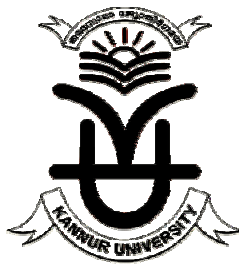


Department Of Information Technology
School of Information Science and Technology

KANNUR UNIVERSITY



**REGULATIONS, CURRICULA, SYLLABUS AND
SCHEME OF EXAMINATIONS**
(Credit and Semester System)

M.Sc. Computer Science
(With effect from 2010 Admission)

Department Of Information Technology
School of Information Science and Technology

KANNUR UNIVERSITY

Regulations, Curricula, Syllabus and Scheme of Examinations
(Credit and Semester System)

M.Sc. Computer Science
(With effect from 2010 Admission)

1. Duration of the programme shall be 2 years, divided into 4 semesters. Each semester should have 16 – 18 weeks. The entire period of the fourth semester shall be devoted for the project work.

2. Selection will be based on Entrance examination conducted by the University. The Entrance examination will consist of questions from the following:

i. Mathematics : 50%

(Syllabus : Set theory, Propositional Logic, Boolean Algebra, Linear Algebra, Coordinate Geometry and Conic Section, Trigonometry, Matrices, Vectors, Linear Programming, Differential Calculus, Integral Calculus, Series and Sequences, Real and Complex numbers, Polynomials, Permutations & Combinations and Elementary Probability theory.)

ii. Aptitude and Mental ability : 50%

3. Eligibility for admission: B.Sc. degree in Computer Science *or* B.C.A *or* any other B.Sc. degree with Mathematics as one of the subjects of this University or any other degree of other University / institution recognized by this University as equivalent there to with a minimum of 50% marks in optional main subjects. Candidates studying in the final year / semester of their qualifying degree and have successfully cleared all the papers of their previous years / semesters may appear for the entrance examination. Such candidates, if selected, will be admitted only on producing the qualifying degree mark-list.

4. Course Structure:

- 4.1. Two kinds of courses/subjects/papers are offered - core courses and elective courses. The department conducting the programme offers core courses. Elective courses are offered either by the department conducting the programme or by any other department.
- 4.2. Elective courses should be relevant to the programme for which the student is admitted and are identified by the department council of the department offering the programme
- 4.3. Each course shall have a unique alphanumeric code.
- 4.4. Credit of a course (except for the project work / dissertation) should not exceed 4. One credit shall be given to one-hour lecture or 3 hours practical/tutorial work per week.
- 4.5. No regular student shall register for more than 24 credits and less than 12 credits per semester.
- 4.6. The minimum total credits required for the successful completion of a four semester M.Sc. programme is 80 and in which minimum credits required for core courses is 60 and minimum for elective courses is 12.
- 4.7. The department council shall design the core and elective courses including the detailed syllabus for each programme offered by the department. The department council shall have the freedom to introduce new courses and / or to modify / redesign existing courses and replace any existing course with a new course to facilitate better exposure and training for the students.
- 4.8. Prior approval from the Board of Studies and Academic Council is not required for such modifications but shall be done only with the approval of the academic committee. Such changes shall be brought to the notice of the board of studies, faculties and academic council in the next meeting.

5. Evaluation of all semester papers will be in two parts viz. Continuous Assessment (CA) and End Semester Assessment (ESA). Forty percent marks will be set apart for CA and Sixty percent marks will be set apart for ESA for both theory and practical parts. Weightage for theory and practical components will be according to the credit distribution.

- Continuous assessment includes assignments, seminars, periodic written examinations etc. There shall be a minimum of two test papers and two assignments for which the minimum percentage of marks will be twenty and ten respectively
- One teacher nominated by the Head of the Department by rotation will act as the Semester Coordinator for consolidating the mark lists for internal evaluation. The consolidated mark-lists will be published in the Departmental notice board on the completion of the classes for that particular semester under the seal and signature of the Head of the Department and the Semester Coordinator.

❖ **Seminar:** Each student should select a relevant topic and prepare a seminar report, under the guidance of a faculty member. Students should prepare an abstract of the topic and distribute it to every faculty member at least two days ahead of the seminar. Presentation shall be for a minimum of one-hour duration. Presentation and seminar report will be evaluated by a group of at least three faculty members (Mark distribution: 50% for report and 50% for presentation and discussion).

❖ **Project:** The Project work should be carried out over the entire period of the final semester in an Industry/R&D organization/Department. If the project is carried out in an Industry/R&D organization outside the campus, then a co-guide shall be selected from the Department. If the project work is of interdisciplinary nature, a co-guide shall be taken from the other department concerned. Every student should do the Project individually and no grouping is allowed. All the candidates are required to get the approval of their synopsis and the guide before commencement of the project from the Department. A Supervisor/Guide should be a postgraduate in CS or allied subject or a person of eminence in the area in which student has chosen the project. A Departmental committee duly constituted by the Head of the Department will review the project periodically every month. The continuous assessment marks (CA) will be based on the periodic progress and progress report. At the end of the semester the candidate shall submit the Project report (two bound copies and one soft copy) duly approved by the guide, co-guide for End Semester Assessment. A board of two examiners appointed by the University should conduct evaluation for ESA. (Mark distribution: Content 30% + Methodology 30% + Presentation 20%, and Viva- voce 20%). If project work and the report are found to be not up to the expected standard, the examiners can ask the candidate to modify and resubmit the project report after incorporating the suggestions of the examiners. Such reports shall be resubmitted within the stipulated period suggested by the examiner(s).

6. Grievance Redressal Mechanisms

There shall be provision for grievance redressal at three levels. Complaints will be filed within one week of the publication of the results.

6.1 There shall be a grievance committee at the Department level, which shall hear the complaints of the students. The Department Council along with a student nominee of the Department Students Union from the concerned faculty shall act as the grievance committee.

6.2 At University level the constitution of the grievance committee shall be as under

- | | |
|--|-----------------------|
| a) The Pro-Vice-Chancellor | Chairman and Convener |
| b) The Convener of the Curriculum committee | Vice-Chairman |
| c) The Head of the Department concerned. | |
| d) A nominee of the University Students Union. | |

This committee shall hear the complaints unsolved by the Department grievance committee.

6.3 Complaints unsolved by the University level grievance committee shall be placed before the Vice- Chancellor.

7. End Semester Assessment:

(a) Question pattern (Theory part): There should be eight questions, with at least one question from each unit, carrying equal marks. Each question may contain sub divisions also. Student has to answer any five full questions to secure full marks.

(b) Question pattern (Practical part): One compulsory question which may contain sub divisions is to be attempted by the student.

8. Grading:

8.1 An alphabetical grading system shall be adopted for the assessment of student’s performance in a course. The grade is based on a ten-point scale. The following table gives the range of marks, grade points and the alphabetical grade.

Range of marks %	Grade points	Alphabetical grade
90 – 100	9	A+
80 – 89	8	A
70 – 79	7	B+
60 – 69	6	B
50 – 59	5	C
<50	0	F

8.2 A minimum of grade point 5 (Grade C) is needed for the successful completion of a course.

8.3 Performance of a student at the end of each semester is indicated by the Grade Point Average (GPA) and is calculated by taking the weighted average of grade points of the courses successfully completed. Following formula is used for the calculation. The average will be rounded off to two decimal places.

$$\text{GPA} = \frac{\text{Sum of (grade points in a course multiplied by its credit)}}{\text{Sum of credits of the courses}}$$

8.4 The overall performance of a student is indicated by the Cumulative Grade Point Average (CGPA) and is calculated using the same formula given above.

8.5 Approximate percentage of marks can be calculated by using **CGPA X 10 + 5**

8.6 Based on CGPA overall letter grade of the student shall be in the following way.

CGPA	Overall letter grade
8.5 and above	A+
7.5 and above but less than 8.5	A
6.5 and above but less than 7.5	B+
5.5 and above but less than 6.5	B
4.5 and above but less than 5.5	C

8.7 Classification for the degree is given as follows:

Classification	Overall letter grade
First Class with distinction	A+ and A
First Class	B+ and B
Second Class	C

8.8 Supplementary Examinations for Failed Candidates:

i) Candidates who have failed (F grade) in the semester examinations (except project work) can appear for the failed papers for the particular semester along with regular students. However, the Continuous Assessment (CA) marks shall remain the same. Two such supplementary chances will be given for each semester within two years.

ii) In the event of failure in Project Work the candidate shall re-register for project work, redo the project work and resubmit the project report afresh for evaluation. The Continuous Assessment marks shall be freshly allotted in this case.

8.9 A student who fails can repeat the full programme once if the department council permits.

8.10. No student shall be allowed to take more than eight consecutive semesters for completing a M.Sc. programme from the date of enrolment.

9. Grade Card

9.1 The University under its seal shall issue to the students a grade card on completion of each semester and a consolidated grade statement at the end of the M.Sc. programme.

9.2 The grade card shall contain the following.

- a. Title of the courses taken as core/elective.
- b. The credits associated with and grades awarded for each course.
- c. The number of credits (core and elective separately) earned by the student and the grade point average.
- d. The total credits (core and elective separately) earned by the student till that semester.

9.3 The grade card issued on completion of the programme shall contain the name of the programme, the department/school offered the programme, the titles of the courses taken, the credits associated with each course, grades awarded, the total credits (core and elective separately) earned by the student, the CGPA and the class in which the student is placed.

10. Ranking:

Only those candidates who have passed all the papers in the first appearance within the minimum period will be considered for ranking on the basis of total marks received for the entire course.

11. Promotion to Higher Semester:

Only a student who has minimum required attendance (75%) or whose shortage has been condoned by the University for genuine reasons and registered for the semester examination will be eligible for promotion to the higher semester. Students who fail to secure minimum attendance or condonation by the University may be given one more chance to repeat the semester along with the subsequent batch of students after obtaining re-admission, if the Department Council permits.

M. Sc. Computer Science
Course Structure and Scheme of Evaluation (From 2010 Admission)
(Credit and Semester System offered in the Department)
(With effect from 2010 Admission)

Semester 1

Subject Code	Subject	Instructional Hrs/week			Marks			Credit
		L	P	T	ESA	CA	Tot	
MCSC11	Computer Organization and Architecture	3	0	2	60	40	100	4
MCSC12	Data Communication and Computer Networks	4	0	1	60	40	100	4
MCSC13	Data structures	3	2	2	60	40	100	4
MCSC14	Database Management Systems	3	2	2	60	40	100	4
MCSC15	Operating Systems and Linux Administration	3	2	1	60	40	100	4
MCSE16	Elective I	3	0	2	60	40	100	3
Total		19	6	10	360	240	600	23

Semester 2

Subject Code	Subject	Instructional Hrs/week			Marks			Credit
		L	P	T	ES	CA	Tot	
MCSC21	Algorithm Analysis and Design	3	2	2	60	40	100	4
MCSC22	Formal Languages and Finite Automata	3	0	1	60	40	100	3
MCSC23	Fundamentals of Speech Processing	3	0	1	60	40	100	3
MCSC24	Soft computing	3	2	1	60	40	100	4
MCSE25	Elective II	0	4	2	60	40	100	2
MCSE26	Elective III	3	2	1	60	40	100	4
MCSC27	Seminar	0	0	2	-	50	50	1
Total		15	10	10	360	290	650	21

Semester 3

Subject Code	Subject	Instructional Hrs/week			Marks			Credit
		L	P	T	ESA	CA	Tot	
MCSC31	Software Engineering	3	0	1	60	40	100	3
MCSC32	Advanced DBMS	3	2	1	60	40	100	4
MCSC33	Pattern Recognition & Digital speech Processing	3	2	1	60	40	100	4
MCSC34	Computer Graphics & Digital Image Processing	3	1	2	60	40	100	4
MCSE35	Elective IV	0	4	2	60	40	100	2
MCSE36	Elective V	4	0	1	60	40	100	4
MCSC37	Seminar	0	0	2	-	50	50	1
Total		16	9	10	360	290	650	22

Semester 4

Subject Code	Subject	Duration of the Project	Marks			Credit
			ESA	CA	Total	
MCSC41	Project & Viva	18 weeks	210	140	350	14

List of Electives

1. MCSE34 Natural Language Processing
2. MCSE37 Data Mining and Warehousing
3. MCSE10 Signals & Systems
4. MCSE12 Information Theory and Coding
5. MCSE16 Discrete Mathematics
6. MCSE6 Probability and Statistics
7. MCSE36 Operations Research
8. MCSE9 System Simulation & Modeling
9. MCSE15 Advanced Microprocessors
10. MCSE5 System Programming & Compiler Design
11. MCSE38 PC Hardware
12. MCSE32 Visual Programming
13. MCSE27 Artificial Intelligence
14. MCSE39 Fuzzy Sets & Systems
15. MCSE40 Cyber security and Laws
16. MCSE26 Multimedia Technology
17. MCSE28 Linux Kernel
18. MCSE41 Linux device drivers
19. MCSE42 Distributed systems
20. MCSE21 Network Programming and Administration
21. MCSE43 Web Programming
22. MCSE31 Advanced Java Programming
23. MCSE44 Wireless and Sensor Networks
24. MCSE45 Mobile Computing
25. MCSE25 Software Development Tools I
26. MCSE35 Software Development Tools II

MCSC11 Computer Organization & Architecture

Unit 1

Basic structure of Computers. Addressing methods and machine program sequencing - Main memory operations - Instruction and instruction sequencing - Addressing modes. Input output organization - peripheral devices - Interrupt - Direct Memory Access - Standard I/O interfaces - Serial/Parallel communications.

Unit 2

Memory - Basic concept - Semiconductor RAM memories - Read Only Memories - Main memory operations - Speed, Size and Cost - cache and virtual memory - Memory hierarchy - memory management hardware - Performance considerations.

Unit 3

Central Processing unit - Fundamental concepts - Instruction format - Execution of complete instructions - Register and stack organizations - Data transfer and manipulation. Hardwired control and Microprogrammed control - RISC and CISC. Computer Arithmetic: Addition, Subtraction, Multiplication and division, Fixed point and Floating point representation.

Unit 4

Basic concepts of Pipelining and Parallel processing - Classification of machines - SISD, SIMD, MISD and MIMD - condition of parallelism. SIMD architecture and programming principles. Pipelining - Linear Pipeline processor - Nonlinear pipeline processor - Instruction pipeline design - Mechanism for instruction pipelining - Dynamic instruction scheduling - Branch handling techniques - Arithmetic pipeline design.

Unit 5

program flow mechanism - Control flow vs data flow - Demand driven mechanisms - Comparison of flow mechanisms - Dataflow computers. Super scalar processors. VLIW architecture. vector and symbolic processors. Vector instruction types. vector-access memory schemes. Optical Computing.

Reference Books:

1. Carl Hamacher, Z Vranesic & S Zaky - "Computer Organization".
2. M. Morris Mano - "Computer System Architecture".
3. Kai Hwang - "Advanced Computer Architecture: Parallelism, Scalability, Programmability".
4. Hwang and Briggs - "Computer Architecture and Parallel Processing".
5. Hennessey & Paterson - "Computer Architecture: A quantitative approach".

MCSC12 Data communication and Networking

Unit 1

Introduction, Basic concepts- Line configuration, Topology, Transmission mode, Categories of networks, Internetworks, Transmission media - Twisted pair Cable, Coaxial Cable, Optical Fiber, Satellite Communication, Cellular Telephony, Terrestrial Microwave, OSI and TCP/IP models.

Unit2

Physical layer, Signals-Digital and analog signals, Periodic and Aperiodic signals, Composite signals, Digital data transmission- parallel transmission and serial transmission, DTE-DCE interface, EIA-232interface, X.21,Modems, Multiplexing-Frequency Division Multiplexing, Time Division Multiplexing and Wave Division Multiplexing, Switching-Circuit Switching, Packet Switching and Message Switching.

Unit 3

Data link layer, Types of Errors-Single-Bit Error and Burst Error , Error detection –Vertical Redundancy Check(VRC),Longitudinal Redundancy Check(LRC) ,Cyclic Redundancy Check(CRC) , Error correction-Single-Bit Error correction, Hamming Code Data compression-Huffman code, Data link control-Line discipline, Flow control, Error control, Ethernet, CSMA/CD, TOKEN BUS, POLLING, SONET/SDH.

Unit 4

Network layer, Networking and Internetworking devices-Repeaters, Bridges, Routers, Gateways, other Devices, Logical addressing, Internet protocols, Address mapping, Error reporting and multicasting, Delivery, Forwarding and Routing algorithms, Distance Vector Routing, Link State Routing, The Dijkstra Algorithm

Unit 5

Transport Layer, Process-to-Process Delivery: UDP, TCP, and SCTP, Congestion Control and Quality of Service, Application Layer, Domain Name System, Remote Logging, Electronic Mail, and File Transfer, WWW and HTTP, Network Management: SNMP, Network security, Cryptography.

Reference:-

1. Data Communications and networking, Fourth Edition by Behrouz A. Forouzan, McGraw Hill 2001
2. Computer Networks, Fourth Edition by Andrew S. Tanenbaum, Prentice-Hall 2003
3. Data and computer communication , Eighth Edition by William Stallings, Prentice-Hall 2007

MCSC13 Data Structures and Algorithms

Unit 1

C++ - overview – C++ language preliminaries – Operators and expressions – selection – iteration – functions – arrays – strings – structures and unions – pointers – preprocessor – Classes and objects – constructors and destructors - operator overloading and type conversions.

Unit 2

Inheritance ; IO streams, file handling; String handling; exception handling; templates; Other features.

Unit 3 :

Data structures:- definition, abstract data types. Algorithms: top-down and bottom-up approaches to algorithm design. Analysis of algorithm: time and space complexity, frequency count, big oh notation , practical complexities. Arrays: representation, address calculation, matrix / polynomial representation and manipulation using arrays. Sparse matrix and polynomial. Sorting and searching - binary search; Insertion, selection, bubble, merge and heap sort algorithms. Comparison of sort algorithms,

Unit 4 :

Linked list: singly, doubly and circular linked lists, header and trailer nodes , basic operations, polynomial as linked list, manipulation of linked polynomials, sparse matrix representation using linked list. Stack: representation using arrays and linked list, applications of stack, expression evaluation, recursion. Queue: array implementation, circular queue, linked queue, priority queues, applications of queue.

Unit 5:

Trees : Binary Trees - traversal; Threaded Binary tree; Binary Search Trees- Building a Binary Search Tree, Height Balance: AVL Trees, Splay Trees Multiway Trees: Tries, B-Trees , Red Black Tree.

Reference Books

1. E. Horowitz, S. Sahni and D. Mehta, “Fundamentals of Data Structures in C++”, Universities Press, 2008.
2. R. Kruse, C.L. Tondo and B. Leung, “Data Structures and Program Design in C, 2nd Edn, Pearson Education, 2003.
3. Y. Langsam, M. J. Augenstein and A.M. Tanenbaum, “Data Structures using C and C++”, 2nd Edn, PHI, 2002.
4. A.V. Aho, J.D. Ullman and J.E. Hopcroft, “Data Structures and Algorithms”, Addison Wesley.

MCSC14 Database Management Systems

Unit 1

Database System Concepts.ER Datamodel - basic concepts, constraints, Keys, ER diagram, design of an ER database schema. Relational data model – Basic concepts, Domains, Attributes, Keys, Tuples, Relations, Relational database.Relational Database Query Languages- Relational algebra, Tuple relational calculus, Domain relational calculus, Basics of QBE and SQL.

Unit 2

Integrity and security - domain constraints, referential integrity, assertions, triggers, authorization, views. Relational database design – Design Principles, Normalization, 1NF, 2NF, 3NF, BCNF, 4NF, 5NF.

Unit 3

File Indexing and Hashing.Transactions - concepts, states of Transactions, ACID properties.Schedules - serial schedules, concurrent schedules, Serializability. Concurrency control protocols.

Unit 4

Case Study of MySQL – Creating/Altering/Dropping Database, Creating/Altering/Dropping /Renaming tables, Datatypes, Operators and Functions, String functions, Select, Insert,Update, Delete Statements, Join, Views, Subqueries.

Unit 5

Flow control constructs- If, Case, Loop, While, Iterate, Repeat and Leave. CodeBlocks- Begin, End. Stored Procedures and Functions. Cursors, Triggers, Transactional and Locking statements- Start Transaction, Set Autocommit, Commit and Rollback. Account Management Statements- Create User, Drop User, Grant, Rename User, Revoke and Set Password.

Reference Books

1. Silbersehatz, Korth and Sudarshan, Database system concepts, MGH 2002
2. Ramakrishnan and Gehrke, Database Management Systems, 3rd Edn, Mc Graw Hill, 2003
3. A Leon & M Leon, Database Management Systems , Leon Vikas – 2003.
4. Elmasri and Navathe, Fundamentals of Database systems, Pearson 2004

MCSC15 Operating Systems and Linux Administration

Unit I

Overview of operating systems: functionalities and characteristics of OS. Hardware concepts related to OS, CPU states, I/O channels, memory hierarchy, The concept of a process, operations on processes, process states, concurrent processes, process control block, process context, Interrupt processing.

Unit II

Job and processor scheduling, scheduling algorithms, process hierarchies. Problems of concurrent processes, critical sections, mutual exclusion, synchronisation, semaphore, process co-operation, producer and consumer processes, Critical regions, Conditional Critical Regions.

Unit III

Deadlock: prevention, detection, avoidance, Memory organisation and management: storage allocation, Virtual memory concepts, paging and segmentation, address mapping, Virtual storage management, page replacement strategies, File system management: blocking and buffering, file descriptor, directory structure, blocks and fragments, directory tree, inodes, file descriptors.

Unit IV

Introduction: Various parts of operating system: kernel, system programs, and application programs; Major services in a LINUX system: init, login from terminals, syslog, periodic command execution cron and at, Graphical user interface, permissions and file magic, Boot Process: The LILO boot process, LILO parameters, /etc/lilo.conf; loadlin; The /boot directory and files, initrd file and mkinitrd, Run levels: /etc/inittab, start-up script /etc/rc.d, rc.sysinit, System initialization scripts: /etc/rc.d/rc.serial, /etc/rcd/rc.local, /etc/issue, /etc/issue.net, /etc/rc.d/init.d, System Configuration: The /etc/sysconfig/ files used in network setup: /etc/sysconfig/network-scripts/ files (parameter files and scripts), File system configuration: file system types, /etc/fstab layout and meaning.

Unit V

System security: Host security: tcp_wrappers and /etc/hosts.allow and /etc/hosts.deny, /etc/security, shadow password, file permissions, users groups and umask, Adding and deleting users, Printing: /etc/printcap file, adding local and remote printers, etc/hosts.lpd file, print filter system for local printers, using lpc, lpq and lprm, System maintenance: Syslogd, klogd and /etc/syslog.conf, Using a remote syslog, The system crontab, daily script, tmpwatch and logrotate, Using and managing the system log files, Basic system backup and restore operations, Emergency rescue operations.

Reference:

1. Unix Power Tools, O'Reilly & Associates, Inc.
2. Essential System Administration, O'Reilly & Associates, Inc.
3. Red Hat Linux 7 by Bill Ball, David Pitts, et al, Techmedia Publication
4. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, Operating System Concepts. Sixth edition. Addison-Wesley (2003).
5. Andrew Tanenbaum, Modern Operating Systems, Prentice Hall.

MCSE16 : Discrete Mathematics

Unit 1

Mathematical logic: statements and notations, connectives, normal forms, well formed formulas, implications, satisfiability and tautology, predicate calculus.

Unit 2

Set and relations: sets, subsets, operations on sets, principle of inclusion and exclusion, piano axioms and mathematic inductions, generating functions, recurrence relations. Product sets and partitions, relations, properties of relations, equivalence of relations, manipulation of relations.

Unit 3

Functions, pigeonhole principles, permutation and combinations, combinatorics – simple counting techniques. Partially ordered sets, external elements of posets, lattices.

Unit 4

Elementary Probability Theory, Groups and semi groups:

Unit 5

Graph: definition, walks, path, trails, connected graph, regular and bipartite graph, cycles and circuits. Tree and rooted tree, spanning tree, eccentricity of vertex, radius and diameter of graph, central graph, centre(s) of a tree. Hamiltonian and Eulerian graph, planar graphs.

Reference Books

1. Kenneth H. Rosen, Discrete Mathematics and Applications, TMH 2003
2. J.P.Tremblay and R Manohar, Discrete Mathematical Structures with Applications to Computer Science, TMH 2001
3. John Truss, Discrete Mathematics for Computer Scientists, Pearson Edn 2002

MCSC21 Algorithm Analysis and Design

Unit 1

Introduction to Java, Object oriented concept, Lexical Issues, Data types, variables, Arrays, Classes, objects, Constructors, Overloading method, Access control, Inner Classes, String Classes, Inheritance, Overriding methods, using super, Abstract class, Exception handling, Throw and Throws.

Unit 2

Thread, Runnable interface, Inter thread communication, Deadlock, Suspending, Resuming and stopping threads, Multithreading, Applets, Event Handling, String Objects, String Buffer, working with windows using AWT classes, AWT controls Layout managers and menus.

Unit 3

Time and space complexities, randomized algorithms, repeated element, primality testing. Divide and conquer- general method, finding maximum and minimum, merge sort, quick sort, selection, Strassen's matrix multiplication, Greedy method : general method, knapsack problem, tree vertex splitting, job sequencing with dead lines.

Unit 4.

Dynamic programming : General method, multistage graphs, all pairs shortest paths, dfs, bfs, connected components, biconnected components and dfs.

Unit 5.

Branch and bound : General method, traveling salesperson problem,.Back tracking : general method, 8 queens, sum of subsets, graph colouring, Hamilton cycles. Basic concepts of Np – Hard and Np – Complete problems.

Reference Books

1. E. Balaguruswamy, Programming with Java, Second Edn.
2. H. Schildt –The complete reference Java 5th Edn. TMH.
3. Computer algorithms, Horowitz, Sahni & Rajasekaran, Galgotia.
4. The analysis and Design of computer algorithms, Aho, Hopcroft, Ullman, Addison Wesley

MCSC22 Formal Languages and Finite Automata

Unit 1

Introduction to the Theory of computation and Finite Automata: Mathematical preliminaries and notation, Proof techniques, Three basic concepts: languages, grammar & automata. Some applications.

Unit 2

Finite automata, Regular expressions and languages Deterministic Finite Acceptors, Nondeterministic Finite Acceptors, Equivalence of deterministic and nondeterministic finite acceptors, Reduction of the number of states in finite automata, Regular expressions, connection between regular expressions and regular languages, regular grammars, closure properties of regular languages, identifying non regular language.

Unit 3

Context-free grammars & languages Context-free grammars, parsing and ambiguity, context-free grammars and programming languages, methods of transforming grammars, two important normal forms.

Unit 4

Pushdown automata for context-free languages Non deterministic pushdown automata and context-free languages, deterministic pushdown automata and deterministic context-free languages, two pumping lemmas, closure properties for context-free language.

Unit 5

Turing machine Standard turing machine, combining turing machines for complicated tasks, Turing's thesis, other models of turing machine, a universal turing machine, nondeterministic turing machine and other bounded automata.

Reference Books

1. An introduction to Formal Languages and Automata, Peter Linz, Narasa publishing House, 1997.
2. Introduction to Languages and the Theory of Automata- John C Martin MGH 1997
3. Introduction to Automata Languages and Computation,- J P Hopcroft. J D Ullman, Narosa Publication,

MCSC23 Fundamentals of Speech Processing

Unit 1

Signals, Systems and Signal Processing: Basic elements of Digital Signal Processing Systems, Advantages of Digital over Analog Signals Processing, Classification of Signals

Unit 2

The Concept of Frequency in Continuous- Time and Discrete- Time Signals, Continuous and discrete Sinusoidal Signals- The sampling theorem Quantization of continuous time signals and systems, The z –transforms, properties of the z - transforms, Fourier series and Fourier transform – Design of digital filters

Unit 3

Introduction to speech recognition: Introduction- the paradigm for speech recognition – history of speech recognition research, The speech signal: speech production mechanism, perception-acoustic phonetic characterization and classification- the speech production process- representing speech in time frequency domains-speech sounds and features. Approaches to automatic speech recognition by machine, speech recognition in adverse environment

Unit 4

Signal Processing and Analysis Methods for Speech Recognition: Introduction- The Bank of Filters Front End Processor- Linear Predictive Coding for Speech Recognition- Vector Quantization, Time domain parameters of speech, methods for extracting the parameters, zero crossing, auto correlation function, pitch estimation.

Unit 5

Pattern Comparisons Techniques: Introduction- Speech Detection- Distortion Measures - Spectral Distortion Measures. Incorporation of Spectral Dynamic Features into Distortion Measures- Time Alignment Normalization. Speech Recognition System Design and Implementation Issues: Introduction, Application of Source Coding Techniques to Recognition- Template Training Methods- Performance Analysis and Recognition Enhancements- Discriminative Methods in Speech Recognition.

Reference Books

1. Fundamentals of speech recognition- Lawrence Rabiner , Bing- Hwang Juang, Prentice hall.
2. Digital processing of speech signals – L R Rabiner and Schafer , Prentice hall. 1978.
3. Digital Signal Processing, Principles, Algorithms and Applications - John G. Proakis, Dimitris G Manolakis,

MCSC24 Soft Computing

Unit I

Neural Networks:- Fundamentals of Neural Networks: – Basic Concepts of Neural Networks - Human Brain – Model of an Artificial Neuron - Neural Network Architectures – Characteristics of Neural Networks – Learning Methods – Taxonomy of Neural Network Architectures – History of Neural Network Research – Early Neural Network Architectures . Some Application Domains

Unit II

Backpropagation Networks:- Architecture of Backpropagation Network – Backpropagation Learning – Application:- Classification of Soil – Effect of Tuning Parameters of the Backpropagation Neural Network – Selection of Various Parameters in BPN. Introduction to Associative Memory and ART

Unit III

Fuzzy Logic:- Fuzzy Set Theory :- Fuzzy Versus Crisp – Crisp sets – Operations on Crisp Sets, Properties of Crisp Sets , Partition and Covering – Fuzzy Sets - Membership Function, Basic Fuzzy Set Operations, Properties of Fuzzy Sets – Crisp Relations – Cartesian Product ,Other Crisp Relations, Operations on Relations - Fuzzy Relations – Fuzzy Cartesian Product, Operations on Fuzzy Relations

Unit IV

Fuzzy Systems:- Crisp Logic – Laws of Propositional Logic, Inference in Propositional Logic, Predicate Logic- Interpretations Of Predicate Logic Formula, Inference in Predicate Logic – Fuzzy Logic- Fuzzy Quantifiers, Fuzzy Inference – Fuzzy Rule based System – Defuzzification Methods - Applications

Unit V

Genetic Algorithms:- Fundamentals of Genetic Algorithms:- Genetic Algorithms: History – Basic Concepts – Biological Background – Creation of Offsprings – Working Principle – Encoding - Binary Encoding, Octal Encoding(0 to 7),Hexadecimal Encoding(0123456789ABCDEF), Permutation Encoding – Value Encoding – Tree Encoding – Fitness Function – Reproduction

References:

1. Neural Networks, Fuzzy Logic, and Genetic Algorithms Synthesis and Applications- S. Rajasekaran and G.A Vijayalakshmi Pai, Prentice-Hall of India Pvt.Ltd ,2004.
2. Artificial Neural Networks - Yegnanarayana B, Prentice-Hall of India Pvt.Ltd
3. Fuzzy Logic With Engineering Applications - TJ Ross, MGH

MCSE21 Network Programming and Administration

Unit1.

TCP / IP Network Configuration: Introduction to TCP / IP network, Protocols, IP address, Hostname, Configuring a Host :setting the host name, assigning IP address, broad cast, net mask and name server address, Editing Host and network files,Interface Configuration: loop back interface, Ethernet interface, The SLIP and PPP interface, Configuring Gateway.Routing through gateway, Network commands: ping, ifconfig, netstat, route.

Unit 2

Network applications Configuration: File Transfer Protocol (FTP) and Trivial File Transfer Protocol (TFTP), Network FileSystems (NFS) . Network Information System(NIS), Hyper Text Transfer Protocol (HTTP) and Web server, ServerMessage Block (SMB) Protocol and Samba server, Dynamic Host configuration Protocol (DHCP) Firewalls-preventing unwanted connections,SE Linux.

Unit 3

Domain Name Services (DNS) and Mail services: working of DNS, Host name Resolution Name lookup with DNS,Reverse Lookup, Domain Name Servers and Zones, DNS database: SOA, NS, MX, A and PTR records, Secondary and primary DNS, Zone change notification, root servers, internet root domains, configuring DNS, Using nslookup. SimpleMail Transfer Protocol (SMTP) , Post office Protocol(POP) Multipurpose Internet Mail Extension (MIME), SMTP and POP3 command, Mail routing, Configuring A mail server.

Unit 4

Inter Process Communication programming : Create a process- fork() system call, Parent and Child Process, Process ID,User and Group ID Half Duplex Unix Pipes, Named Pipes, (First In First Out) , System V IPC : Message Queues, Semaphores, Shared memory, Sample programs for IPC that uses Pipes, FIFO.

Unit 5

Introduction to Socket Programming –Introduction to Sockets –,Socket address Structures , Byte ordering functions , address conversion functions ,Elementary TCP Sockets ,socket, connect, bind, listen, accept, read, write, close functions, , Byte ordering routines, Byte Operations, Address conversion routines, Advanced socket system calls: readv and writev, sendmsg and recvmsg, getpeername, getsockname, getsockopt andsetsockopt, shout down, select, reserved port, Simple client Programs that uses some reserved ports, Simple Client / Server Program Using Unreserved ports.

Reference Books:

1. Olaf Kirch & Terry Dawson, Linux Network Administrators Guide, O'relly, 2003
2. Hunt, Linux DNS server Administration, BPB Publication, 2003 .
3. W. Richard Stevens, "UNIX NETWORK PROGRAMMING Vol-I" Second Edition, PHI / Pearson Education, 1998. (Units – V)

MCSC25 Software Development Tool I

Unit 1

Introduction : Beginning Programming with Visual Studio .Net Environment, Working With Variables, Operators, Expressions and Datatypes , Writing Methods

Unit 2

Decision Statements , Iteration Statements, Errors and Exceptions

Unit 3

C# Language : Classes and Object ,Values and References ,Enumerations and Structs, Arrays and Collections , Inheritance, Garbage Collection and Resource Management

Unit 4

Creating Component: Indexer, Delegates and Events, Operator Over Loading

Unit 5

Working With Window Applications, Managing Data, Building Web Applications

References

- 1 Microsoft Visual C# .Net, John Sharp, Jon Jagger ,2003
- 2 ASP .Net Web site Using C# and VB .Net ,Zak Ruvalcaba

Syllabus for Semester III

MCSC31 Software Engineering

Unit 1

The Product- The Process- Project management concepts- Software Project and Project Metrics.

Unit 2

Software Project Planning – Risk Analysis and Management- Project scheduling and Tracking- Software Quality Assurance.

Unit 3

Software Configuration Management- System Engineering – Analysis Concepts and Principles Analysis modeling.

Unit 4

Design concepts and Principles- Architectural Design-User Interface Design.

Unit 5

Component Level Design- Software Testing Techniques- Software Testing Strategies- Technical Metrics for Software.

References

1. R.S.Pressman, Software Engineering A Practitioner's approach – MGH – 2001.
Ian Sommerville, Software Engineering, 5th Edn. Addison Wesley, 2002

MCS32 Advanced DBMS

Unit 1

Review of basics. Relational database – Integrity constraints: functional, multivalued and join dependency, Inclusion and General functional dependency.

Unit 2.

Query processing and optimization : Evaluation of relational operations, transaction of relational Expressions, Indexing and Query Optimization. Deductive databases : Datalog and Recursion, Evaluation of datalog program, recursive queries with negation.

Unit 3.

Parallel and Distributed databases : Distributed Data Storage – Fragmentation and replication, Location and fragment transparency, Distributed Query Processing and Optimization, Distributed Transaction modeling and Concurrency control, Distributed deadlock, commit protocols, design of parallel databases, Parallel Query evaluation.

Unit 4.

Image and Multimedia Databases : Modeling and storage of Image and Multimedia Data, Data structures – R-tree, k-dtree, Quadrees, Content Based Retrieval : Colour histograms, textures etc. Image Features, Spatial and topological relationships, Multimedia data formats, video data model, Audio and Handwritten data, Geographical Information systems.

Unit 5

Data Mining : Knowledge Representation Using rules, Association and classification rules, sequential patterns, Algorithms for rule discovery. Data warehousing : Data Warehouse architecture, multidimensional Data Model, Update propagation, OLAP Queries.

Reference Books

1. Silberschatz, Korth and Sudarshan, Database system concepts, MGH 2002
2. Ramakrishnan and Gehrke, Database Management Systems, 3rd Edn, Mc Graw Hill, 2003
3. A Leon & M Leon, Database Management Systems , Leon Vikas – 2003.

MCS33 Pattern Recognition and Digital Speech Processing

UNIT I

Introduction and General Pattern recognition Concerns: Pattern Recognition, Classification and Description, Patterns and Feature extraction with examples, Training and Learning in PR Systems, Pattern recognition Approaches, Other Approaches to PR, Overview to PR Literature and Recourses.

UNIT II

Statistical Pattern Recognition: Introduction to Statistical Pattern Recognition, The Gaussian Case and Class Dependence, Discriminant functions, Additional examples, Extensions, Classifier Performance , Risk, and Errors **Supervised Learning (Training) Using Parametric and Nonparametric Approaches:** Introduction, Parametric Estimation and Supervised Learning, Maximum Likelihood (ML) Estimation, The Bayesian Parametric Estimation Approach Supervised Learning Using Nonparametric Approaches, Parzen Windows, K-NN Nonparametric Estimation, the Nearest Neighbor Rule (NNR) **Linear discriminant Functions and The discrete and Binary Feature Cases:** Introduction, Discrete and Binary Classification Problems, Techniques to directly Obtain Linear Classifiers **Unsupervised Learning and Clustering:** Formulation of Unsupervised learning Problems, Clustering for Unsupervised Learning And Classification

UNIT III

Introduction to neural Pattern Associators and Matrix Approaches: Neural Network- Based Pattern Associators, matrix Approaches (Linear Associative mappings) and examples, **Feedforward networks and Training by Backpropagation:** Multilayer, Feedforward Network Structure, training the Feedforward Network: The Delta rule (DR) and Generalized Delta Rule (GRD), Extension of the DR for Units in the Hidden Layers [The Generalized Delta Rule (GRD)], Extended Example: Pattern Associator for Character Classification. **Content Addressable Memory Approaches and Unsupervised Learning in NeurPR:** Introduction, The Hopfield Approach to Neural Computing, Additional Examples of CAM Applications in PR, Unsupervised Learning in NeurPR: Self-Organizing Networks

UNIT IV

Large Vocabulary Continuous Speech Recognition: Introduction, Subword Speech units, Subword Unit Models Based On HMMs, training of Subword Units, Language Models for Large Vocabulary Speech Recognition, Statistical Language Modeling, Perplexity of the Language Model, Overall recognition System Based on Subword Units, Context-Dependent Subword Units, Creation of Vocabulary-Independent Units, Semantic Postprocessor for recognition

UNIT V

Task Oriented Applications of Automatic Speech Recognition: Introduction, Speech- Recognizer Performance Scores, Characteristics of Speech- Recognition Applications, Broad Classes of Speech-Recognition Applications, Command-and-Control Applications, Projections for Speech recognition. **Speaker Verification:** Introduction, Acoustic Parameters, Similarity Measures, Text- Dependent Speaker Verification, Text- Independent Speaker Verification, Text- Prompted Speaker Verification, Identification, Verification and the Decision Threshold.

Reference Book:

1. Fundamentals of Speech Recognition- Lawrence Rabiner, Biing-Hwang Juang, Prentice Hall
2. Pattern Recognition- Robert Schalkoff, Willey 1992.
3. Speech and Audio Signal Processing- Ben Gold and Nelson Morgan, Willey

MCSC34 Computer Graphics and Digital Image Processing

Unit I Introduction to Computer Graphics and OpenGL

What is computer graphics? Elements of pictures created in computer graphics, Getting started making pictures, Drawing basic graphics primitives, Making line drawing, simple interaction with mouse and keyboard.

Unit II More drawing tools and Vector tools

World window and view port-world window to viewport mapping, setting world window and viewport in opengl, Clipping lines, Developing canvas class, Drawing circles and arcs, Introduction to vectors, Representing key geometric objects.

Unit III Transformation of objects, polygonal meshes, Raster displays

Introduction to transformations, 3D affine transformations, changing co-ordinate system, Drawing 3D scene with OpenGL, Introduction to solid modeling with polygonal meshes, viewing in 3D, Tools for raster displays.

Unit IV Fundamentals of Digital Image Processing

Introduction to digital image processing, Fundamental steps in digital image processing, Components of an Image processing system, Image sensing and acquisition, Image sampling and quantization, Basic relationship between pixels, Linear and nonlinear operations.

Unit V Image enhancement in frequency domain and spatial domain

Basic gray level transformations, Histogram processing, Basics of spatial filtering-Smoothing spatial filters and sharpening spatial filters, Introduction to Fourier Transform and the frequency domain, Smoothing frequency domain filters and sharpening frequency domain filters, Homomorphic filtering.

Reference Book:

1. Computer Graphics using OpenGL second edition by FS Hill, JR
Prentice Hall of India Private Limited-New Delhi-110001, 2005
2. Principles of computer graphics, Theory and practice using OpenGL and Maya
By Shalini Govil-Pai, Springer.
3. Digital image processing, Second Edition by Rafale C Gonzalez, Richard E Woods, Pearson education.

MCSE36 Operations Research

Unit 1

Linear programming: Formulation, Graphical Solution-2 variables, Development of Simplex Method, Artificial Variable Techniques, Big- M method, Two-Phase method, Reversed Simplex method.

Unit 2

Duality in LPP and its formulation, Dual Simplex Method, Bounded variable method, Applications of LPP, Transportation problems, Assignment Problem, Traveling Sales persons problem.

Unit 3

Integer Programming problem (IPP), Cutting Plane algorithm, Branch and bound method of solving IPP, Dynamic programming problems and its characteristics, Deterministic Dynamic Programming Problem.

Unit 4

Sequencing Problem, Processing n jobs through two machines and their mechanics, Processing n jobs through m machines, Processing 2 jobs through m machines, Project scheduling by PERT / CPM, Difference between PERT / CPM, Constructing the network, Critical path analysis, Float of an activity, Three time estimated for PERT, project cost by CPM.

Unit 5

Stochastic process, Classification of stochastic process, Discrete parameter Markov chains, Continuous Parameter Markov Chains, Birth and Death Processes, Queuing model and its characteristics, Classification of Queuing Model (M/M/1): FCFS(birth and death model).

Reference Books

1. Thaha H.A.- Operation Research- PHI,2003.
2. Sharm J.K Mathematical Models in Operation Research, TMGH, 1989.
3. Trivedi K. S. Probability, Statistics with Reliability, Queuing and Computer Science Applications. PHI

MCSC35 Software Development Tools II

Unit1

Introduction , Setting Up the Project ,Adding Code to the Generated Source File, Compiling and Running the Application ,Building and Deploying the Application .

Unit 2

General Java Development Integration with External Tools and Services , Java and JavaFX GUIs
Web Services

Unit 3

Applications ,Java EE & Java Web Applications ,PHP Applications, Dynamic Languages
NetBeans Platform and Module Development, C/C++ Applications .

Unit 4

Project Setup, Creating and Editing Java Source Code, Compiling and Running the Application

Unit 5

Testing and Debugging the Application, Building and Deploying the Application

Reference:

NetBeans Platform 6.9 Developer's Guide: Jürgen Petri

Electives

MCSE34 Natural Language Processing

Unit 1

Regular expressions and automata, Morphology and Finite State transducers, N – grams.

