# M.E. COMPUTER SCIENCE AND ENGINEERING

## SEMESTER I

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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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<td>Multicore Architecture</td>
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UNIT I  QUEUEING MODELS  

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  

UNIT V  NON-LINEAR PROGRAMMING  

TEXT BOOKS  

REFERENCES  
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  MULTIPROCESSEORS  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  8

UNIT II  FILE SUBSYSTEM  8

UNIT III  SYSTEM CALLS FOR THE FILE SYSTEM  10

UNIT IV  PROCESSES  10

UNIT V  MEMORY MANAGEMENT AND I/O  9

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
UNIT I  PARALLEL AND DISTRIBUTED DATABASES  

UNIT II  OBJECT AND OBJECT RELATIONAL DATABASES

UNIT III  XML DATABASES

UNIT IV  MOBILE DATABASES
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

TOTAL  = 45

REFERENCES


CP9124 PARALLEL ALGORITHMS

UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V

REFERENCES

MOBILE AND PERVERSIVE COMPUTING

UNIT I

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

UNIT II

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

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

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


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 – wrestling 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
Software Components – objects – fundamental properties of Component technology –
modules – interfaces – callbacks – directory services – component architecture –
components and middleware.

UNIT II    JAVA COMPONENT TECHNOLOGIES
Threads – Java Beans – Events and connections – properties – introspection – JAR files
RMI and RMI-IIOP.

UNIT III   CORBA TECHNOLOGIES
Java and CORBA – Interface Definition language – Object Request Broker – system
object model – portable object adapter – CORBA services – CORBA component model
– containers – application server – model driven architecture.

UNIT IV    COM AND .NET TECHNOLOGIES
COM – Distributed COM – object reuse – interfaces and versioning – dispatch interfaces
– connectable objects – OLE containers and servers – Active X controls – .NET

UNIT V     COMPONENT FRAMEWORKS AND DEVELOPMENT
Connectors – contexts – EJB containers – CLR contexts and channels – Black Box
component framework – directory objects – cross-development environment –
component-oriented programming – Component design and implementation tools –
testing tools – assembly tools.

REFERENCES
UNIT I

UNIT II

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

UNIT V

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

1. Ronald Brachman, Hector Levesque “Knowledge Representation and Reasoning “, The Morgan Kaufmann Series in Artificial Intelligence 2004

TOTAL=45
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.

TOTAL = 45

REFERENCES
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–
Organizations– Operations– Web Systems– System Timings - Device– Based Controls
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, 1999

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

UNIT II  SEARCH ENGINES AND DATA VISUALIZATION  9

UNIT III  STATISTICS AND DATA MINING  9

UNIT IV  PATTERN MATCHING  9

UNIT V  MODELING AND SIMULATION  9

REFERENCES
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:

CP9161 KNOWLEDGE MANAGEMENT

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  9
Challenges of Embedded Systems – Embedded system design process. Embedded processors – ARM processor – Architecture, ARM and Thumb Instruction sets

UNIT II  EMBEDDED C PROGRAMMING  9

UNIT III  OPTIMIZING ASSEMBLY CODE  9

UNIT IV  PROCESSES AND OPERATING SYSTEMS  9
Multiple tasks and processes – Context switching – Scheduling policies – Interprocess communication mechanisms – Exception and interrupt handling - Performance issues.

UNIT V  EMBEDDED SYSTEM DEVELOPMENT  9
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
Association Rule Mining: - Efficient and Scalable Frequent Item set Mining Methods – Mining Various Kinds of Association Rules – Association Mining to Correlation Analysis – Constraint-Based Association Mining.

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
1. Jiawei Han and Micheline Kamber “Data Mining Concepts and Techniques” Second Edition,


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


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 9

UNIT II IMAGE ENHANCEMENT AND RESTORATION 9

UNIT III IMAGE SEGMENTATION AND FEATURE ANALYSIS 9

UNIT IV MULTI RESOLUTION ANALYSIS AND COMPRESSIONS 9

UNIT V APPLICATIONS OF IMAGE PROCESSING 9

REFERENCES

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

Total=45

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:

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

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: