Sri Chandrasekharendra Saraswathi ViswaMahavidyalaya

[University]

Enathur, Kanchipuram - 631 561

M.Tech. INFORMATION TECHNOLOGY

(For Candidates Admitted from 2014 Onwards)

SYLLABUS

CHOICE BASED CREDIT SYSTEM FOR M.Tech (IT)

FULL-TIME / PART-TIME MODE PROGRAMME

ELIGIBILITY

Candidates for the admission to the first year course leading to the degree of M.Tech (IT) will be required to possess:

1. A pass in B.E / B.Tech degree examination in Information Technology (or) Computer Science and Engineering (or) Electrical and Electronics Engineering (or) Electronics and Instrumentation (or) Electronics and Communication Engineering (or)Instrumentation and control Engineering (or) Telecommunication Engineering (or) Mechatronics with at least 50% of marks. (Or)

2. A pass in M.Sc in Computer Science (or) Information Technology with at least 50% of marks. (Or)

3. A pass in M.C.A with at least 50% of marks.

CREDITS

Each course is normally assigned one credit per lecture per week and one credit for two periods of tutorials or part thereof for laboratory or practical per week.

Each semester curriculum shall normally have a blend of theory and practical courses. The Total credits for the entire degree course will be 80. For the award of the degree a student has to earn a minimum of 80 credits.

DURATION OF THE PROGRAMME

A student is normally expected to complete M.Tech (IT) programme in two years in the case of full time and three years for part time mode. But in any case not more than four years for full time and five years for part time mode from the time of admission.

REGISTRATION FOR COURSES

A newly admitted student will automatically be registered for all the courses prescribed for the first semester, without any option.

Every other student shall submit a completed registration form indicating the list of courses intended to be credited during the next semester. This registration will be done a week before the last working day of the current semester. Late registration with the approval of the dean on the recommendation of the head of the department along with a late fee will be done, up to the last working day.

ASSESSMENT

The split-up of assessment and examination marks for theory subjects is as follows.

Internal Assessment

First Assessment (Test)	:	10 Marks
Second Assessment (Test)	:	10 Marks
Seminar	:	10 Marks
Assignment	:	10 Marks
External Assessment		
Examination	:	60 Marks
TOTAL	**:**	**100 Marks**

The split-up of the assessment and examination marks for practical is as follows.

Internal Assessment

First Assessment (test)	:	15 Marks
Second Assessment (test)	:	15 Marks
Maintenance of record book	:	10 Marks
External Assessment		
Examination	:	60 Marks
TOTAL	**:**	**100 Marks**

The project work will be carried out in the final semester in two phases first phase in pre final semester and second phase in final semester. The project work will be assessed for 40 marks by a committee consisting of the guide and a minimum of two members nominated by the head of the department. The head of the department may himself / herself be a member or the Chairman/Chair Person. 60 marks are allotted for the project work and viva voce examination at the end of the final semester.

STUDENT COUNSELOR

To help the students in planning their course of study and for general advice on the academic programme, the head of the department will attach a certain number of students to a member of the faculty who shall function as student counselor for those students throughout their period of study. Such student counselors shall advise the students, give preliminary approval for the courses to be taken by the students during each semester and obtain the final approval of the head of the department.

CLASS COMMITTEE

- For each semester separate class committee will be constituted by the head of the department. The composition of the class committee will be as follows.
- Course coordinators of the entire course shall be appointed by the head of the department from among the staff members teaching the course.
- A project coordinator shall be appointed by the head of the department from among the project supervisors.
- Teaching staff of other individual courses
- One professor (or) reader appointed by the head of the department, preferably a one not teaching the concerned class.
- The head of the department may opt to be a member or the chairman.
- All student counselors of the class, and the head of the department (if not already a member) or any staff member nominated by the head of the department may opt to be special invitees.
- The class committee shall meet three times during the semester
- The first meeting will be held within two weeks from the date of class commencement in which type of assessment like test, assignment etc for the first and second assessments and the dates of completion of the assessments will be decided.
- The second meeting will be held within a week after the completion of the first assessment, to review the performance and for follow-up action.
- The third meeting will be held after all the assessments are completed for all the courses, and at least one week before the commencement of the examinations. During this meeting the assessment on a maximum of 40 marks will be finalized for every student and tabulated and submitted to the head of the department for approval and transmission to the controller of examinations.

WITHDRAWAL FROM A COURSE

A student can withdraw from a course at any time before a date fixed by the head of the department prior to the second assessment, with the approval of the dean of the faculty on the recommendation of the head of the department.

TEMPORARY BREAK OF STUDY

A student can take a one-time temporary break of study covering the current year / semester and / or the next semester with the approval of the dean on the recommendation of the head of the department, not later than seven days after the completion of the mid-semester test. However, the student must complete the entire programme within the maximum period of four years for full time mode and five years for part time mode.

SUBSTITUTE ASSESMENT

A student, who has missed for genuine reasons, accepted by the head of the department, one or more of the assessments of a course other than the examination, may take a substitute assessment for any one of the missed assessments. The substitute assessment must be completed before the date of the third meeting of the respective class committees.

A student who wishes to have a substitute assessment for a missed assessment must apply to the head of the department within a week from the date of the missed assessment.

ATTENDANCE REQUIREMENTS

To be eligible to appear for the examination in a particular course, a student must put in a minimum of 80% of attendance in the course. However, if the attendance is 70% or above but less than 80% in any course, the authorities can permit the student to appear for the examination in the course on payment of the prescribed condonation fee

A student who withdraws from or does not meet the minimum attendance requirement in course must re-register for and repeat the course.

PASSING AND DECLARATION OF EXAMINATION RESULTS

All assessments of all the courses on the absolute mark basis will be considered and pass by the results passing board in accordance with the rules of the university. Thereafter, the controller of examinations shall convert the marks for each course to the corresponding letter grade as follows, compute the grade point average and cumulative grade point average, and prepare the grade cards.

90 to 100 marks	-	Grade ‘S’
80 to 89 marks	-	Grade ‘A’
70 to 79 marks	-	Grade ‘B’
60 to 69 marks	-	Grade ‘C’
55 to 59 marks	-	Grade ‘D’
50 to 54 marks	-	Grade ‘E’
less than 50 marks	-	Grade ‘F’

A student who obtains less than 50 marks out of 100 in the subject or is absent for the examination will be awarded Grade ‘F’.

A student who earns a grade of S,A,B,C,D or E for a course is declared to have successfully completed that course and earned the credits for that course. Such a course cannot be repeated by the student.

A student who obtains letter grade F in a course has to reappear for the examination in that course.

The following grade points are associated with each letter grade for calculating the grade point average.

S – 10; A-9; B-8; C-7; D-6; E-5; F-0

F Grade will be considered for computing GPA and CGPA.

After results are declared, grade sheets will be issued to the students. The grade card will contain the list of courses registered during the semester, the grades scored and the grade point average (GPA) for the year/semester.

GPA is sum of the products of the number of credits of a course with the grade point scored in that course, taken over all the courses for the Semester , divided by the sum of the number of credits for all courses taken in that semester. CGPA is similarly calculated considering all the courses taken from the time of admission.

After successful completion of the programme, the degree will be awarded with the following classification based on CGPA.

For First Class with Distinction the student must earn a minimum of 80 credits within two years for full time mode and three years for part time mode from the time of admission, pass all the courses in the first attempt and obtain a CGPA of 8.25 or above.

For First Class the student must earn a minimum of 80 credits within three years for full time mode and four years for part time mode from the time of admission and obtain a CGPA of 6.5 or above.

For Second Class the student must earn a minimum of 80 credits within four years for full time mode and five years for part time mode from the time of admission

ELECTIVES

Apart from the various elective courses offered in the curriculum of the branch of specialization, a student can choose electives from any specialization under the faculty during the entire period of study, with the approval of the head of the department offering the course. Some of the electives have lab components along with theory and hence have more credits than the electives which are only theoretical.

COURSE CONTENTS AND SCHEME OF EXAMINATION FOR FULL TIME MODE

COURSE CONTENT & SCHEME OF EXAMINATION

FOR FULL TIME MODE

I SEMESTER

Sub. Code	Subject	L	T	P	Duration of Exam (Hours)	Maximum Marks			C
						I	E	Total	
MTRT001	Advanced Operation Research	3	2	0	3	40	60	100	4
MTRT002	Advanced Data Structure and Algorithms	3	2	0	3	40	60	100	4
MTRT003	Advanced Computer Architecture	3	2	0	3	40	60	100	4
MTRT004	Object Oriented Software Engineering	3	0	0	3	40	60	100	3
MTRT005	Advanced Data Communication and Adhoc Networks	3	2	0	3	40	60	100	4
MTRP001	Data Structures & Algorithms Lab (Using C++)	0	0	6	3	40	60	100	3
	Minimum requirement	15	08	6					**22**

II SEMESTER

Sub. Code	Subject	L	T	P	Duration of Exam (Hours)	Maximum Marks			C
						I	E	Total	
MTRT006	Advanced Operating Systems	3	2	0	3	40	60	100	4
MTRT007	Advanced Data base Technologies	3	2	0	3	40	60	100	4
MTRT008	Mobile and Pervasive Computing	3	0	0	3	40	60	100	3
MTRE001	Elective – I	3	2	0	3	40	60	100	4
MTRE002	Elective – II	3	2	0	3	40	60	100	4
MTRP002	Web Technology Lab	0	0	6	3	40	60	100	3
	Minimum requirement	15	08	6					**22**

L – Lecture Hours T – Tutorial Hours P - Practical Hours C- Total Credits
I – Internal Assessment E – External Assessment

III SEMESTER

Sub. Code	Subject	L	T	P	Duration of Exam (Hours)	Maximum Marks			C
						I	E	Total	
MTRT009	Advanced Cloud Computing	3	2	0	3	40	60	100	4
MTRT010	Big Data Analytics	3	2	0	3	40	60	100	4
MTRE003	Elective – III	3	2	0	3	40	60	100	4
MTRE004	Elective – IV	3	2	0	3	40	60	100	4
MTRE005	Elective – V	3	2	0	3	40	60	100	4
MTRP003	Project Work Phase – I	-	-	12	-	40	60	100	6
	Minimum requirement	15	10	12					**26**

Electives:

Some of the electives have lab components along with theory and hence have 5 credits (Lecture - 3 Tutorial - 0 Lab - 4 and Total 5 credits) and the electives which are only theoretical have 4 credits. (Lecture - 3 Tutorial - 2 Lab - 0 and Total 4 credits)

IV SEMESTER

Sub. Code	Subject	Maximum Marks			C
		I	E	Total	
MTRP004	Project Work Phase – II	40	60	100	**10**
	Minimum requirement				**10**

L – Lecture Hours T – Tutorial Hours P - Practical Hours C- Total Credits
I – Internal Assessment E – External Assessment

COURSE CONTENTS AND SCHEME OF EXAMINATION FOR PART TIME MODE

COURSE CONTENT & SCHEME OF EXAMINATION

FOR PART TIME MODE

I SEMESTER

Sub. Code	Subject	L	T	P	Duration of Exam (Hours)	Maximum Marks			C
						I	E	Total	
MTPT001	Advanced Operation Research	3	2	0	3	40	60	100	4
MTPT002	Advanced Data base Technologies	3	2	0	3	40	60	100	4
MTPT003	Advanced Computer Architecture	3	2	0	3	40	60	100	4
	Minimum requirement	9	6	0					**12**

II SEMESTER

Sub. Code	Subject	L	T	P	Duration of Exam (Hours)	Maximum Marks			C
						I	E	Total	
MTPT004	Object Oriented Software Engineering	3	0	0	3	40	60	100	3
MTPT005	Advanced Data Communication and Adhoc Networks	3	2	0	3	40	60	100	4
MTPT006	Advanced Data Structure and Algorithms	3	2	0	3	40	60	100	4
MTPP001	Data Structures & Algorithms Lab (Using C++)	0	0	6	3	40	60	100	3
	Minimum requirement	9	4	6					**14**

III SEMESTER

Sub. Code	Subject	L	T	P	Duration of Exam (Hours)	Maximum Marks			C
						I	E	Total	
MTPT007	Advanced Operating Systems	3	2	0	3	40	60	100	4
MTPT008	Mobile and Pervasive Computing	3	0	0	3	40	60	100	3
MTPE001	Elective – I	3	2	0	3	40	60	100	4
	Minimum requirement	9	4	0					**11**

L – Lecture Hours T – Tutorial Hours P - Practical Hours C- Total Credits
I – Internal Assessment E – External Assessment

IV SEMESTER

Sub. Code	Subject	L	T	P	Duration of Exam (Hours)	Maximum Marks			C
						I	E	Total	
MTPT009	Advanced Cloud computing	3	2	0	3	40	60	100	4
MTPE002	Elective – II	3	2	0	3	40	60	100	4
MTPE003	Elective – III	3	2	0	3	40	60	100	4
MTPP002	Web Technology Lab	0	0	6	3	40	60	100	3
	Minimum requirement	9	6	6					**15**

V SEMESTER

Sub. Code	Subject	L	T	P	Duration of Exam (Hours)	Maximum Marks			C
						I	E	Total	
MTPT010	Big Data Analytics	3	2	0	3	40	60	100	4
MTPE004	Elective - IV	3	2	0	3	40	60	100	4
MTPE005	Elective – V	3	2	0	3	40	60	100	4
MTPP003	Project Work Phase – I	-	-	12	-	40	60	100	6
	Minimum requirement	9	6	12					**18**

Electives:

Some of the electives have lab components along with theory and hence have 5 credits (Lecture - 3 Tutorial - 0 Lab - 4 and Total 5 credits) and the electives which are only theoretical have 4 credits. (Lecture - 3 Tutorial - 2 Lab - 0 and Total 4 credits)

VI SEMESTER

Sub. Code	Subject	Maximum Marks			C
		I	E	Total	
MTPP004	Project Work Phase - II	40	60	100	10
	Minimum requirement				**10**

L – Lecture Hours T – Tutorial Hours P - Practical Hours C- Total Credits
I – Internal Assessment E – External Assessment

MTRT001/ MTPT001	**ADVANCED OPERATIONS RESEARCH**	**L**	**T**	**P**	**C**	**Total Marks**
		3	**2**	**0**	**4**	**100**

UNIT- I TRANSPORTATION, ASSIGNMENT AND ROUTING PROBLEMS

Transportation problem - Loops in a transportation table - Finding initial basic feasible solution (NWC, LCM and VAM methods) - Moving towards optimality - Degeneracy in transportation problems- Transportation algorithm (MODI method) - Unbalanced transportation problems - Assignment algorithm : Hungarian assignment method - Routing problems: Travelling salesman problem.

UNIT- II NETWORK MODELS

Introduction –Rules for construction a project network-Network computations-Floats—Network techniques-PERT and CPM.

UNIT- III SEQUENCING PROBLEMS

Problem of sequencing - Problems with n jobs and 2 machines - Problems with n jobs and k machines - Problems 2 jobs and k machines

UNIT-IV DECISION THEORY

Introduction-Formulation of the problem-Influence Diagram-Decision making under uncertainty- Decision making under Risk-Expected payoff calculations with perfect information.

UNIT -V SIMULATION

Introduction- Monte-Carlo simulation-Generation of Random Numbers-Simulation applied to Queuing problems- Simulation applied to some other types of problems.

REFERENCES

1. Kanti Swarup, P.K.Gupta and Man Mohan, Operations Research, Twelth Edition, Sultan Chand & Sons, New Delhi, 2004.
2. H.A.Taha, Operations Research, Ninth Edition, Mac Millen Ltd., 2010
3. Richard Bronson, Operations Research, (Schaum's Outline Series, McGraw Hill Company, 1982.
4. S.Hillier and J.Liebermann, Operations Research, Sixth Edition, Mc Graw Hill Company, 1995.
5. J.K.Sharma, Operation Research (Theory and Applications), Mac Millen Ltd., 1997.

MTRT002/ MTPT006	**ADVANCED DATA STRUCTURES AND ALGORITHMS**	**L**	**T**	**P**	**C**	**Total Marks**
		3	**2**	**0**	**4**	**100**

UNIT - I INTRODUCTION

Growth – of functions summations – formulas and properties, Recurrences

UNIT – II SORTING

Heap sort – Quick sort – radix sort – bucket sort, Analysis of sort techniques

UNIT – III DATA STRUCTURE

Arrays – linked lists – stacks – queues, representation of sets, has tables, binary search trees, red-black trees, splay trees.

UNIT – IV ALGORITHMS & ANALYSIS

Dynamic programming, Greedy algorithms, Introduction to parallel algorithms, Amortized analysis, String matching algorithms, the native – the Rabin karp.

UNIT – V ADVANCED DATA STRUCTURE

B-Trees, Binomial heaps Fibonacci heaps. GRAPH ALGORITHMS: Graphics: Representation – BFS – DFS – Topological Sort – Connected Components – Minimum spanning tree – Kruskal's algorithm – Prims algorithm – Dijikstra's algorithm – Floyd's algorithm – bellman ford algorithm, max flow and min cut problem.

REFERENCES

1. Introduction to algorithms – Thomas H.Coreman, Charless E.Leiserson, Ronald L.Rivest 3rd edition, 2010, PHI.
2. A.V.Aho, J.E.Hopscroft and J.D.Ullamn, Design and analysis of Computer algorithms, 1974, Addison Wesli.
3. Computer Algorithms and Introduction to Design & analysis – Sara baase, Allenran Gelda, 2000, Pearson.
4. Data structures algorithm and application in C++ - Sahni, 2000.

MTRT003/ MTPT003	ADVANCED COMPUTER ARCHITECTURE	L	T	P	C	Total Marks
		3	2	0	4	100

UNIT -I PIPELINING AND ILP

Fundamentals of Computer Design - Measuring and Reporting Performance – Instruction Level Parallelism and Its Exploitation - Concepts and Challenges - Overcoming Data Hazards with Dynamic Scheduling – Dynamic Branch Prediction - Speculation – Multiple Issue Processors – Case Studies.

UNIT- II ADVANCED TECHNIQUES FOR EXPLOITING ILP

Compiler Techniques for Exposing ILP - Limitations on ILP for Realizable Processors - Hardware versus Software Speculation - Multithreading: Using ILP Support to Exploit Thread-level Parallelism - Performance and Efficiency in Advanced Multiple Issue Processors - Case Studies.

UNIT- III MULTIPROCESSORS

Symmetric and distributed shared memory architectures – Cache coherence issues - Performance Issues – Synchronization issues – Models of Memory Consistency - Interconnection networks – Buses, crossbar and multi-stage switches.

UNIT- IV MULTI-CORE ARCHITECTURES

Software and hardware multithreading – SMT and CMP architectures – Design issues – Case studies – Intel Multi-core architecture – SUN CMP architecture – IBM cell architecture- hp architecture.

UNIT- V MEMORY HIERARCHY DESIGN

Introduction - Optimizations of Cache Performance - Memory Technology and Optimizations - Protection: Virtual Memory and Virtual Machines - Design of Memory Hierarchies - Case Studies.

REFERENCES

1. John L. Hennessey and David A. Patterson, " Computer Architecture – A quantitative approach", Morgan Kaufmann / Elsevier, 5th. edition, 2011.
2. David E. Culler, Jaswinder Pal Singh, "Parallel Computing Architecture : A hardware/ software approach" , Morgan Kaufmann / Elsevier, 1997.
3. William Stallings, " Computer Organization and Architecture – Designing for Performance", Pearson Education, Seventh Edition, 2006

MTRT004/ MTPT004	OBJECT ORIENTED SOFTWARE ENGINEERING	L	T	P	C	Total Marks
		3	0	0	3	100

UNIT- I CLASSICAL PARADIGM

System Concepts – Project Organization – Communication – Project Management

UNIT- II PROCESS MODELS

Life cycle models – Unified Process – Iterative and Incremental – Workflow – Agile Processes.

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

System Design, Architecture – Design Principles - Design Patterns – Dynamic Object Modeling – Static Object Modeling – Interface Specification – Object Constraint Language

UNIT- V IMPLEMENTATION, DEPLOYMENT AND MAINTENANCE

Mapping Design (Models) to Code – Testing - Usability – Deployment – Configuration Management
– Maintenance.

REFERENCES

1. Bernd Bruegge, Alan H Dutoit, Object-Oriented Software Engineering, 3rd edition, Pearson Education, 2009.
2. Craig Larman, Applying UML and Patterns 3rd ed, Pearson Education, 2005.
3. Stephen Schach, Software Engineering 7th ed, McGraw-Hill, 2007.
4. Ivar Jacobson, Grady Booch, James Rumbaugh, The Unified Software Development Process, Pearson Education, 1999.
5. Alistair Cockburn, Agile Software Development 2nd ed, Pearson Education, 2007.

MTRT005/ MTPT005	ADVANCED DATA COMMUNICATION AND ADHOC NETWORKS	L	T	P	C	Total Marks
		3	2	0	4	100

UNIT – I INTRODUCTION

LAN Standards – Ethernet and IEEE802.3 LAN Standards – Token Ring and IEEE802.5 LAN standards – FDDI – Wireless LAN and IEEE 802.11 Standards – LAN Bridges - Packet Network Topology – Routing and packet networks – Shortest path Algorithms.

UNIT – II PROTOCOLS

ATM networks – Traffic management and QOS – Congestion Control – TCP/IP Architecture – The Internet protocols – Ipv6 – UDP – TCP – DHCP and Mobile IP – Internet Routing Protocol – Multicasting Routing.

UNIT – III NETWORK ARCHITECTURE

Advanced Network Architecture – IP Forwarding Architecture – Overlay Models – MPLS – RVSP – Differentiated Service – Security Protocol –Security and Cryptographic Algorithm – Security Protocols Cryptography Algorithm

UNIT -IV INTRODUCTION TO AD HOC NETWORKS

Introduction-Fundamentals of Wireless Communication Technology - The Electromagnetic Spectrum – Radio Propagation Mechanisms - Characteristics of the Wireless Channel - IEEE 802.11a,b Standard – Origin Of Ad hoc: Packet Radio Networks - Technical Challenges - Architecture of PRNETs - Components of Packet Radios – Ad hoc Wireless Networks -an Ad Hoc Network? Heterogeneity in Mobile Devices - Wireless Sensor Networks - Traffic Profiles - Types of Ad hoc Mobile Communications - Types ofun Mobile Host Movements - Challenges Facing Ad Hoc Mobile Networks-Ad hoc wireless Internet

UNIT- V AD HOC ROUTING PROTOCOLS

Introduction - Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks - Classifications of Routing Protocols -Table-Driven Routing Protocols - Destination Sequenced Distance Vector (DSDV) - Wireless Routing Protocol (WRP) - Cluster Switch Gateway Routing (CSGR) - Source-Initiated On-Demand Approaches - Ad Hoc On-Demand Distance Vector Routing (AODV) - Dynamic Source Routing (DSR) - Temporally Ordered Routing Algorithm (TORA) - Signal Stability Routing (SSR) - Location-Aided Routing (LAR) - Power-Aware Routing (PAR) - Zone Routing Protocol (ZRP)

REFERENCES

1. Data Communication and Networking By Vehrouz A.Forouzan – 5th Edition, 2012.
2. Communication Network – Fundamental concepts and key Architecture BY Leon Garcia and Widjaja.
3. Siva Ram Murthy.C and Manoj . B.S“Ad Hoc Wireless Networks: Architectures and Protocols”, Prentice Hall PTR,2004.
4. C.K. Toh, Ad Hoc Mobile Wireless Networks: Protocols and Systems, Prentice Hall PTR ,2001.
5. Charles E. Perkins, Ad Hoc Networking, Addison Wesley, 2000

MTRP001/ MTPP001	**DATA STRUCTURES & ALGORITHMS LAB USING C++**	**L**	**T**	**P**	**C**	**Total Marks**
		0	**0**	**6**	**3**	**100**

1. Implementation of Singly, Doubly and Circular linked list.
2. Implementation of Multi stacks in a Single Array.
3. Implementation of Circular Queue.
4. Implementation of Binary Search trees.
5. Implementation of Hash table.
6. Implementation of Heaps.
7. Implementation of AVL Rotations.
8. Implementation of Breadth First Search Techniques.
9. Implementation of Depth First Search Techniques.
10. Implementation of Prim's Algorithm.
11. Implementation of Dijkstra's Algorithm.
12. Implementation of Kruskal's Algorithm
13. Implementation of Searching Techniques
14. Implementation of Sorting Techniques

MTRT006/ MTPT007	**ADVANCED OPERATING SYSTEMS**	**L**	**T**	**P**	**C**	**Total Marks**
		3	**2**	**0**	**4**	**100**

UNIT - I INTRODUCTION

Overview - Functions of an Operating System – Design Approaches – Types of Advanced Operating System - Synchronization Mechanisms – Concept of a Process, Concurrent Processes – The Critical Section Problem, Other Synchronization Problems – Language Mechanisms for Synchronization – Axiomatic Verification of Parallel Programs – Process Deadlocks - Preliminaries – Models of Deadlocks, Resources, System State – Necessary and Sufficient conditions for a Deadlock – Systems with Single-Unit Requests, Consumable Resources and Reusable Resources.

UNIT - II DISTRIBUTED OPERATING SYSTEMS

Introduction – Issues – Communication Primitives – Inherent Limitations - Lamport's Logical Clock; Vector Clock; Causal Ordering; Global State; Cuts; Termination Detection. Distributed Mutual Exclusion – Non-Token Based Algorithms – Lamport's Algorithm - Token-Based Algorithms – Suzuki-Kasami's Broadcast Algorithm – Distributed Deadlock Detection – Issues – Centralized Deadlock-Detection Algorithms - Distributed Deadlock-Detection Algorithms - Agreement Protocols – Classification - Solutions –Applications.

UNIT - III DISTRIBUTED RESOURCE MANAGEMENT

Distributed File systems – Architecture – Mechanisms – Design Issues – Distributed Shared Memory – Architecture – Algorithm – Protocols - Design Issues. Distributed Scheduling – Issues – Components – Algorithms.

UNIT IV FAILURE RECOVERY AND FAULT TOLERANCE

Basic Concepts-Classification of Failures – Basic Approaches to Recovery; Recovery in Concurrent System; Synchronous and Asynchronous Checkpointing and Recovery; Check pointing in Distributed Database Systems; Fault Tolerance; Issues - Two-phase and Nonblocking Commit Protocols; Voting Protocols; Dynamic Voting Protocols.

UNIT-V DESIGN ISSUES

Structures – Design Issues – Threads – Process Synchronization – Processor Scheduling – Memory Management – Reliability / Fault Tolerance; Database Operating Systems – Introduction – Concurrency Control – Distributed Database Systems – Concurrency Control Algorithms.

REFERENCES

1. Mukesh Singhal and N. G. Shivaratri, “Advanced Concepts in Operating Systems”,McGraw- Hill. ISBN: 007057572X
2. Abraham Silberschatz, Peter B. Galvin, G. Gagne, “Operating System Concepts”, Ninth Edition, Addison Wesley Publishing Co., 2012.
3. Andrew S. Tanenbaum, “Modern Operating Systems”, Third Edition, Addison Wesley, 2008

MTRT007/ MTPT002	ADVANCED DATABASE TECHNOLOGIES	L	T	P	C	Total Marks
		3	2	0	4	100

UNIT- I DATABASE CONCEPTS

Basic Concepts: Databases and Database users – Database system concepts and architecture – Data modeling using Entity Relationship model – Generalization and specialization – Record storage and file organizations- Index structures for files.

UNIT- II RELATIONAL CONCEPTS

The Relational Data Model, Relation Constraints, and the relational algebra – SQL – The Relational Database Standard – ER to Relational mapping – Network Data Model – Basic concepts – Retrieval, Update and set processing facilities – Hierarchical Data Model – Basic Concepts – Retrieval and update facilities – virtual records. Introduction to Relational Model, Relational Algebra, Commercial query languages-Case studies-Normalization Techniques.

UNIT- III DATABASE STORAGE AND SYSTEM DESIGN

Relational Database Design – Functional dependencies and normalization for relational database – Query processing and optimization – concurrency control – Transaction processing – Database recovery techniques. Storage Structures, Indexing and multi dimensional indexes, External Sorting, Buffer Management, Concurrency Control,Recovery.

UNIT- IV DISTRIBUTED DATABASES

Query processing, semi-joins, query optimization, distributed and client/server architecture-distributed transactions – Locking and commit protocols-Concurrency control, transaction and recovery Heterogeneity issues Parallel databases - Parallel Architectures, performance measures, shared nothing/shared disk/shared memory based architectures

UNIT -V ADVANCED DATABASE SYSTEMS

Semi-structured and Web databases - The World Wide Web- HTML- Architecture -XML, XML/QL - Database Connectivity OODBMS - ORDBMS- Deductive databases- data mining and Warehousing-temporal and spatial databases-mobile databases-No SQL-In memory Databases.

REFERENCES

1. ELMASRI & NAVATHE – Fundamental of Database Systems – 6th Edition, Addison Wesely, 2012
2. Abraham Silberschtz, Henry. F. Korth, S.Sudharsan, "Database System Concepts", 4th Edition, Tata McGraw Hill, 2011
3. KORTH and SILBERSCHATZ, Database system concepts – Tata McGraw Hill
4. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", 3rd Edition,Addison Wesley,2000
5. Thomas Conolly, Carolyn Begg, " Database Systems", 3rd edition, Pearson Education,2003
6. Jim Gray and Andreas Reuter, "Transaction Processing : Concepts and Techniques", Moragan Kauffman Publishers, 1993.
7. W. Kim., "Introduction to Object Oriented Databases ", MIT Press, 1992.
8. Stefano Ceri & Giuesppe Pelagatti, "Distributed Databases - Principles and Systems",McGraw Hill Book Company, 1987.
9. Martin Fowler , Pramod J. Sadalage, NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence pearson edition – 2012.

MTRT008/ MTPT008	MOBILE AND PERVASIVE COMPUTING	L	T	P	C	Total Marks
		3	0	0	3	100

UNIT- I MOBILE NETWORKS

Cellular Wireless Networks – GSM – Architecture – Protocols – Connection Establishment – Frequency Allocation – Routing – Mobility Management – Security –GPRS.

UNIT- II WIRELESS NETWORKS

Wireless LANs and PANs – IEEE 802.11 Standard – Architecture – Services –Network – HiperLAN – Blue Tooth- Wi-Fi – WiMAX

UNIT- III ROUTING

Mobile IP – DHCP – AdHoc– Proactive and Reactive Routing Protocols – Multicast Routing.

UNIT -IV TRANSPORT AND APPLICATION LAYERS

Mobile TCP– WAP – Architecture – WWW Programming Model– WDP – WTLS – WTP – WSP – WAE – WTA Architecture – WML – WMLScripts.

UNIT- V PERVASIVE COMPUTING

Pervasive computing infrastructure-applications- Device Technology - Hardware, Human-machine Interfaces, Biometrics, and Operating systems– Device Connectivity – Protocols, Security, and Device Management- Pervasive Web Application architecture-Access from PCs and PDAs - Access via WAP – SDN and Open Flow

REFERENCES

1. Jochen Schiller, “Mobile Communications”, PHI, Second Edition, 2003.
2. Jochen Burkhardt, Pervasive Computing: Technology and Architecture of Mobile
   Internet Applications, Addison-Wesley Professional; 3rd edition, 2007
3. Frank Adelstein, Sandeep KS Gupta, Golden Richard, Fundamentals of Mobile and Pervasive Computing, McGraw-Hill 2005
4. Debashis Saha, Networking Infrastructure for Pervasive Computing: Enabling Technologies, Kluwer Academic Publisher, Springer; First edition, 2002
5. Introduction to Wireless and Mobile Systems by Agrawal and Zeng, Brooks/ Cole (Thomson Learning), First edition, 2002
6. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, Principles of Mobile Computing, Springer, New York, 2003

MTRP002/ MTPP002	**WEB TECHNOLOGY LAB**	**L**	**T**	**P**	**C**	**Total Marks**
		0	**0**	**6**	**3**	**100**

1. Creation of HTML pages with frames, links, tables and other tags.
2. Usage of internal and external CSS along with HTML pages
3. Client side Programming
4. Java script for displaying date and comparing two dates.
5. Form Validation including text field, radio buttons, check boxes, list box and other controls
6. Usage of ASP/JSP objects response, Request, Application, Session, Server, ADO etc
7. Writing online applications such as shopping, railway/air/bus ticket reservation system with set of ASP/JSP pages
8. Using sessions and cookies as part of the web application
9. Writing Servlet Program using HTTP Servlet
10. Any online application with database access
11. Creation of XML document for a specific domain.
12. Writing DTD or XML schema for the domain specific XML document
13. Parsing an XML document using DOM and SAX Parsers
14. Sample web application development in the open source environment

MTRT009/ MTPT009	**ADVANCED CLOUD COMPUTING**	**L**	**T**	**P**	**C**	**Total Marks**
		3	**2**	**0**	**4**	**100**

UNIT- I CLOUD ARCHITECTURE AND MODEL

Technologies for Network-Based System – System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture. Cloud Models:- Characteristics – Cloud Services – Cloud models (IaaS, PaaS, SaaS) – Public vs Private Cloud –Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.

UNIT- II VIRTUALIZATION

Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource management – Virtualization for Data-center Automation.

UNIT -III CLOUD INFRASTRUCTURE

Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources.

UNIT- IV PROGRAMMING MODEL

Parallel and Distributed Programming Paradigms – MapReduce , Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - Cloud Software Environments -Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim

UNIT- V SECURITY IN THE CLOUD

Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control – Autonomic Security.

REFERENCES

1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.
2. John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010.
3. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", TMH, 2009.
4. Kumar Saurabh, " Cloud Computing – insights into New-Era Infrastructure", Wiley India,2011.
5. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud" O'Reilly
6. James E. Smith, Ravi Nair, "Virtual Machines: Versatile Platforms for Systems and Processes", Elsevier/Morgan Kaufmann, 2005.
7. Katarina Stanoevska-Slabeva, Thomas Wozniak, Santi Ristol, "Grid and Cloud Computing – A Business Perspective on Technology and Applications", Springer.
8. Ronald L. Krutz, Russell Dean Vines, "Cloud Security – A comprehensive Guide to Secure Cloud Computing", Wiley – India, 2010.
9. Rajkumar Buyya, Christian Vecchiola, S.Tamarai Selvi, 'Mastering Cloud Computing", TMGH,2013.
10. Gautam Shroff, Enterprise Cloud Computing, Cambridge University Press, 2011
11. Michael Miller, Cloud Computing, Que Publishing,2008

MTRT010/ MTPT010	BIG DATA ANALYTICS	L	T	P	C	Total Marks
		3	2	0	4	100

UNIT -I INTRODUCTION TO BIG DATA

Introduction to BigData Platform – Challenges of Conventional Systems - Intelligent data analysis – Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference - Prediction Error.

UNIT- II DATA ANALYSIS

Regression Modeling - Multivariate Analysis – Bayesian Methods – Bayesian Paradigm - Bayesian Modeling - Inference and Bayesian Networks - Support Vector and Kernel Methods - Analysis of Time Series: Linear Systems Analysis - Nonlinear Dynamics - Rule Induction - Fuzzy Logic: Extracting Fuzzy Models from Data - Fuzzy Decision Trees

UNIT -III SEARCH METHODS AND VISUALIZATION

Search by simulated Annealing – Stochastic, Adaptive search by Evaluation – Evaluation Strategies – Genetic Algorithm – Genetic Programming – Visualization – Classification of Visual Data Analysis Techniques – Data Types – Visualization Techniques – Interaction techniques – Specific Visual data analysis Techniques.

UNIT -IV MINING DATA STREAMS

Introduction To Streams Concepts – Stream Data Model and Architecture – Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.

UNIT -V FRAMEWORKS

MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases - S3 - Hadoop Distributed File Systems – Case Study.

REFERENCES

1. Michael Berthold, David J. Hand, “Intelligent Data Analysis”, Springer, 2007.
2. Anand Rajaraman and Jeffrey David Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2012.
3. Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics”, John Wiley & sons, 2012.
4. Glenn J. Myatt, “Making Sense of Data”, John Wiley & Sons, 2007
5. Pete Warden, “Big Data Glossary”, O’Reilly, 2011.
6. Jiawei Han, Micheline Kamber “Data Mining Concepts and Techniques”, Second Edition, Elsevier, Reprinted 2008. 36
7. Da Ruan, Guoquing Chen, Etienne E.Kerre, Geert Wets, Intelligent Data Mining, Springer,2007
8. Paul Zikopoulos ,Dirk deRoos , Krishnan Parasuraman , Thomas Deutsch , James Giles, David Corrigan , Harness the Power of Big Data The IBM Big Data Platform, Tata McGraw Hill Publications, 2012
9. Michael Minelli (Author), Michele Chambers (Author), Ambiga Dhiraj (Author) , Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses,Wiley Publications,2013
10. Zikopoulos, Paul, Chris Eaton, Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, Tata McGraw Hill Publications, 2011

PROJECT PHASE – I

The student is supposed to carry out a project in two phases the first phase in pre final semester. The student has to do the analysis and design part in phase – I and produce a documentation of the design with the details up to System Planning and Design.

PROJECT PHASE- II

In Phase – II the System Implementation has to be carried out and the complete project report has to be submitted at the end of final semester.

ELECTIVES

List of Electives

S.No	Subject	L	T	P	C
1.	Neural Networks	3	2	0	4
2.	Image Processing	3	2	0	4
3.	Mobile Application Development	3	2	0	4
4.	Information Retrieval Techniques	3	2	0	4
5.	Digital Forensics and Security	3	2	0	4
6.	Data Mining And Data Warehousing	3	2	0	4
7.	Software Quality And Reliability	3	2	0	4
8.	Cryptography & Network Security	3	2	0	4
9.	Grid Computing	3	2	0	4
10.	Natural Language Processing	3	2	0	4
11.	Network Protocol Standards	3	2	0	4
12.	Robotics And Artificial Intelligence	3	2	0	4
13.	Real Time Systems	3	2	0	4
14.	Soft Computing	3	2	0	4
15.	Embedded Technology	3	2	0	4
16.	Web services And Service Oriented Architecture	3	0	4	5
17.	.Net Technologies	3	0	4	5
18.	Multi Core Architecture	3	2	0	4
19.	Knowledge Management	3	2	0	4
20.	Software Testing	3	2	0	4
21.	Advanced Internet Technologies	3	2	0	4

NEURAL NETWORKS

UNIT – I BACK PROPAGATION

Introduction to Artificial Neural Systems - Perceptron - Representation – Linear reparability - Learning – Training algorithm - The back propagation network - The generalized delta rule - Practical considerations – BPN applications.

UNIT – II STATISTICAL METHODS

Hopfield nets - Cauchy training - Simulated annealing - The Boltzmann machine. Associative memory - Bidirectional associative memory - Applications.

UNIT – III COUNTER PROPAGATION NETWORK AND SELF ORGANIZING MAPS

CPN building blocks - CPN data processing. SOM data processing - Applications.

UNIT IV - ADAPTIVE RESONANCE THEORY AND SPATIO TEMPORAL PATTERN CLASSIFICATION

ART network description - ART1 - ART2 - Application. The formal avalanche - Architecture of spatio temporal networks - The sequential competitive avalanche field - Applications of STNs.

UNIT – V NEO – CONGNITRON

Cognitron - Structure & training - The neocognitron architecture - Data processing - Performance - Addition of lateral inhibition and feedback to the neocognitron. Optical neural networks - Holographic correlators.

REFERENCES

1. James Freeman A. and David Skapura M., Neural Networks - Algorithms, Applications & Programming Techniques Addison Wesley,1992.

2. Yegnanarayana B., Artificial Neural Networks, Prentice Hall of India Private Ltd., New Delhi, 1999.

IMAGE PROCESSING

UNIT- I DIGITAL MAGE FUNDAMENTAL

Introduction: Digital Image- Steps of Digital Image Processing Systems-Elements of Visual Perception - Connectivity and Relations between Pixels. Simple Operations- Arithmetic, Logical, Geometric Operations.Mathematical Preliminaries - 2D Linear Space Invariant Systems - 2D Convolution - Correlation 2D Random Sequence - 2D Spectrum

UNIT- II IMAGE TRANSFORMS AND ENHANCEMENT

Image Transforms: 2D Orthogonal and Unitary Transforms-Properties and Examples. 2D DFT- FFT – DCT - Hadamard Transform - Haar Transform - Slant Transform - KL Transform -Properties And Examples.Image Enhancement:- Histogram Equalization Technique- Point Processing-Spatial Filtering-In Space And Frequency - Nonlinear Filtering-Use Of Different Masks

UNIT- III IMAGE RESTORATION AND CONSTRUCTION

Image Restoration: Image Observation And Degradation Model, Circulant And Block Circulant Matrices and Its Application In Degradation Model - Algebraic Approach to Restoration- Inverse By Wiener Filtering - Generalized Inverse-SVD And Interactive Methods - Blind Deconvolution-Image Reconstruction From Projections

UNIT – IV IMAGE COMPRESSION & SEGMENTATION

Image Compression: Redundancy And Compression Models -Loss Less And Lossy.
Loss Less- Variable-Length, Huffman, Arithmetic Coding - Bit-Plane Coding, Loss Less Predictive Coding, Lossy Transform (DCT) Based Coding, JPEG Standard - Sub Band Coding. Image Segmentation: Edge Detection - Line Detection - Curve Detection - Edge Linking And Boundary Extraction, Boundary Representation, Region Representation And Segmentation, Morphology-Dilation, Erosion, Opening And Closing. Hit And Miss Algorithms Feature Analysis

UNIT – V COLOR AND MULTISPECTRAL IMAGE PROCESSING

Color Image-Processing Fundamentals, RGB Models, HSI Models, Relationship Between Different Models. Multispectral Image Analysis - Color Image Processing Three Dimensional Image Processing-Computerized Axial Tomography-Stereometry-Stereoscopic Image Display-Shaded Surface Display

REFERENCES

1. Digital Image Processing, Gonzalez.R.C & Woods. R.E., 3/e, Pearson Education, 2008
2. Digital Image Procesing, S. Jayaraman, S. Esakkirajan, T. Veerakumar, McGraw Hill Education ,2009.Pvt Ltd, NewDelhi
3. Digital Image Processing, Kenneth R Castleman, Pearson Education,1995.
4. Fundamentals of Digital image Processing, Anil Jain.K, Prentice Hall of India, 1989.
5. Image Processing, Sid Ahmed, McGraw Hill, New York, 1995.

MOBILE APPLICATION DEVELOPMENT

UNIT-I INTRODUCTION TO MOBILE APPLICATION

Introduction to mobile telephony – mobile device- communication standard: GSM, CDMA, UMTS,Introduction to 1G/2G/3G/4G – LTE – Mobile application – categories – factors in developing mobile application –Mobile Application Development - Software architecture – application models framework and tools – Html 5 –Java script –AJAX

UNIT-II INTRODUCTION TO ANDROID

Introduction to Android – installation –Android Architecture – Application fundamentals – SDK features – development framework – android application and Activities – creative user interfaces – layouts- views – resources – menu –graphics –animation –intents

UNIT-III ANDROID TOOLS

Android file management tool – database storage – working with SQ lite – Gps functionality – location based API – creating map based activities – geocoding – location – based service – handling audio and video service – networking : using Bluetooth – managing connectivity – telephony –SMS

UNIT – IV MOBILE OPERATING SYSTEM

iOs Programming – introduction to objective C: class objective – methods –interface – inheritance introduction to foundation framework classes – file handling – property list, NSCopy and archiving selectors and targets – dynamic binding. Introduction to iphone Architecture- introduction to Development IDE – XCODE, interface Builder – Creating simple applications – Handling basic interaction – creating basic view controllers Monitoring and action – Creating advanced view controllers

UNIT-V INTERFACE

Storyboarding integration – programmatic interface creation – integrating with core services –Email contracts – data actions preference – files and addresses – camera , Webkit – data base with iphone app – code data integration –advanced controllers – navigation controllers integration with Core Service – core audio –video – even handling- gesture recognition – maps and location protocols and categories- communication with the service – using the accelerometer – Bluetooth programming

REFERENCES

1. Reto meier, professional android 2 application Development ,Wiley publication , 2011
2. J.F.Dimarzio, Android – a programmer's guid , McGraw Hill ,2010
3. James A,Brannan , blake ward, iOs SDK Programming, Tata McGraw Hill ,2011

INFORMATION RETRIEVAL TECHNIQUES

UNIT -I INTRODUCTION

Basic Concepts - Retrieval Process - Modeling – Classic Information Retrieval - Set Theoretic, Algebraic and Probabilistic Models - Structured Text Retrieval Models – Retrieval Evaluation -Word Sense Disambiguation

UNIT -II QUERYING

Languages - Key Word based Querying - Pattern Matching - Structural Queries - Query Operations - User Relevance Feedback - Local and Global Analysis - Text and Multimedia languages

UNIT -III TEXT OPERATIONS AND USER INTERFACE

Document Preprocessing - Clustering - Text Compression - Indexing and Searching - Inverted files - Boolean Queries - Sequential searching - Pattern matching – User Interface and Visualization - Human Computer Interaction - Access Process – Starting Points - Query Specification - Context - User relevance Judgment - Interface for Search

UNIT -IV MULTIMEDIA INFORMATION RETRIEVAL

Data Models - Query Languages - Spatial Access Models - Generic Approach – One Dimensional Time Series - Two Dimensional Color Images - Feature Extraction

UNIT -V APPLICATIONS

Searching the web – Challenges – Charactering the Web – Search Engines –Browsing – Meta searchers – Online IR Systems – Online Public Access Catalogs –Digital Libraries – Architectural Issues –Document Models, Representations and Access – Prototypes and Standards

REFERENCES

1. Ricardo Baeza-Yate, Berthier Ribeiro-Neto, “Modern Information Retrieval”,Pearson Education Asia, 2005.
2. G.G. Chowdhury, “Introduction to Modern Information Retrieval”, Neal-Schuman Publishers; 2nd edition, 2003.
3. Daniel Jurafsky and James H. Martin, “Speech and Language Processing”, Pearson Education, 2000
4. David A. Grossman, Ophir Frieder, “ Information Retrieval: Algorithms, and Heuristics”, Academic Press, 2000
5. Charles T. Meadow, Bert R. Boyce, Donald H. Kraft, “Text Information Retrieval Systems”, Academic Press, 2000

DIGITAL FORENSICS AND SECURITY

UNIT - I HACKING

Hacking windows – Network hacking – Web hacking – Password hacking. A study on various attacks – Input validation attacks – SQL injection attacks – Buffer overflow attacks - Privacy attacks.

UNIT - II ATTACKS AND SECURITY

TCP / IP – Checksums – IP Spoofing port scanning, DNS Spoofing. Dos attacks – SYN attacks, Smurf attacks, UDP flooding, DDOS – Models. Firewalls – Packet filter firewalls, Packet Inspection firewalls – Application Proxy Firewalls. Batch File Programming

UNIT - III THREATS AND PREDICTION

Fundamentals of Computer Fraud – Threat concepts – Framework for predicting inside attacks – Managing the threat – Strategic Planning Process.

UNIT - IV PROTECTION AND RISK REDUCTION

Architecture strategies for computer fraud prevention – Protection of Web sites – Intrusion detection system – NIDS, HIDS – Penetrating testing process – Web Services – Reducing transaction risks.

UNIT - V FORENSICS & NOVELTY DETECTION

Key Fraud Indicator selection process customized taxonomies – Key fraud signature selection process – Accounting Forensics – Computer Forensics – Journaling and it requirements – Standardized logging criteria – Journal risk and control matrix – Neural networks – Misuse detection and Novelty detection.

REFERENCES

1. Kenneth C.Brancik “Insider Computer Fraud” Auerbach Publications Taylor & Francis Group.
2. Ankit Fadia “ Ethical Hacking” second edition Macmillan India Ltd 2006

DATA MINING AND DATA WAREHOUSING

UNIT- I DATA WAREHOUSING

Introduction –Difference between Operational Database system and data warehouse-Multi Dimensional Data Model- Data Warehouse Architecture-Data Warehouse Implementation-From Data warehousing to Data Mining-OLAP Need- Categorization of OLAP Operations

UNIT- II DATA MINING AND PREPROCESSING

Data mining- Introduction - Data Mining Functionalities-Steps in Data Mining Process-Classification of Data Mining Systems –Major Issues in Data Mining Data Preprocessing-Data Cleaning, Integration, Transformation, Reduction, Discretization Concept Hierarchy Generation

UNIT -III CLASSIFICATION & PREDICTION

Classification vs. Prediction – Data preparation for Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule BasedClassification – Classification by Back Propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods –Model Selection.

UNIT -IV CLUSTERING

Cluster Analysis: - Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid-Based Methods – Model-Based Clustering Methods – Clustering High-Dimensional Data –Constraint-Based Cluster Analysis – Outlier Analysis.

UNIT- V APPLICATION

Applications of Data Mining-Social Impacts Of Data Mining-Tools-An Introduction to DB Miner-Case Studies-Mining WWW-Mining Text Database-Mining Spatial Databases

REFERENCES

1. Jiawei Han, Micheline Kamber, "Data Mining: Concepts and Techniques", Morgan Kaufmann Publishers, 2002.
2. Alex Berson,Stephen J. Smith, “Data Warehousing, Data Mining,& OLAP”, Tata Mcgraw- Hill, 2004.
3. Usama M.Fayyad, Gregory Piatetsky - Shapiro, Padhrai Smyth And Ramasamy Uthurusamy, "Advances In Knowledge Discovery And Data Mining", The M.1.T Press, 1996.
4. Ralph Kimball, "The Data Warehouse Life Cycle Toolkit", John Wiley & Sons Inc., 1998.
5. Sean Kelly, "Data Warehousing In Action", John Wiley & Sons Inc., 1997.

SOFTWARE QUALITY AND RELIABILITY

UNIT- I FUNDAMENTALS OF SOFTWARE QUALITY

Software quality − Hierarchical models of Boehm and McCall − Quality measurement− Metrics measurement and analysis − Gilb's approach − GQM model

UNIT -II SOFTWARE QUALITY ASSURANCE

Quality tasks − SQA plan − Teams − Characteristics − Implementation − Documentation − Reviews and audits

UNIT- III QUALITY CONTROL AND RELIABILITY

Tools for quality − Ishikawa's basic tools − CASE tools − Defect prevention and removal − Reliability models − Rayleigh model − Reliability growth models for quality assessment

UNIT- IV QUALITY MANAGEMENT SYSTEM

Elements of QMS − Rayleigh model framework − Reliability growth models for QMS − Complexity metrics and models − Customer satisfaction analysis

UNIT -V QUALITY STANDARDS

Need for standards − ISO 9000 Series − ISO 9000-3 for software development − CMM and CMMI − Six sigma concepts

REFERENCES

1. Allan C. Gillies, "Software Quality: Theory and Management", Thomson Learning, 2003.
2. Stephen H. Kan, "Metrics and Models in Software Quality Engineering", Pearson Education (Singapore) Pvt. Ltd., 2002.
3. Norman E. Fenton and Shari Lawrence Pfleeger, "Software Metrics", Thomson, 2003.
4. Mordechai Ben, Menachem and Garry S.Marliss, "Software Quality" Thomson Asia Pvt. Ltd., 2003.
5. ISO 9000-3 "Notes for the application of the ISO 9001 Standard to software development".
6. Kamna Malik and Praveen Choudry, "Software Quality: A Practitioner Approach", PHI, 2000.

CRYPTOGRAPHY & NETWORK SECURITY

UNIT – I INTRODUCTION

Cryptography - Role of Cryptography in Data Security - Security Attacks, Services, and Mechanisms - Conventional Encryption Principles - Block Cipher & Stream Cipher - Modes of Operation in Block Cipher Design Principle - Conventional Encryption model - Classical and Modern techniques - Encryption Algorithms(DES, Triple DES,AES) - Location of Encryption Devices - Confidentiality using Symmetric Encryption - KDC

UNIT – II PUBLIC KEY ENCRYPTION

Introduction to Number theory (Euler's & Fermat's Theorem, Euler Totient Theorem, Test for Primality, Finite Field & Generator Field, Modular Arithmetic) - Public Key Cryptography - RSA algorithm - Diffie Hellman Key exchange - Elliptic Curve Cryptography - Authentication Funtions - Message authentication - Hash & MAC algorithm - Security of MAC & HMAC - Digital signatures - Authentication Protocols - Key Management

UNIT -III NETWORK SECURITY PRACTICES

Kerberos – X.509 Authentication Certificate - Electronic Mail Security - Pretty Good Privacy - S/MIME -IP Security - IP Security Architecture - Combining Security Association - Key Management.

UNIT -IV WEB SECURITY

Web Security - Web Security Requirements - Secure Socket Layer and Transport Layer Security - Secure Electronic Transaction - Network Management Security – Basic concepts of SNMP, SNMP v1& SNMP v2 - Community facility - SNPM v3

UNIT- V SYSTEM SECURITY

System Security: Intruders, Viruses and Related Threats – Virus Counter Measures – Introduction to Fire walls - Firewall Design Principles – Types of Firewalls and Configuration of Firewalls - Trusted Systems.

REFERENCES

1. William Stallings "Cryptography and Network Security", Fourth edition, PHI, New Delhi.
2. Bruce, Schneider, Applied Cryptography, 2nd edition, Toha Wiley & Sons, 1996.
3. Douglas R.Stinson, Cryptography – Theory and Practice, CRC Press, 1995.

GRID COMPUTING

UNIT- I INTRODUCTION

Grid Computing values and risks – History of Grid computing – Grid computing model and protocols – overview of types of Grids

UNIT -II TYPES OF GRIDS

Desktop Grids : Background – Definition – Challenges – Technology – Suitability – Grid server and practical uses; Clusters and Cluster Grids; HPC Grids; Scientific in sight – application and Architecture – HPC application development environment and HPC Grids; Data Grids; Alternatives to Data Grid – Data Grid architecture.

UNIT- III ARCHITECTURE AND MANAGEMENT

The open Grid services Architecture – Analogy – Evolution – Overview – Building on the OGSA platform – implementing OGSA based Grids – Creating and Managing services – Services and the Grid – Service Discovery – Tools and Toolkits – Universal Description Discovery and Integration (UDDI)

UNIT -IV NATIVE PROGRAMMING AND SOFTWARE APPLICATIONS

Desktop supercomputing – parallel computing – parallel programming paradigms – problems of current parallel programming paradigms – Desktop supercomputing programming paradigms – parallelizing existing applications – Grid enabling software applications – Needs of the Grid users – methods of Grid deployment – Requirements for Grid enabling software – Grid enabling software applications.

UNIT -V APPLICATIONS, SERVICES AND ENVIRONMENTS

Application integration – application classification – Grid requirements – Integrating applications with Middleware platforms – Grid enabling Network services – managing Grid environments – Managing Grids – Management reporting – Monitoring – Data catalogs and replica management – portals – Different application areas of Grid computing

REFERENCES

1. Ahmar Abbas, " Grid Computing , A Practical Guide to Technology and Applications", Firewall media , 2004.
2. Joshy Joseph , Craig Fellenstein , "Grid Computing", Pearson Education , 2004.
3. Foster , "Grid Blue print foe new computing".

NATURAL LANAGUAGE PROCESSING

UNIT- I INTRODUCTION

Introduction to NLP – Computational Models of Language – Organization of NLP Systems

UNIT -II PARSING

Syntax – Linguistic Background – Elements of Simple Sentences – Parsing Techniques – Features and Augmented Grammars – Deterministic Parsing

UNIT -III SEMANTICS

Semantic – Logical Form – Case Relations – Semantic Networks – Basic Operations for Semantic Interpretation – Strategic and Issues

UNIT- IV KNOWLEDGE REPRESENTATION

Context & World Knowledge – Knowledge Representation – Question – Answering Systems – Natural Language Generation – Typical NLP Systems and their Architectures– Cognitive Aspects of Natural Languages

UNIT- V CASE STUDY

Indian Language Processing – Approach to Machine Translation – Typical Case Studies

REFERENCES

1. James Allen – "Natural Language Understanding ", Pearson Education, 2004
2. Ronald Hausser "Foundations of Computational Linguistics", Springer-Verlog,1999.
3. Winograd , " Language as a cognitive process- syntax" , Addison Wesley.
4. Popov , " Talking with computer in Natural language" springer verlog,1986.
5. Akshar Bharathi, Vineet Chaitanya, Rajeev Sangal , "Natural Language Processing – A Paninian Perspective" , PHI , 2000

NETWORK PROTOCOL STANDARDS

UNIT- I INTRODUCTION

Introduction to Networks -Application of Networks - Architecture Topology Switching - SLIP, PPP -ALOHA protocols, CSMA/CD, IEEE 802.3, 802.4, 802.5

UNIT- II ADDRESSING AND ROUTING

Classful addressing – other issues – subnetting – supernetting – classless addressing – routing methods – delivery – table and modules – CIDR – ARP package – RARP.