Unit 2

Word classes and part of speech tagging, Context free grammars for English, Parsing with context free grammars.

Unit 3

Features and Unifications, Lexicalized and Probabilistic parsing.

Unit 4

Semantics: Representing meaning, Semantic analysis, Lexical semantics, Word Sense Disambiguation and Information retrieval.

Unit 5

Pragmatics: Discourse, Dialog and Conversational Agents, Natural Language Generation, Machine Translation.

Reference books:

1. Daniel, Jurafsky and Martin, Speech and Language Processing, Pearson, 2003

MCSE35 Data Mining And Warehousing

Unit 1

Introduction to data warehousing- evolution of decision support systems- data warehouse environment- modeling a data warehouse- granularity in the data warehouse- data warehouse life cycle- building a data warehouse- online analytical processing

Unit2

Data Warehousing Components. Building a Data Warehouse. Mapping the Data Warehousing to a Multiprocessor Architecture. DBMS Schemas for Decision Support. Data Extraction, cleanup & Transformation Tools. Metadata.

Unit 3

Introduction to Data Mining. Decision Trees. Neural Networks. Nearest Neighbor & Clustering. Genetic Algorithms. Rule Induction. Selecting & Using the Right Technique.

Unit 4

Data mining – demands potential and major issues- classification of data mining techniques- generalization, summarization and characterization- discovery and analysis of patterns, trends and deviations- mining knowledge in database systems

Unit 5

Data mining models- decision trees- genetic algorithms- neural nets – data mining process- data preparation – defining a study- data cleaning- prediction- enabling data mining through data warehouse- integration of data mining tools with database systems data mining applications – future trends

References:

1. Berson, “Data Warehousing, Data Mining & OLAP”.
2. Mallach, “Data Warehousing System”, (McGraw Hill).
3. Anahory and Murray „Data warehousing in the real world , Pearson Education/Addison Wesley
4. W H Inmon ,Building the Data Warehouse –, John Wiley & Sons
5. George M Marakas, Modern Data Warehousing , Mining and Visualization-, Pearson Education
6. Margaret H Dunham, Data Mining: Introductory and Advanced Topics- *Core Concepts* , Pearson Education
7. U.M. Fayyad G P and Shapiro.,Advances in Knowledge Recovery and Data Mining MIT Press

MCSE10 Signals & Systems

Unit. I

Mathematical description of signals and systems: continuous- time vs discrete- time functions, continuous-time signals functions , function and combinations of functions, continuous- time scaling and shifting transformations. Differentiations and integration of signals, continuous time even and odd functions, continuous time periodic functions , discretion and analysis of system: system characteristics, Eigen functions of continuous time functions , convolution sum, convolution integral.

Unit 2

Discrete time signals and systems: Discrete time signals, discrete time systems, analysis of discrete-time linear-time invariant systems, discrete time systems described by difference equations, implementation of discrete systems correlation of discrete time systems.

Unit 3

The Z transforms and its applications: Z transform, properties Z transform, rational Z transform, inversion of Z transform one sided Z transform analysis of linear time invariant systems in the Z domain.

Unit 4

Frequency analysis of signals and systems: frequency analysis of continuous time signals, frequency analysis of discrete time signals, properties of Fourier transformation for discrete time signals , frequency domain characteristics of linear time invariant systems, linear time invariant as frequency selective filters, inverse systems and de convolutions.

Unit 5

Discrete Fourier transform and application: Frequency domain sampling. Discrete Fourier Transform (DFT), properties of DFT, linear filtering methods based on DFT, frequency analysis of signals using DFT. Efficient computation of DFT; Fast Fourier Transform (FFT) algorithms, application of FFT algorithm, linear filtering approach to computation of DFT, quantization effects in computation of DFT.

References books:

1. Michael J. Robberts Signals and systems TMGH 2004
2. John G Proakis and Dimitres G Manolakis Digital Signal Processing PHI 2002

MCSE12 Information Theory and Coding

Unit 1

Information Theory: Information and entropy, source encoding ,Noiseless coding, Shannon's first fundamental theorem,Sources with finite memory: Markov sources, Discrete channel with discrete, Shannon's second fundamental theorem on coding for memory less noisy channel, Discrete channel with continuous noise, continuous channel with continuous noise,Channel capacity theorem, Properties.

Unit 2

Error control coding: Galois fields,Vector spaces and metrics, Block codes, Binary cyclic codes, Multiple error correcting codes, Majority – logic decoding, convolutional codes, Burst error correcting codes, ARQ, Performance of codes.

Unit 3

Digital image characterization: image sampling and reconstruction concepts, Sampling systems, Reconstruction system, vector space image representation, Generalized two dimensional linear operator, image quantization, Scalar quantization, Processing quantized variables, Monochrome and color image quantization,

Unit 4

Discrete two dimensional linear processing: super position and Convolution, Finite area superposition and convolution,Circulant superposition and convolution, Unitary transforms, Generalized unitary transforms, Fourier transforms,Cosine,Sine & Hartely transforms, Hadamard, Har walsh hadamard, Karhanen- Loeve transforms, Linear processing techniques: Transform domain processing, transformed domain superposition, Fast Fourier Transformation convolution,Fourier transform filtering.

Unit 5

Image improvement: Image enhancement, Contrast manipulation noise cleaning, Edge crispning, color image enhancement, multi spectral image enhancement, Image restoration, Image restoration modes, Optical system models,Photographic process models, Discrete image restoration models,

Reference books:

1. Simon Haykin : Digital communications – John Willy & sons, 2003.
2. William K . Pratt : Digital image Processing John Willy sons, 2003.

MCSE16 Discrete Mathematics

Unit 1

Mathematical logic: statements and notations, connectives, normal forms, well formed formulas, implications, satisfiability and tautology, predicate calculus.

Unit 2

Set and relations: sets, subsets, operations on sets, principle of inclusion and exclusion, pigeon hole axioms and mathematical inductions, generating functions, recurrence relations. Product sets and partitions, relations, properties of relations, equivalence of relations, manipulation of relations.

Unit 3

Functions, pigeonhole principles, permutation and combinations, combinatorics – simple counting techniques. Partially ordered sets, external elements of posets, lattices.

Unit 4

Elementary Probability Theory, Groups and semi groups:

Unit 5

Graph: definition, walks, path, trails, connected graph, regular and bipartite graph, cycles and circuits. Tree and rooted tree, spanning tree, eccentricity of vertex, radius and diameter of graph, central graph, centre(s) of a tree. Hamiltonian and Eulerian graph, planar graphs.

Reference Books

1. Kenneth H. Rosen, Discrete Mathematics and Applications, TMH 2003
2. J.P.Tremblay and R Manohar, Discrete Mathematical Structures with Applications to Computer Science, TMH 2001
3. John Truss, Discrete Mathematics for Computer Scientists, Pearson Edn 2002.

MCSE6 Probability & Statistics

Unit 1

Probability distributions : Random variables, Binomial distribution, Hyper geometric distribution, Mean and variance of probability distribution, Chebyshev's theorem, Poisson approximation to binomial, Poisson processes, Geometric distribution, Normal distribution, Normal approximation to Binomial distribution, Uniform distribution, Log-normal distribution, Gamma distribution, Beta distribution, Weibull distribution.

Unit 2

Sampling distributions and Inference Concerning Means :- Population and Samples, the sampling distribution of the mean(known and unknown), sampling distribution of variance, Point estimation, Bayesian estimation, Tests of Hypotheses, the null Hypotheses and the significance tests, Hypotheses concerning one mean, Operating characteristic curves, Inference concerning two means.

Unit 3

Inference concerning Variance and Proportions : Estimation of variances, Hypotheses concerning one variance, Hypotheses concerning two variances, Estimation of proportions, Bayesian estimation, Hypotheses concerning one proportion, Hypotheses concerning several proportions, analysis of rxc tables, Goodness of fit.

Unit 4

Correlation and Regression analysis : Curve fitting, the method of least squares, inference based on the least square estimators, curvilinear regression, correlation, Fisher's transformation, inference concerning correlation coefficient.

Unit 5

Analysis of variance :- General principles, Complexity randomized design, Randomized Block diagram, Multiple comparison, Some further experimental designs, Analysis of covariance.

Reference Books

1. Probability and Statistics for Engineers (V Edn), Johnson, Miller & Freund
2. Statistics for Management, Levin & Rubin, PHI
3. Probabilities in engineering and Computer Sciences, Milton & Arnold, MGH
4. Introduction to Probability and Statistics for engineers and Scientists, Ross, John Wiley & Sons
5. Statistics – concepts and Applications, Frank & Althoen, Cambridge University press

MCSE36 Operations Research

Unit 1

Linear programming: Formulation, Graphical Solution-2 variables, Development of Simplex Method, Artificial Variable Techniques, Big- M method, Two-Phase method, Reversed Simplex method.

Unit 2

Duality in LPP and its formulation, Dual Simplex Method, Bounded variable method, Applications of LPP, Transportation problems, Assignment Problem, Traveling Sales persons problem.

Unit 3

Integer Programming problem (IPP), Cutting Plane algorithm, Branch and bound method of solving IPP, Dynamic programming problems and its characteristics, Deterministic Dynamic Programming Problem.

Unit 4

Sequencing Problem, Processing n jobs through two machines and their mechanics, Processing n jobs through m machines, Processing 2 jobs through m machines, Project scheduling by PERT / CPM, Difference between PERT / CPM, Constructing the network, Critical path analysis, Float of an activity, Three time estimated for PERT, project cost by CPM.

Unit 5

Stochastic process, Classification of stochastic process, Discrete parameter Markov chains, Continuous Parameter Markov Chains, Birth and Death Processes, Queuing model and its characteristics, Classification of Queuing Model (M/M/1): FCFS (birth and death model).

Reference Books

1. Thaha H.A.- Operation Research- PHI, 2003.
2. Sharm J.K Mathematical Models in Operation Research, TMGH, 1989.
3. Trivedi K. S. Probability, Statistics with Reliability, Queuing and Computer Science Applications. PHI

MCSE9 System Simulation and Modeling

Unit 1

Definition of system and simulation, Merits and demerits of simulation, Areas of application, Types of systems, various types of models to represent them, Discrete and Continuous systems. Stages of a typical simulation study, Simulation Examples, Concepts of system Clocks, Event scheduling Vs Time advance algorithms.

Unit 2

Random Numbers: Roles of random numbers in simulation, pseudo random number generation techniques- their properties, methods of testing PRN sequens. Random Varieties: Generation, Inverse transformation techniques- with exponential distributions and empirical continuous distributions, Direct transformations- with Normal distributions, Acceptance Rejection techniques, with Poisson distribution.

Unit 3

Simulation Languages: Needs of special purpose simulation Languages, Detailed study of CPSS, SIMULA, SIMSCRIPT. Introduction to Object oriented Simulation. Input Modeling: Data collection, Distribution functions such as Normal, Poisson, exponential Distributions, Goodness of fit tests, Chi square test. Input model with out data, Effect of covariance and correlation of the quality of data.

Unit 4

Verification and Validation of Models: Guidelines for verification of models, their calibration and Validation, Face validity, Validation of model assumptions, Validating input –output transformations, Use of historical Data.

Unit 5

Evaluation of Simulation Experiments: Length of simulation run, static and dynamic stochastic simulations, elimination of transients, Auto correlated observations, variance reduction techniques.

Reference books:

1. Jerry Banks, John S. Carson & Barry L. Nelson – Discrete Event system simulation PHI India 2001.
2. N.Deo System simulations with Digital computers, PHI 1979.
3. James A Payne Introduction to Simulation : Programming Techniques & Methods of Analysis MGH 1988.

MCSE15 Advanced Microprocessors

Unit 1

Organization of a microprocessor system, Overview and architecture of intel 8086. Hardware specifications. Instruction set and programming : 8086 instruction set, assembly level programming, interrupts, DMA.

Unit 2

Intel 80186, 80188 and 80286 Processors, Architecture, Programming enhancements, Real mode and protected mode of operations. Arithmetic coprocessors and MMX technology: 8087 and 80287 Architecture and Instruction set.

Unit 3

Special 80-386 registers, Memory management, Protected mode and virtual 8086 mode. The memory paging mechanism. Introduction to 80486 processor. Enhancement in architecture and instruction set.

Unit 4

Special Pentium registers, Pentium memory management, New Pentium instructions. Introduction to Pentium Pro and its features.

Unit 5

Pentium II, Pentium III and Pentium IV enhancements. Itanium Processor : Special architecture and new features, instruction set.

Reference books:

1. Berry B. Brey, The Intel Microprocessors, Architecture, Programming and Interfacing, PHI, 2003
2. J.L. Antonakos, The Pentium Microprocessor, Pearson Education, 2003.

MCSE5 Systems Programming & Compiler Design

Unit1

Assemblers: Elements of Assembly Language Programming, Overview of Assembly Process, Design of Two pass Assembler, Macros and Macro Processors, Macro definition, call and expansion , Nested Macro calls, Advanced Macro facilities, Design of Macro preprocessor.

Unit 2

Linkers, Linking and Relocation concepts, Design of linkers, Self relocating programs, Linking for overlays, Loaders. Introduction to compilers, Different Phases. Lexical Analysis, input buffering, specification of tokens, Recognition of tokens, lexical Analyser generators, lex.

Unit 3.

Syntax Analysis. Context free grammar, writing a grammar, Top down parsing, Bottom Up Parsing, Operator precedence ,LR parsers, LR parsing algorithms, LR grammars, Construction of SLR, Canonical and LALR parsing tables. Parser generators, Yacc.

Unit 4.

Run time Environment. Storage organization schemes, Activation records, Compile time layout. Storage allocation strategies, static allocation, stack allocation, heap allocation. Accessing non-local names. Parameter passing mechanisms.

Unit 5

Symbol tables, representing scope information. Intermediate code generation, intermediate languages, declaration and assignment statements. Code generation: Issues, target machine, run time storage management, instruction selection, register allocation. Runtime storage allocation, basic blocks and flow graphs. Code optimization: Principal sources of optimization.

Reference books

1. D.M. Dhamdhree, "Systems Programming and Operating Systems", TMH, 2003.
2. A.V. Aho, R. Sethi, J.D. Ullman, "Compilers – Principles, techniques and tools", Pearson Education, 2003
3. A.V. Aho and J.D. Ullman, " Principles of Compiler Design", Narosa , 2002

MCSE15 Advanced Microprocessors

Unit 1

Organization of a microprocessor system, Overview and architecture of intel 8086. Hardware specifications. Instruction set and programming : 8086 instruction set, assembly level programming, interrupts, DMA.

Unit 2

Intel 80186, 80188 and 80286 Processors, Architecture, Programming enhancements, Real mode and protected mode of operations. Arithmetic coprocessors and MMX technology: 8087 and 80287 Architecture and Instruction set.

Unit 3

Special 80-386 registers, Memory management, Protected mode and virtual 8086 mode. The memory paging mechanism. Introduction to 80486 processor. Enhancement in architecture and instruction set.

Unit 4

Special Pentium registers, Pentium memory management, New Pentium instructions. Introduction to Pentium Pro and its features.

Unit 5

Pentium II, Pentium III and Pentium IV enhancements. Itanium Processor : Special architecture and new features, instruction set.

Reference books:

1. Berry B. Brey, The Intel Microprocessors, Architecture, Programming and Interfacing, PHI, 2003
2. J.L. Antonakos, The Pentium Microprocessor, Pearson Education, 2003.

MCSE38 PC Hardware

UNIT 1

CPU AND MEMORY: CPU essentials – processor modes – modern CPU concepts – Architectural performance features – the Intel’s CPU – CPU over clocking – over clocking requirements – over clocking the system – over clocking the Intel processors – Essential memory concepts – memory organizations – memory packages – modules – logical memory organizations – memory considerations – memory types – memory techniques – selecting and installing memory. How memory works

UNIT 2

MOTHERBOARDS: Active motherboards – sockets and slots – Intel D850GB – Pentium4 mother board – expansion slots – form factor – upgrading a mother board – chipsets – north bridge – south bridge – CMOS – CMOS optimization tactics – configuring the standard CMOS setup – motherboard BIOS – POST – BIOS features – BIOS and Boot sequences – BIOS shortcomings and compatibility issues – power supplies and power management – concepts of switching regulation–potential power problems – power management.

UNIT III

STORAGE DEVICES: RAM and ROM - Secondary storage devices - magnetic storage – magnetic recording principles – data and disk organization – floppy drive – hard drive – data organization and hard drive – sector layout – IDE drive standard and features – Hard drive electronics – CD-ROM drive – construction – CDROM electronics – DVD-ROM – DVD media – DVD drive and decoder.

UNIT IV

I/O PERIPHERALS: Parallel port – signals and timing diagram – IEEE1284 modes – asynchronous communication - serial port signals – video adapters – graphic accelerators – 3D graphics accelerator issues – DirectX – mice – modems – keyboards – sound boards – audio bench marks.
BUS ARCHITECTURE: Buses – Industry standard architecture (ISA), peripheral component Interconnect (PCI) – Accelerated Graphics port (AGP) – plug-and-play devices – SCSI concepts – USB architecture. Input / Output devices – Monochrome and color monitors, keyboard, mouse, printers and plotters.

UNIT V

ASSEMBLING A PERSONAL COMPUTER :Preparation of the Case; Configuration of the Motherboard; Installation of the Processor; Installation of the Memory; Prepare Drives for Installation; Installation of the Floppy Disk Drive; Installation of the Other Drives; Installation of the Motherboard; Connecting Cables to the Motherboard; Installation of the Expansion Cards; Perform the “Smoke Test”; Installation of the Software; Finishing Touches, BIOS /CMOS Setup Program; Various setup Options
OPERATING SYSTEM INSTALLATION AND CONFIGURATION: Operating Systems: - Introduction to the OS; Microsoft Operating Systems (DOS Versions and Windows versions); Installing Windows XP: - Pre -installation Checks; Setup Methods; The Setup Process; Re-starting the Computer and Finishing the Installation; Setup Failure and Recovery; Windows 95 Setup Files; Windows 95 Installation walk –through Process; Re-starting the Computer and Finishing to Installation; Setup Failure and Recovery Installing Linux: - Hardware Requirements; Disk Partitions; File System Choices;Running the Setup Program; Stages of Setup; The Recover Console

REFERENCES

1. Stephen J. Bigelow, “Trouble Shooting, maintaining and Repairing PCs”, Tata McGraw-Hill, New Delhi, 2001.
2. Craig Zacker & John Rourke, “The complete reference:PC hardware”, Tata McGraw-Hill, New Delhi, 2001.
3. Mike Meyers, “Introduction to PC Hardware and Trouble shooting”, Tata McGraw-Hill, New Delhi, 2003.
4. B. Govindarajulu, “IBM PC and Clones hardware trouble shooting and maintenance”, Tata McGraw-Hill, New Delhi, 2002.
5. Computer Organisation ,Moris Mano, PHI
6. All About FDD, Manohar Lotia, BPB
7. All About HDD, Manohar Lotia ,BPB
8. Electronic Devices and ckts, Allen Mottershead, PHI
9. Upgrading and Repairing PC, Scott Mueller, PHI
10. Complete PC upgrade and maintenance guide, Mark Minasi, BPB
11. Computer monitor Servicing Manua, Manohar Lotia, BPB
12. All about Keyboard and mouse, Manoha Lotia, BPB
13. All about Printers, Manohar Lotia, BPB
13. Inside the PC, Peter Norton, PHI
14. Introduction to microprocessor, L.A.Laventhal, PHI
15. Integrated Circuit, Botkar, hanna Publisher
16. Linux complete reference

MCSE32 Visual Programming

Unit 1

Introduction to VC++ and MFC: IDE, resource editor, resource files, Application wizard and class wizard, message handling, tools in VC++, simple programs DLL and API, Messages, Components, User, GDI and kernel. MFC fundamentals, Structure of MFC applications, Creating Main window using MFC, Processing messages.

Unit 2

Windows basic controls and classes: Message box, Menus, Basic SDI classes, Application class, Document class, View class, Mainframe Class. *CFrameWnd* and Message maps, Menu message handler and Timer settings, CMenu, Object and functions, CWnd(), Child windows, CWnd::create(), dialogues and common dialogue classes, Static controls and Dynamic controls, Message handling with controls, simple dialog based program, Data transfer function, DDV functions, CString, Communication between dialogs, Modal and Modeless dialogs, CcmdUI

Unit 3.

Graphics and Text Drawing : GDI and device context, GDI object and device context settings, stock drawing objects, CDC classes and examples, setViewportOrg(), CClientDC object, setROP2(), OnPaint(), setting text, background colour and background display mode, fast drawing and bit map graphics. Advanced Windows Controls and Multitasking : Updown controls spin controls, slider controls, progress bar, tool bar, status bar, tree views and calendar controls, property sheets and wizards, thread basics, multiple threads, suspending and resuming threads, synchronization, semaphore, event objects, CCriticalSection and Timed Lock Request.

Unit 4.

Document View Architecture: Document view frame work (4 classes), Initializing application, storing and retrieving documents, CDocument and CView class, OnDraw(), Document template, RUNTIME_CLASS macro, application wizard, class wizard, adding message handler using class wizard, designing user interface, printing the view, serialization and CArchive, splitter windows and filing, Collection classes, MDI application, CForm View class, form program.

Unit 5.

ActiveX controls and ODBC classes : ActiveX and OLE, COM and COM interface, MFC and ActiveX, ActiveX projects, ActiveX control program and control properties, stock caption properties, ActiveX methods, stock DoClick methods, ActiveX events, ActiveX control containers. ODBC classes: ODBC, Database drivers, DSN, connecting VC++ program to remote database. CDatabase class, open, close, CRecordSet class, establishing connection, Movefirst, Movenext, Movelast, Moveprev functions, adding, editing and deleting records, Edit, AddNew and Update functions, sorting and filtering records, m_strSort and m_strFilter variables, create simple database editing programs.

