTING
Boundary-Scan Test – Faults – Fault Simulation – Automatic Test-Pattern Generation – Scan Test – Built-in Self Test – Applications of ASICs – Case studies.

Total=45

REFERENCES

UNIT I EMBEDDED COMPUTING
Challenges of Embedded Systems – Embedded system design process. Embedded processors – ARM processor – Architecture, ARM and Thumb Instruction sets

UNIT II EMBEDDED C PROGRAMMING

UNIT III OPTIMIZING ASSEMBLY CODE

UNIT IV PROCESSES AND OPERATING SYSTEMS
Multiple tasks and processes – Context switching – Scheduling policies – Interprocess communication mechanisms – Exception and interrupt handling - Performance issues.

UNIT V EMBEDDED SYSTEM DEVELOPMENT
Meeting real time constraints – Multi-state systems and function sequences. Embedded software development tools – Emulators and debuggers. Design methodologies – Case studies – Complete design of example embedded systems.

Total = 45

REFERENCES
UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V
Mining Object, Spatial, Multimedia, Text and Web Data:
Multidimensional Analysis and Descriptive Mining of Complex Data Objects – Spatial Data Mining – Multimedia Data Mining – Text Mining – Mining the World Wide Web.

REFERENCES


UNIT I PROJECT MANAGEMENT CONCEPTS 9

UNIT II SOFTWARE ESTIMATION & COSTING 15

UNIT III RISK MANAGEMENT 15
Risk Definition – Risk Categories – Risk Assessment (Identification / Analysis / Prioritization) – Risk Control (Planning / Resolution / Monitoring) – Failure Mode and Effects Analysis (FMEA)

UNIT IV METRICS 15

UNIT V PEOPLE MANAGEMENT 6
Team Management – Client Relationship Management.

TOTAL= 45

REFERENCES:

MM9111 PRINCIPLES OF MULTIMEDIA

UNIT I INTRODUCTION


UNIT II ELEMENTS OF MULTIMEDIA


UNIT III MULTIMEDIA SYSTEMS


4. UNIT IV MULTIMEDIA TOOLS

Authoring tools – features and types - card and page based tools - icon and object based tools - time based tools - cross platform authoring tools - Editing tools - text editing and word processing tools - OCR software - painting and drawing tools - 3D modeling and animation tools - image editing tools -sound editing tools - digital movie tools – plug -ins and delivery vehicles for www

UNIT V MULTIMEDIA APPLICATION DEVELOPMENT


TOTAL = 45
TEXT BOOKS:

REFERENCES:
UNIT I    FUNDAMENTALS OF IMAGE PROCESSING
Introduction – Elements of visual perception, Steps in Image Processing Systems –
Image Acquisition – Sampling and Quantization – Pixel Relationships – Colour
Fundamentals and Models, File Formats. Introduction to the Mathematical tools.

UNIT II    IMAGE ENHANCEMENT AND RESTORATION
Spatial Domain Gray level Transformations Histogram Processing Spatial Filtering –
Smoothing and Sharpening. Frequency Domain: Filtering in Frequency Domain – DFT,
FFT, DCT, Smoothing and Sharpening filters – Homomorphic Filtering., Noise models,
Constrained and Unconstrained restoration models.

UNIT III    IMAGE SEGMENTATION AND FEATURE ANALYSIS
Detection of Discontinuities – Edge Operators – Edge Linking and Boundary Detection –
Thresholding – Region Based Segmentation – Motion Segmentation, Feature Analysis
and Extraction.

UNIT IV    MULTI RESOLUTION ANALYSIS AND COMPRESSIONS
Multi Resolution Analysis: Image Pyramids – Multi resolution expansion – Wavelet
Transforms, Fast Wavelet transforms, Wavelet Packets.
Free Compression – Lossy Compression – Compression Standards – JPEG/MPEG.