UNIT- III IP, ICMP, TGMP AND UDP

Datagram – fragmentation – options – checksum – IP package – ICMP – messages, formats – error reporting – query – checksum – ICMP package – IGMP – messages, operation – encapsulation – IGMP package – UDP – datagram – checksum – operation – uses – UDP package.

UNIT- IV TRANSPORT LAYER

Transport Layer- Design issues, Connection Management, Transmission Control Protocol (TCP) – Congestion control-Multipath TCP- User Datagram Protocol (UDP).

UNIT- V APPLICATION LAYER PROTOCOLS

Application Layer Protocol- Telnet - TFTP - FTP - SMTP - Ping Finger, Bootstrap Network Time Protocol- SNMP- CoDel (Controlled Delay).

REFERENCES

1. S. Tanenbaum, "Computer Networks ", Third Edition, Prentice Hall India, 1997.
2. Behrouz Forouzan, “TCP/IP protocol suite “, 2nd edition, Tata McGrawhill.
3. W Richard Stevens, "TCP/IP Illustrated -Volume I, The protocols ", Addition-Wesley Professional Computing Series, 1994.
4. Douglas Comer, “Internetworking with TCP / IP” ,Vol – 1, PHI, 2000

ROBOTICS AND ARTIFICIAL INTELLIGENCE

UNIT- I INTRODUCTION

Historical Perspective of Robots – Classification by Co-Ordinate system –classification by control method, Major Components of a Robot – Links and joints –Currents and future applications of Robots.

UNIT- II ROBOT END EFFECT AND SENSORS

Robot End effect and sensors – Grippers – Mechanical, Vacuum, Magnetic Grippers– Drives, Robot Sensors and Controllers – Internal and External Sensors – NonOptical and Optical position sensors – Encodes – Velocity, Acceleration, force,Torque, Proximity touch and slip sensors. Robot Vision – Imaging Components,Image representation Picture wading, Object recognition and categorization software.

UNIT- III ROBOT ACTUATORS

Control of actuators in Robots – Robot control Architecture – closed Loop control – effect of friction and gravity – Frequency domain – Robot Joint Control – Adaptive control stepper Motors – Brushless DC Motors – Direct drive actuators, Hydraulic and pneumatic and Actuators – Servo Amplifiers.

UNIT- IV TRANSFORMATIONS AND KINEMATICS

Translational and Rotational Transformations – Co-Ordinate reference Framer – Homogeneous Transformations – Forward solution – Inverse solution.

UNIT- V ROBOT PROGRAMMING & ARTIFICIAL INTELLIGENCE

Robot Programming Languages – characteristics of Languages – Position Specification – Motion Specification, Robot Program synthesis – Programming solution using VAL Robot programming Language ,Artificial Intelligence - search strategies ,Heuristic search , Rule based problem solving , Knowledge Representation .

REFERENCES

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REAL TIME SYSTEMS

UNIT – I INTRODUCTION

Architecture of Real time Systems / Embedded Systems – Operating Systems issues – Performance Measures – Estimating Program runtimes.

UNIT – II TASK ASSIGNMENT AND SCHEDULING

Uniprocessor Scheduling – IRIS Tasks – Tasks Assignment Mode charges – Fault tolerant scheduling.

UNIT- III PROGRAMMING LANGUAGES AND TOOLS

Desired characteristics based on ADA – Data typing – Control Structures – Packages – Exception Handling – Overloading – Multitasking – Timing specification – Task Scheduling – Just-in-time Compilation – Runtime support

UNIT- IV REAL TIME DATABASES

Basic Networking principles – Real time databases – Transaction processing – Concurrency control – Disk scheduling algorithms – Serialization and Consistency.

UNIT- V FAULT TOLERANCE, REABILITY AND SYNCHRONIZATION

Fault types – Fault detection and containment – Redundancy – Data diversity – Reversal checks –Obtaining parameter values – Reliability models for hardware redundancy – Software error models – Clocks – Fault tolerant synchronization – Synchronization in software.

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1. C.M. Krishna, Kang G.Shin, “Real Time Systems”, McGraw-Hill, 1997.
2. Raymond J.A. Buhr, Donald L. Bailey, “An Introduction To Real Time Systems”, Prentice Hall International, 1999.
3. K.V.K.K.Prasad, “Embedded, Real-Time Systems, concepts, Design and Programming” ,DreamTeach, 2003
4. Jane S Liu, “Real Time Systems”, Pearson Education, 2004.

SOFT COMPUTING

UNIT - I FUZZY SET THEORY

Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set-theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If-Then Rules.

UNIT - II FUZZY INFERENCE SYSTEMS AND MODELS

Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

UNIT - III NEURAL NETWORKS

Supervised Learning Neural Networks – Perceptrons - Adaline – Backpropagation Mutilayer Perceptrons – Radial Basis Function Networks – Unsupervised Learning Neural Networks – Competitive Learning Networks – Kohonen Self-Organizing Networks – Learning Vector Quantization – Hebbian Learning.

UNIT- IV NEURO FUZZY MODELING

Adaptive Neuro-Fuzzy Inference Systems - Architecture – Hybrid Learning Algorithm – Learning Methods that Cross-fertilize ANFIS and RBFN - Coactive Neuro Fuzzy Modeling - Framework Neuron Functions for Adaptive Networks - Neuro Fuzzy Spectrum.

UNIT -V APPLICATIONS OF COMPUTATIONAL INTELLIGENCE

Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction.

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1. J.S.R.Jang, C.T.Sun and E.Mizutani, “Neuro-Fuzzy and Soft Computing”, PHI, 2004, Pearson Education 2004.
2. Timothy J.Ross, “Fuzzy Logic with Engineering Applications”, McGraw-Hill, 1997.
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5. R.Eberhart, P.Simpson and R.Dobbins, “Computational Intelligence - PC Tools”, AP Professional, Boston, 1996.

EMBEDDED TECHNOLOGY

UNIT - I EMBEDDED MICROCOMPUTER SYSTEM

Motorola MC68H11 Family Architecture – Registers – Addressing Modes Programs – Interfacing Methods - Interrupts– Interrupt Service Routine – Features of Interrupts – Interrupt Vector – Priority – Serial I/O Devices – RS 232, RS485 – Analog Interfacing – Applications.

UNIT -II SOFTWARE DEVELOPMENTS

Round Robin – Round Robin with Interrupts – Function – Queue Scheduling Architecture & Algorithms

UNIT - III REAL TIME OPERATING SYSTEM

Task & Task States – Tasks & Data – Semaphores & Shared Data – Operating System Services –Message Queues – Timer Functions – Event Memory Management – Interrupt Routines & RTOS Environment – Basic design Using RTOS.

UNIT - IV ARM ARCHITECTURE

ARM Design Philosophy, Registers, Program Status Register, Instruction Pipeline, Interrupts and Vector Table, Architecture Revision, ARM Processor Families.

UNIT –V ARM PROGRAMMING MODEL

Instruction Set: Data Processing Instructions, Addressing Modes, Branch, Load, Store Instructions, PSR Instructions, Conditional Instructions.

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1. David E. Simon , “An Embedded Software Primer”,Pearson Education,2004.
2. John B Peatman , “Design with PIC Microcontroller”,Pearson Education Asia, 1998. (Unit II)
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6. Development” ,Addison Wesley, 1998.
7. Heath Steve, “Embedded System Design”, Newnes ,1997.
8. ARM Systems Developer’s Guides- Designing & Optimizing System Software – Andrew N. Sloss, Dominic Symes, Chris Wright, 2008, Elsevier.

WEB SERVICES AND SERVICE ORIENTED ARCHITECTURE

UNIT- I BASICS

Software Architecture – Types of IT Architecture –Architectural patterns and styles- SOA – Evolution – Key components – perspective of SOA – Enterprise-wide SOA – Architecture – Enterprise Applications – Solution Architecture for enterprise application – Software platforms for enterprise Applications – Patterns for SOA – SOA programming models.

UNIT -II TECHNOLOGIES USED

Service-oriented Analysis and Design – Principles of service design-Design of Activity, Data, Client and business process services – Technologies for SOA – Web services-XML-SOAP – WSDL – JAX WS for Java Platform– XML WS for .NET Platform – Service integration with ESB – Scenario – Technologies for Service orchestration- Business case for SOA – stakeholder objectives – benefits of SPA – Cost Savings

UNIT -III IMPLEMENTAION

SOA implementation and Governance – strategy – SOA development – SOA governance – trends in SOA – event-driven architecture – software s a service

UNIT -IV SECURITY

Meta data management – XML security – XML signature – XML Encryption – SAML – XACML – XKMS – WS-Security – Security in web service framework - advanced messaging

UNIT -V APPLICATIONS

Transaction processing – paradigm – protocols and coordination – transaction Specifications – Designing Portals-SOA in mobile – research issues

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1. Shankar Kambhampaly, “Service –Oriented Architecture for Enterprise Applications”, Wiley India Pvt Ltd, 2008.
2. Eric Newcomer, Greg Lomow, “Understanding SOA with Web Services”, Pearson Education.
3. Mark O’ Neill, et al. , “Web Services Security”, Tata McGraw-Hill Edition, 2003.

.NET TECHNOLOGIES

UNIT- I .NET FRAMEWORK

Programming Models – Introduction to .NET Framework – Evolution of .NET technologies - CTS,CLS, CLR, MSIL, JIT, Assemblies, .NET Security Model – Introduction to Base Class Library - Introduction to VB.NET - Working with Visual Studio IDE – IDE Components –Environment Options -VB.NET Fundamentals – Variables – Data Types – Arrays – Control Flow Statements – Modular Coding – Subroutines – Functions – Argument Passing

UNIT -II OBJECT ORIENTED CONCEPTS

Classes – Instance Fileds – Constructors – Properties – Methods – Object – Inheritance – Static Classes – Interfaces -Exception Handling– Need – Models – Statements – Creating Exception Classes - Collections – Arrays – ArrayList Collection – HashTable Collection – SortedList Class – IEnumerator and IComparer Interfaces Handling Strings, Characters and Dates – File Class - Directory Class – Accessing Files – FileStream– StreamWriter– StreamReader– BinaryWriter- Binary Reader

UNIT- III WORKING WITH FORMS

Windows Forms – Form Properties – Form Events - Building Dynamic Forms at Runtime - Introduction to Components and controls – Adding Components and controls to forms – Layout and Grouping – Responding to User Inputs – Mouse and Keyboard Events – Designing Menus – Building MDI Applications- Reading Input through Controls – Presentation and Information Controls – Common Dialog Controls – RichTextBox Control - Creating Windows Installer

UNIT- IV VISUAL DATABSE TOOLS

ADO.NET Architecture – DataSet – DataGrid Control- Data Binding – DataAdapter – Command Objects – DataReader - Performing Updates
Introduction to Web Programming – Building Web Applications – Web Controls - Interacting with Web Applications – Maintaining State – ASP.NET Objects – Page Object – Response Object – Request Object – Server Object – Deploying ASP.NET Applications

UNIT- V WEBSERVICES

Data-Bound Web Controls – Simple Data binding – Binding to DataSets – Customizing dataGrid Control -Building and Consuming Web Services – ASP.NET Web Service Projects -Theoretical Introduction to C# and Comparison with VB.

REFERENCES

1. Jeffrey R. Shapiro, VB.NET Complete Reference , Tata McGrawHill , 9th Reprint 2006 (Units 1 & 2)
2. Evangelos Petroutsos , Mastering Visual Basic. NET, BPB Publications Reprinted 2005 (Units 1 & 2)
3. Michael Otey , Denielle Otey, ADO.NET Complete Reference, Tata McGrawHill, 4th reprint 2005 (Unit IV & V)
4. Evangelos Petroutsos , Ali Bilgin, .Mastering Visual Basic. NET Database Programming BPB Publications – 2002 (Unit 1 & 2)
5. Pro C# with .NET 3.0 – Andrew Troelsen – Special Edition 2007 (Unit 5)

MULTI-CORE ARCHITECTURE

UNIT-I FUNDAMENTALS OF QUANTITATIVE DESIGN AND ANALYSIS

Classes of Computers – Trends in Technology, Power, Energy and Cost – Dependability – Measuring, Reporting and Summarizing Performance – Quantitative Principles of Computer Design – Classes of Parallelism - ILP, DLP, TLP and RLP - Multithreading - SMT and CMP Architectures – Limitations of Single Core Processors - The Multi core era – Case Studies of Multi core Architectures

UNIT-II DLP IN VECTOR, SIMD AND GPU ARCHITECTURES

Vector Architecture - SIMD Instruction Set Extensions for Multimedia – Graphics Processing Units - Detecting and Enhancing Loop Level Parallelism - Case Studies.

UNIT-III TLP AND MULTIPROCESSORS

Symmetric and Distributed Shared Memory Architectures – Cache Coherence Issues - Performance Issues – Synchronization Issues – Models of Memory Consistency - Interconnection Networks – Buses, Crossbar and Multi-stage Interconnection Networks.

UNIT-IV RLP AND DLP IN WAREHOUSE-SCALE ARCHITECTURES

Programming Models and Workloads for Warehouse-Scale Computers – Architectures for Warehouse-Scale Computing – Physical Infrastructure and Costs – Cloud Computing – Case Studies.

UNIT-V ARCHITECTURES FOR EMBEDDED SYSTEMS

Features and Requirements of Embedded Systems – Signal Processing and Embedded Applications – The Digital Signal Processor – Embedded Multiprocessors - Case Studies.

REFERENCES

1. John L. Hennessey and David A. Patterson, " Computer Architecture – A Quantitative Approach", Morgan Kaufmann / Elsevier, 5th. edition, 2012.
2. Kai Hwang, "Advanced Computer Architecture", Tata McGraw-Hill Education, 2003
3. Richard Y. Kain, "Advanced Computer Architecture a Systems Design Approach", PHI, 2011.
4. David E. Culler, Jaswinder Pal Singh, "Parallel Computing Architecture : A Hardware/ Software Approach" , Morgan Kaufmann / Elsevier, 1997.

KNOWLEDGE MANAGEMENT

UNIT - I INTRODUCTION

The value of Knowledge – Knowledge Engineering Basics – Knowledge Economy – The Task and Organizational Content – Knowledge Management – Knowledge Management Ontology.

UNIT- II KNOWLEDGE MODELS

Knowledge Model Components – Template Knowledge Models – Reflective Knowledge Models – Knowledge Model Construction – Types of Knowledge Models

UNIT- III TECHNIQUES OF KNOWLEDGE MANAGEMENT

Knowledge Elicitation Techniques – Modeling Communication Aspects – Knowledge Management and Organizational Learning

UNIT- IV KNOWLEDGE SYSTEM IMPLEMENTATION

Case Studies – Designing Knowledge Systems – Knowledge Codification – Testing and Deployment – Knowledge Transfer and Knowledge Sharing – Knowledge System Implementation

UNIT - V ADVANCED MODELS

Advanced Knowledge Modeling – Value Networks – Business Models for Knowledge Economy – UML Notations – Project Management

REFERENCES

1. Guus Schreiber, Hans Akkermans, Anjo Anjewierden, Robert de Hoog, Nigel Shadbolt, Walter Van de Velde and Bob Wielinga, “Knowledge Engineering and Management”, Universities Press, 2001.
2. Elias M.Awad & Hassan M. Ghaziri, “Knowledge Management”, Pearson Education, 2003.
3. C.W. Holsapple, “Handbooks on Knowledge Management”, International Handbooks on Information Systems, Vol 1 and 2, 2003.
4. http://www.epistemics.co.uk
5. http://depts.washington.edu/pettt/papers/WIN_poster_text.pdf

SOFTWARE TESTING

UNIT-I SOFTWARE TESTING PRINCIPLES

Need for testing - Psychology of testing - Testing economics - White box, Black box, Grey box testing – SDLC and Testing - Verification & Validation

UNIT-II TESTING STRATEGIES

White box testing techniques - Statement coverage - Branch Coverage - Condition coverage -
Decision/Condition coverage - Multiple condition coverage - Dataflow coverage - Mutation testing - Automated code coverage analysis - Black box testing techniques - Boundary value analysis - Robustness testing - Equivalence partitioning - Syntax testing - Finite state testing - Levels of testing - Unit, Integration and System Testing.

UNIT-III TESTING OBJECT ORIENTED SOFTWARE

Challenges - Differences from testing non-OO Software - Class testing strategies - Class Modality - State-based Testing - Message Sequence Specification

UNIT-IV TESTABILITY AND RELATED ISSUES

Design for Testability - Observability & Controllability - Built-in Test - Design by Contract -
recondition, Post condition and Invariant - Impact on inheritance - Applying in the real world
Regression Testing - Challenges – test optimization.

UNIT-V MISCELLANEOUS TOPICS

Automated Tools for Testing - Static code analyzers - Test case generators - GUI Capture/Playback – Stress Testing - Testing Client -server applications - Testing compilers and language processors - Testing web-enabled applications

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1. Glenford J.Myers, " The Art of Software Testing ", John Wiley & Sons, 1979.
2. Boris Beizer, Black-Box Testing: " Techniques for Functional Testing of Software and Systems ", John Wiley & Sons, 1995.
3. P.C.Jorgensen, " Software Testing - A Craftman's Approach ", CRC Press, 1995.
4. William E.Perry, " Effective Methods for Software Testing (2nd Edition) ", John Wiley & Sons, 2000.
5. Robert V.Binder, " Testing Object-Oriented Systems: Models Patterns and Tools ", Addison Wesley, 2000.
6. Boris Beizer, " Software Testing Techniques (2nd Edition) ", Van Nostrand Reinhold, 1990

ADVANCED INTERNET TECHNOLOGIES

UNIT I INTRODUCTION

Web architecture - Tiers - Concepts of tiers –Web pages Static and Dynamic pages – Comparison of Technologies - Review aspects of XHTML, DHTML, CSS, JavaScript

UNIT II MIDDLEWARE AND COMPONENT BASED E-COMMERCE ARCHITECTURE

CORBA - Java Remote Method Invocation- Component Object Model (COM) - Distributed Component Object Model (DCOM)

UNIT III EXTENSIBLE MARKUP LANGUAGE

XML – Benefits-Well-Formed XML -Valid XML -Document Type Definition (DTD) - XML Parsers – XML Namespaces – Schema

UNIT IV XML TRANSFORMATION LANGUAGES

XML style sheets and transformation languages - CSS - XSL - XSLT– XLINK – XPATH – Xquery – Introduction to AJAX

UNIT V JAVA SERVER FACES

Introduction to Java Server Faces- Building a Java Server Face application – The Java Server faces Request Processing Life Cycle-Managed Beans and JSF Expression Languages- JSF Event Model

REFERENCES

1. Achyut S Godbode & Atul Kahate, “Web Technologies”, Tata McGraw Hill, 2nd Edition 2012.
2. Michael Morrision, “XML unleashed”, Sams Publication, 1999
3. Schalk Burns, “The Complete Reference Java Server Faces”, Tata McGraw Hill,1st Edition