Reference books:

1. Shirley Wodtke, MFC C++ classes, 1997
2. John Paul Muller, Visual C++ from the Group-TMGGH,1998.
3. Herbert Schildt, MFC programming, 1996
4. Robert D. Thompson, MFC programmers refernce, 1998
5. Michael J. Young, Mastering Visual C++ 6.0, 2000

MCSE27 Artificial Intelligence

Unit 1

Artificial Intelligence- scope, history and applications, the predicate calculus, Inference rules, Structures and strategies for state space search, Strategies for space search, representing reasoning with the predicate calculus.

Unit 2

Heuristics Search: admissibility, monotonicity and informedness, Heuristic in games, Complexity issues, Control and implementation of state space search, Recursion based search, Pattern directed search, Production systems, Predicate calculus and planning, The black board architecture for problem solving.

Unit 3

Knowledge Based System: Knowledge-Intensive problem solving, Overview of expert system technology, rule based expert systems, model based reasoning, Case based reasoning, The Knowledge-Representation problem, reasoning with uncertain or incomplete information, The statistical approach to uncertainty, Non-monotonic systems, reasoning with Fuzzy sets.

Unit 4

Knowledge representation languages, Issue in Knowledge Representation, a survey of Network Representation. Conceptual graph: A Network Representation language, structured representation, Introduction to LISP: search in LISP, a functional approach to the farmer, wolf, goat and cabbage problem. Higher order functions and procedural abstraction, search strategies in LISP, a recursive Unification function, interpreters and embedded languages, Logic programming in LISP, streams and delayed evaluation. An expert system shell in LISP.

Unit 5

Automated reasoning: Weak methods in theorem proving, The general problem solver and difference tables, resolution theorem proving, further issues in automated reasoning, Machine learning: connectionist- Foundation for connectionist networks, Perception learning, back propagation learning, competitive learning, Hebbian coincidence learning, Attractor networks or memories, machine learning – social and emergent models, The genetic algorithm, classifier systems and genetic programming, artificial life and society based learning.

Reference Books:

1. G.F. Luger and W.A Stubblefield, Artificial Intelligence – Structures and Strategies for complex problem solving, Addison-Wesley-1998.
2. P.H Winston – Artificial Intelligence Addison-Wesley-1992.
3. E. Rich and Knight, Artificial Intelligence, TMGH,1991.
4. Nils J. Nilsson , Artificial Intelligence , A New Synthesis, Morgan Kauf 2000

MCSE39 Fuzzy Sets and Systems

Unit 1

Classical sets and fuzzy sets, classical relation and fuzzy relation. Membership function.

Unit 2.

Fuzzy to crisp conversion, fuzzy arithmetic, Numbers, Vectors and Extension principles, classical Logic and fuzzy Logic.

Unit 3.

Fuzzy rule based systems, Fuzzy nonlinear simulation, Fuzzy decision making, fuzzy classification.

Unit 4.

Fuzzy Pattern Recognition, fuzzy Control systems.

Unit 5

Fuzzy measures – belief, Plausibility, Probability and possibility – fuzzy set Models in Operation Research.

Reference books:

1. Fuzzy Logic with Engineering applications, T J Ross, Mc Graw Hill, 1997.
2. Fuzzy set theory and Applications, Kluewer Academic Publishers, 1996.

MCSE40 Cyber Security and Laws

Unit1

Object and Scope of the IT Act - Genesis, Object, Scope of the Act, Encryption, Symmetric Cryptography, Asymmetric Cryptography, RSA Algorithm, Public Key Encryption, Digital Signature, Technology behind Digital Signature, Creating a Digital Signature, Verifying a Digital Signature, Digital Signature and PKI, Digital Signature and the Law

Unit 2

Governance and IT Act 2000- Legal recognition of electronic records, Legal recognition of digital signature Use of electronic records and digital signatures in Government and its agencies. Certifying Authorities, Need of Certifying Authority and Power, Appointment, function of Controller, Who can be a Certifying Authority?, Digital Signature Certifications, Generation, Suspension and Revocation Of Digital Signature Certificate

Unit3

Domain Name Disputes and Trademark Law, Concept of Domain Names, New Concepts in Trademark Jurisprudence, Cyber squatting, Reverse Hijacking, Meta tags, Framing, Spamming, Jurisdiction in Trademark Dispute

Unit4

Cyber Regulations Appellate Tribunal, Establishment & Composition Of Appellate Tribunal, Powers of Adjudicating officer to Award Compensation, Powers of Adjudicating officer to Impose Penalty

Unit5

The Cyber Crimes (S-65 to S-74)- Tampering with Computer Source Documents(S-65), Hacking with Computer System(S-66), Publishing of Information Which is Obscene in Electronic Form(s-67) ,Offences : Branch of Confidentiality& Privacy (S-72), Offences : Related to Digital Signature Certificate(S-73 & S-74)

Reference:

- 1) Cyber Law in India by Farooq Ahmad ã Pioneer Books
- 2) Information Technology Law and Practice by Vakul Sharma Universal Law Publishing Co. Pvt. Ltd.
- 3) The Indian Cyber Law by Suresh T Vishwanathan Bharat Law house New Delhi.
- 4) Hand book of Cyber & E-commerce Laws by P.M. Bakshi & R.K.Suri Bharat Law house New Delhi.
- 5) Guide to Cyber Laws by Rodney D. Ryder Wadhwa and Company Nagpur.
- 6) The Information Technology Act,2000 Bare Act Professional Book Publishers New Delhi.

MCSE26 Multimedia Technology

Unit 1

Introduction, Medium, Main properties of a multimedia system, Traditional data stream characteristics, Sound, Music and Speech.

Unit 2.

Image and Graphics, Basic concepts, Computer Image Processing,

Unit 3.

Video and Animation, Basic concept, Television, Computer Based Animation, Data compression, JPEG, MPEG.

Unit 4.

Optical Storage media, Computer Technology, Multimedia Operating System.

Unit 5

Networking, Multimedia communication System, Multimedia server.

Reference books:

1. Ralf Steinmetz and Klara Nahrsted, Multimedia : computing communications and Applications. PHI 1995.
2. Guojun LU : Communication and computing for Multimedia systems. Artech House Inc-1996.

MCSC28 Linux Kernel

Unit 1

Introduction: Characteristics, multi-tasking, multi-user access, multiprocessing, architecture independence, demand load executables, paging, dynamic cache for hard disk, shared libraries, POSIX 1003.1 support, various formats for executable files, Memory protected mode, support for national keyboards and fonts, different file systems, TCP/IP, SLIP and PPP *support*; Compiling the kernel; Configuration facilities; Kernel architecture; Processes and tasks; Important data structures, task structure, process table, files and inodes, dynamic memory management, queues and semaphores, system time and timers; Main algorithms, signals, interrupts, booting the system, timer interrupt, scheduler; System call, working, getpid, nice, pause, fork, execve, exit, wait; Implementing new system calls.

Unit 2

Memory Management: Architecture independent memory model; Pages of memory; Virtual address space; Converting the linear address; Page directory; page middle directory; page table; Virtual address space; user segment; virtual memory areas; brk system call; Mapping functions; Kernel segment; Static and dynamic memory allocation in the kernel segment; Block device caching; Block buffering; update and bdflush processes; Buffer cache list structures; Paging; Page cache and management; Finding free page; reloading a page.

Unit 3

Inter-process communication: Synchronization; Communication via files, locking; Pipes; System V IPC, access permissions, numbers and keys, semaphores, message queues, shared memory, ipc and ipcrm commands; IPC with sockets; Unix domain socket implementation.

Unit 4

File System: Basic principles; Representation in the kernel; Mounting; Superblock operations; Inode; Inode operations; File structure; File operations; File opening; Directory cache; Proc file system; Ext2 file system; Structure; Directories in ext2 file system; block allocation.

Unit 5

Device Drivers: Character and block devices; Polling and interrupts; Interrupt mode; Interrupt sharing; Bottom halves; Task queues; DMA mode; Hardware detection; Automatic interrupt detection; Driver implementation; setup function; init; open and release; read and write; IOCTL; select; lseek; mmap; readdir; fsync and fasync; check_media_change and revalidate.

Reference books:

1. M beck , Linux Kernel Internals, Second edition, Addison Wesley. 1998
2. Robert Love, Linux Kernel Development, SAMS, 2003

MCSE41 Linux Device Drivers

Unit 1

An introduction to device drivers: The role of the device driver, splitting the kernel, classes of devices and modules. Building and removing modules: Kernel modules Vs Application, compiling and loading the kernel and loading, the kernel symbol table, initialization and shut down, Using resources, automatic and manual configurations, doing it in user space.

Unit 2

Char drivers: The design of snull, major and minor numbers, file operations, the file structure, open and release, sculls memory usage ,A brief introduction to race conditions, read and write, playing with the new devices, the device file system. loctl, locking i/o, poll and select, Asynchronous Notification, seeking device, Access control on a device file; Flow of Time: Time Intervals in kernel, knowing the current time, delaying Execution, Task queues, kernel timers.

Unit 3

Hardware management: I/O ports and I/O Memory, Using I/O ports, Using Digital I/O ports, using I/O Memory. Interrupt Handling: Overall control of interrupts, preparing the parallel port, installing an Interrupt Handler, implementing a handler, tasklets and bottom-half processing, interrupt sharing, interrupt-driven I/O, race conditions. Kmod and Advanced Modularization: loading modules on demand, inter module communication;

Unit 4

Mmap and DMA: Memory management in Linux, the mmap device Operation, the kiobuf interface, direct memory access and bus mastering. Network Drivers: How snull is designed ,connecting to the kernel, the net_ device structure, opening and closing, packet transmission, packet reception, the interrupt handler, changes in link states, the socket buffers, MAC Address Resolution, Custom ioctl commands, multicasting;

Unit 5

Overview of the peripheral buses: The PCI interface,ISA,PC104 and PC 104+ Sbus, Nubus, External buses; Physical layout of the kernel source: Booting the kernel .before booting, the init process, the kernel directory, the fs directory, net directory, ipc and lib;

Reference books:

1. Alessandro Rubini & Jonathan Corbet Linux Device Drivers (O'Reilly) 2001.

MCSE42 Distributed Systems

UNIT 1

Characteristics of distributed System: Examples of distributed systems – resource sharing and web – world wide web – issues in the design of distributed system. System models: Architectural models and fundamental models. Networking and internetworking: Types of network – network principles – internet protocols

UNIT 2

Interprocess communication : the API for internet protocol – external data representation and marshalling – client server communication - group communication- case study: inter process communication in Unix. Distributed objects and remote invocation: communication between distributed objects – remote procedure call – Events and notification.

UNIT 3

Operating system support: Operating system layer – protection – processes and threads- communication and invocation – Operating system architecture security: Overview of security techniques

UNIT 4

Distributed file system: File service architecture - network file system- Andrew file system-recent advances Transactions and concurrency control: nested transactions-locks optimistic concurrency control-comparison of methods for concurrency control-flat and nested distributed transactions

UNIT 5

distributed deadlocks- transactions recovery. Replication System model and group communication- fault tolerant services-transactions with replicated data

References:

1. George Coulouris, Jean Dollimore and Tim Kindberg, Distributed Systems: Concepts and Design –3rd ed., Pearson Education.
1. Andrew S Tanenbaum and Maarten Van Steen Distributed Systems: Principles and Paradigms –Pearson
2. Thomas Connolly and Carolyn Begg., Database Systems: A practical approach to design implementation and management – Pearson Education

MCSE21 Network Programming and Administration

Unit 1

TCP / IP Network Configuration: Introduction to TCP / IP network, Protocols, IP address, Hostname, Configuring a Host :setting the host name, assigning IP address, broad cast, net mask and name server address, Editing Host and network files,Interface Configuration: loop back interface, Ethernet interface, The SLIP and PPP interface, Configuring Gateway.Routing through gateway, Network commands: ping, ifconfig, netstat, route.

Unit 2

Network applications Configuration: File Transfer Protocol (FTP) and Trivial File Transfer Protocol (TFTP), Network FileSystems (NFS) . Network Information System(NIS), Hyper Text Transfer Protocol (HTTP) and Web server, ServerMessage Block (SMB) Protocol and Samba server, Dynamic Host configuration Protocol (DHCP) Firewalls-preventing unwanted connections,SE Linux.

Unit 3

Domain Name Services (DNS) and Mail services: working of DNS, Host name Resolution Name lookup with DNS,Reverse Lookup, Domain Name Servers and Zones, DNS database: SOA, NS, MX, A and PTR records, Secondary and primary DNS, Zone change notification, root servers, internet root domains, configuring DNS, Using nslookup. SimpleMail Transfer Protocol (SMTP) , Post office Protocol(POP) Multipurpose Internet Mail Extension (MIME), SMTP and POP3 command, Mail routing, Configuring A mail server.

Unit 4

Inter Process Communication programming : Create a process- fork() system call, Parent and Child Process, Process ID,User and Group ID Half Duplex Unix Pipes, Named Pipes, (First In First Out) , System V IPC : Message Queues, Semaphores, Shared memory, Sample programs for IPC that uses Pipes, FIFO.

Unit 5

Introduction to Socket Programming –Introduction to Sockets –,Socket address Structures , Byte ordering functions , address conversion functions ,Elementary TCP Sockets ,socket, connect, bind, listen, accept, read, write, close functions, , Byte ordering routines, Byte Operations, Address conversion routines, Advanced socket system calls: readv and writev, sendmsg and recvmsg, getpeername, getsockname, getsockopt andsetsockopt, shout down, select, reserved port, Simple client Programs that uses some reserved ports, Simple Client / Server Program Using Unreserved ports.

Reference Books:

1. Olaf Kirch & Terry Dawson, Linux Network Administrators Guide, O'relly, 2003
2. Hunt, Linux DNS server Administration, BPB Publication, 2003 .
3. W. Richard Stevens, "UNIX NETWORK PROGRAMMING Vol-I" Second Edition, PHI / Pearson Education, 1998. (Units – V)

MCSE43 Web Programming

Unit 1

Introduction to Web programming – Introduction to SGML features – HTML, XHTML, DHTML, XML – HTML Vs XML – Creating XML documents – Parsing an XML document – Writing well formed documents – Organizing elements with namespaces – Defining elements in a DTD – Declaring elements and attributes in a DTD.

Unit 2

CGI/Perl: Creating link to a CGI Script – Using a link to send data to a CGI Script – parsing data sent to a Perl CGI script – Using CGI script to process form data – Using scalar variables in Perl – Using variables in Perl – Using arithmetic operators in Perl – Associating a form with a script.

Unit 3

Event driven programming using Java applets – Java Server Pages – JSP scripting elements – Linking to external files – JSP declarations – JSP Expressions – JSP Scriptlets – Processing client requests.

Unit 4

Java Beans : features – designing Java Beans – Properties of beans – creation of events – EJB basics – types of beans –development of session beans – steps in creation and implementing interfaces – Accessing a database from JSP.

Unit 5

PHP: Defining PHP variables – variable types – operators – control flow constructs in PHP – Establishing connection with MySQL database – managing system data – parsing data between pages – Introduction to AJAX programming.

Reference Books

1. Robert W. Sebesta, *Programming with World Wide Web*, 4th edition, Pearson Education, 2009.
2. Xue Bal et. al, *The Web Warrior Guide to Web programming*, Thomson Learning.
3. Chris Bates, *Web Programming: Building Internet Applications, 3rd ed*, Wiley Academic Catalog.
4. H.M. Deitel, P.J. Deitel, A.B. Goldberg, *Internet and World Wide Web: How to Program, 3rd edition*, Pearson Education.
5. Kalata, *Internet Programming with VBScript and JavaScript*, Thomson Learning.
6. Joseph L Weber, *Using JAVA 2 Platform – Special Edition*, Prentice Hall India.
7. Larne Pekowsky, *Java Server Pages*, Pearson Asia.
8. Barry Burd, *JSP*, IDG Books India.
9. Ed Roman, *Mastering Enterprise Java Beans and the Java 2 platform Enterprise Edition*, Wiley Computer Publishing.
10. Floyd Marinescu, *EJB Design Patterns*,
11. Steven Holzner, *Ajax Bible*, Wiley Student Edition.

MCSE43 Advanced Java Programming

Unit 1

Java Database connectivity:- JDBC Architecture- Drivers- Database connections-Statements-Resultsets-Transactions-metadata- stored procedures-error handling-BLOBs and CLOBs

Unit 2

Java Networking :- RMI -Architecture- Defining remote Objects-Creating stubs & skeletons –Serializable classes-Accessing Remote Objects-factory classes-Dynamically loaded classes-RMI activation-Registering remote objects-marshalled objects CORBA –Architecture-Services-IDL-ORB-Naming service-Inter-ORB Communication-creating CORBA objects-simple server class-helper class-holder class-client and server stubs-registering with naming services, finding remote object-adding object to naming context-initial ORB references

Unit 3

JNDI- Architecture-context-initial context class-Object in a context –Naming shell application-listing the children of a context-binding objects –accessing directory services-X.500 directories-Dir context interface-Attributes and attribute interface-modifying directory entities-creating directory entities-searching.

Unit 4

Java Servlets- Servlet life cycle-servlet Basic-servlet chaining-HTTP servlets-forms and interaction-POST-HEAD and other request-server-side includes-cookies-Session tracking-databases and non-HTML Content-Request dispatching-shared attributes-resource abstraction

Unit 5

Enterprise Java Beans:-EJB roles—EJB Client-Object –container-Transaction Management—implementing a Basic EJB Object-Implementing session Beans-Implementing Entity Beans-Deploying an enterprise Java Beans Object-Changes in EJB1.1 specification.

Reference books.

1. David Flanagan, Jim Farley, William Crawford & Kris Magnusson, Java Enterprise in a nutshell- A desktop Quick reference –O'REILLY, 2003
2. Stephen Ausbury and Scott R. Weiner, Developing Java Enterprise Applications, Wiley - 2001
3. Jason Hunder & William Crawford, Java Servlet Programming, O'REILLY, 2002

MCSE45 Wireless and Sensor Networks

Unit 1

Introduction and overview :Overview of the course; overview of sensor network protocols, architecture, and applications; simulation and experimental platforms; main features of WSNs; research issues and trends. Enabling technologies :Fundamentals of 802.15.4, Bluetooth, and UWB; Physical and MAC layers.

Unit 2

Sensor node hardware and software :Hardware: mica2, micaZ, telosB, cricket, Imote2, tmote, btnode, and Sun SPOT. Software (OS): tinyOS, MANTIS, Contiki, and RetOS. Programming tools: C, nesC, Mate

Unit 3

Localization, connectivity, and topology :Sensor deployment mechanisms; coverage issues; node discovery protocols.

Unit 4

Network layer protocols :Data dissemination and processing; multi-hop and cluster based protocols; routing.

Unit 5

Middleware and application layers : Data dissemination; data storage; query processing; sensorWeb; sensorGrid. Open issues for future research :Energy preservation and efficiency; security challenges; fault-tolerance.

References

- 1 *Protocols and Architectures for Wireless Sensor Networks*. H. Karl and A. Willig. John Wiley & Sons, June 2005.
- 2 *Wireless Sensor Networks: Technology, Protocols, and Applications*. K. Sohraby, D. Minoli, and T. Znati. John Wiley & Sons, March 2007.
- 3 *Wireless Sensor Networks*. C. S. Raghavendra, K. M. Sivalingam, and T. Znati, Editors. Springer Verlag, Sep. 2006.
- 4 *Wireless Sensor Networks: Architectures and Protocols*. E. H. Callaway, Jr. AUERBACH, Aug. 2003.
- 5 *Networking Wireless Sensors*. B. Krishnamachari. Cambridge University Press, Dec. 2005.
- 6 *Wireless Sensor Networks: An Information Processing Approach*. F. Zhao and L. Guibas. Morgan Kaufmann, Jul. 2004.
- 7 *Sensor Networks and Configuration: Fundamentals, Standards, Platforms, and Applications*. N. P. Mahalik. Springer Verlag, Nov. 2006.
- 8 *Wireless Sensor Networks: A Systems Perspective*, N. Bulusu and S. Jha, Editors, Artech House, August 2005

MCSE45 Mobile Computing

Unit 1

WIRELESS COMMUNICATION FUNDAMENTALS : Introduction – Wireless transmission – Frequencies for radio transmission – Signals – Antennas – Signal Propagation – Multiplexing – Modulations – Spread spectrum – MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks.

Unit 2

TELECOMMUNICATION NETWORKS :Telecommunication systems – GSM – GPRS – DECT – UMTS – IMT-2000 – Satellite Networks - Basics – Parameters and Configurations – Capacity Allocation – FAMA and DAMA – Broadcast Systems – DAB - DVB.

Unit 3

WIRELESS LAN :Wireless LAN – IEEE 802.11 - Architecture – services – MAC – Physical layer – IEEE 802.11a - 802.11b standards – HIPERLAN – Blue Tooth.

Unit 4

MOBILE NETWORK LAYER : Mobile IP – Dynamic Host Configuration Protocol - Routing – DSDV – DSR – Alternative Metrics.

Unit 5

TRANSPORT AND APPLICATION LAYERS : Traditional TCP – Classical TCP improvements – WAP, WAP 2.0.

REFERENCES

1. Jochen Schiller, “Mobile Communications”, PHI/Pearson Education, Second Edition, 2003. (Unit I Chap 1,2 &3- Unit II chap 4,5 &6-Unit III Chap 7.Unit IV Chap 8- Unit V Chap 9&10.)
2. William Stallings, “Wireless Communications and Networks”, PHI/Pearson Education, 2002. (Unit I Chapter – 7&10-Unit II Chap 9)
3. Kaveh Pahlavan, Prasanth Krishnamoorthy, “Principles of Wireless Networks”, PHI/Pearson Education, 2003.
4. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, “Principles of Mobile Computing”, Springer, New York, 2003.
5. Hazysztof Wesolowshi, “Mobile Communication Systems”, John Wiley and Sons Ltd, 2002.