UNIT V    APPLICATIONS OF IMAGE PROCESSING
Representation and Description, Image Recognition- Image Understanding – Image
Classification – Video Motion Analysis – Image Fusion – Steganography – Colour
Image Processing.

REFERENCES
   Hall India, 2006.
5. Rafael C.Gonzalez , Richard E.Woods and Steven L. Eddins, “Digital Image

Total = 45
UNIT I AD-HOC MAC

UNIT II AD-HOC NETWORK ROUTING & TCP

UNIT III WSN -MAC

UNIT IV WSN ROUTING, LOCALIZATION & QOS

UNIT V MESH NETWORKS

REFERENCES:
UNIT I  OVERVIEW OF VIRTUALIZATION  

UNIT II  SERVER CONSOLIDATION  

UNIT III  NETWORK VIRTUALIZATION  

UNIT IV  VIRTUALIZING STORAGE  

UNIT V  VIRTUAL MACHINES PRODUCTS  

TOTAL =45HRS
REFERENCES:

UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V
Transaction processing – paradigm – protocols and coordination – transaction specifications – SOA in mobile – research issues

REFERENCES:
UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V

REFERENCES
UNIT I    UNDERSTANDING CLOUD COMPUTING

UNIT II    DEVELOPING CLOUD SERVICES

UNIT III    CLOUD COMPUTING FOR EVERYONE
Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation

UNIT IV    USING CLOUD SERVICES

UNIT V    OTHER WAYS TO COLLABORATE ONLINE

REFERENCES
UNIT I   INTRODUCTION

UNIT II  NEURAL NETWORKS AND GENETIC ALGORITHMS

UNIT III  BAYESIAN AND COMPUTATIONAL LEARNING

UNIT IV  INSTANT BASED LEARNING
K- Nearest Neighbour Learning – Locally weighted Regression – Radial Bases Functions – Case Based Learning.

UNIT V  ADVANCED LEARNING

Total =45

REFERENCES:
UNIT I  FUNDAMENTALS OF TUNING  8

UNIT II  INDEX TUNING  8
Types of Queries – Data Structures – B tree – B* Tree - Hash Structures – Bit Map Indexes – Clustering Indexes – Non Clustering Indexes – Composite Indexes – Hot Tables – Comparison of Indexing and Hashing Techniques.

UNIT III  QUERY OPTIMIZATION  10

UNIT IV  TROUBLESHOOTING  10

UNIT V  CASE STUDIES  9

Total = 45

REFERENCES


UNIT I  INTRODUCTION TO ERP


UNIT II  ERP IMPLEMENTATION


UNIT III  BUSINESS MODULES


UNIT IV  ERP MARKET


UNIT V  ERP – PRESENT AND FUTURE

Turbo Charge the ERP System – EIA – ERP and E–Commerce – ERP and Internet – Future Directions in ERP.

REFERENCES:


TOTAL  = 45
UNIT I  PERSPECTIVES IN HUMAN RESOURCE MANAGEMENT  9

UNIT II  THE CONCEPT OF BEST FIT EMPLOYEE  9

UNIT III  TRAINING AND EXECUTIVE DEVELOPMENT  9
Types of training, methods, purpose, benefits and resistance. Executive development programmes – common practices - benefits – self development – knowledge management.

UNIT IV  SUSTAINING EMPLOYEE INTEREST  9

UNIT V  PERFORMANCE EVALUATION AND CONTROL PROCESS  9

TOTAL = 45

TEXT BOOKS


REFERENCES

CP9177 MULTICORE ARCHITECTURE

UNIT I

UNIT II

UNIT III
Multicore programming Model – Shared memory model, message passing model, transaction model – OpenMP and MPI Programming.

UNIT IV

UNIT V
Cell Broad band engine architecture, PPE (Power Processor Element), SPE (Synergistic processing element), Cell Software Development Kit, Programming for Multicore architecture.

TOTAL: 45

TEXT BOOK:
3. IBM Journals for Power 5, Power 6 and Cell Broadband engine architecture.

REFERENCES: