

MCA (SEMESTER II) SYLLABUS

Paper 1

Advanced Data and File Structures (ADS)

One paper : 100 marks / 3 hour duration practical + test = 25 marks

1. Non –linear data structures

General Trees, Operations, Trees traversals
Binary Trees, Operations on binary trees,
Conversion of a general tree to binary,
Applications of trees, Heaps
Graphs- multilink structures, representations
Graph traversals
Applications of graphs
Spanning trees

2. Sorting

Growth of function, -'O' notation,
Complexity of algorithm, Classification,
Internal sorting
Insertion sort
Selection sort
Shell sort
Tree sort
Selection sort
Bubble sort
Quick sort
Heap sort
Distributive – radix sort
External sorting
Multi way merge
External Radix Sort

3. Searching

Sequential search

Binary search

Search trees traversals

Binary trees

Threaded binary search trees

Inserting and deleting nodes in a binary search tree

Balancing binary search tree

Height balanced(AVL) tree: Concept and construction.

Weight balanced (BB) trees.

Hashing Techniques

Hash function

Address calculation techniques, common hashing functions.

Collision resolution.

Linear probing, Quadratic

Double hashing.

Bucket addressing.

Deletion and rehashing.

4. File Structures

Concept of record.

File Operations : Create, update and delete

File systems organization : Sequential, Relative, Indexed and Random access mode

Sequential organization and access.

Relative file organization

Addressing techniques

Direct mapping techniques : Absolute, relative and indexed sequential files(ISAM)

Concept of index

Levels of index

Overflow Handling.

5. Indexed structures

Binary search trees as indexes

m-way search tree: insertion, deletion, performance

B-Trees-searching, insertion, deletion, performance.

Overview of B*- Trees and B+-Trees

Random files,

Multi key files Organization, multikey access, inverted file organization.
Alternate key ISAM.
Comparison and trade-off.
File design considerations.

Term work / Practicals : Each candidate will submit a journal in which at least 10 practical assignments based on the above syllabus along with the flow chart and program listing will be submitted with the internal test paper. Test graded for 10 marks and practicals graded for 15 marks.

References:

1. "Introduction to data management and file design"-R.Kennith Walter,1986
2. "An introduction to data structures with applications"-Trembley and Manohar.
3. "Data Structure – A Pseudocode Approach with C " __Richard F. Gilberg, Bechrouz
A. Forouzan (Thomson Learning)
4. "Data Structure using C" AM Tanenbaum, Y Langsam and MJ Augenstein,
Prentice- Hall, India, 1991.
5. "Data Structure and Program Design in C" – RL Kruse, BP Leung and CL Tondo,
Prentice Hall, 1991.
6. "Data Structures and Algorithm Analysis in C" – Weiss, Mark Allen,
Addison
Wesley

Paper 2

Operating System (OS)

One paper : 100 marks / 3 hour duration Practical + test : 25 marks

1. Fundamentals of operating systems - OS Services and components, multitasking, multiprogramming, timesharing, spooling.

2. Process and thread management – concept of process and threads, process states, process management, context switching, interaction between process and OS multithreading.

3. Concurrency control – concurrency and race conditions, mutual exclusion requirements, software and hardware solutions, semaphores, monitors, classical IPC problems and solutions, deadlocks – characterization, detection, recovery, avoidance and prevention.

4. Memory management – memory partitioning, swapping, paging, segmentation, virtual memory, page replacement algorithms.

5. I/O Systems- Principles of I/O Hardware: I/O devices, devices controllers, direct memory access.

6. Principles of I/O Software: Goals, Interrupt handlers, device drivers, device independent I/O software.

Disk : Disk hardware, scheduling algorithms. Error handling, track-at-a-time Caching. RAM Disks

Clocks : clock hardware, memory mapped terminals, I/O software.

Terminals : Terminal hardware, memory mapped terminals, I/O software. Interrupt handlers, device drivers, device independent software subsystem.

7. File systems-file storage, access methods and free space management

8. Security – Need and strategies for security in stand alone and networked systems

concept of access control list and capabilities , password and encryption schemes.

9 Case studies : MS, DOS, MS WINDOWS, LINUX (UNIX) operating system..

Term work practicals; Each candidate will submit a journal in which at least 10

Practical assignments based on the above syllabus along with the flow chart and program listing will be submitted with the internal test paper. Test graded for 10 marks and practicals graded for 15 marks.

Relevant Books

1. Operating Systems Concepts (5th Ed) by Silberchatz and Galvin, Wiley, 2000.
2. Operating systems(4thEd) – Internals and Design Principles by William Stallings, Prentice Hall, 2000.
3. Computer Organization and Architecture (4th Ed) by William Stallings, Prentice Hall India, 1996.
4. Modern Operating Systems by Andrew S Tanenbaum, Prentice Hall India, 1992.

Paper 3

Systems Analysis, Design and Implementation (SADI)

One paper : 100 marks/ 3 hour duration Assignments + test: 25 marks

1. Overview of System Analysis and design requirements of a good systems Analyst.

2. System Concepts and Models: SDLC, Prototyping, Iterative Models, Spiral Model, RAD Model, Formal Methods Model, 4GL Model, their advantages and Disadvantages.

3. System Analysis: Requirements Determination techniques. Information requirements Analysis: processing modeling with physical and logical data flow diagrams, data dictionaries, data modeling with entity relationship diagrams;

4. Developing a proposal : Feasibility study and cost estimation. Identification of list of deliverables.

5. System Design: System structure charts, Data structure diagrams, Data Access diagrams, Warnier Orr Diagrams, HIPO charts, design of input and control, design of output and control, file design/database design, process design, user interface design, prototyping, software constructions.

Test plans, Structured walk throughs, and design and code reviews.

Use of CASE tools in the analysis, Hardware/software selection, Make V/s Buy decision

6. Documentation: Importance, Types of documentation, Security and disaster planning and management.

Term work/Assignments; Each candidate will submit a journal in which assignments based on the above syllabus and the internal test paper. Test graded for 10 marks and assignments graded for 15 marks.

Books:

1. "Systems Analysis and Design": Howrskiewycz, PHI
2. "Analysis and Design of Information Systems": Senn, TMH
3. "System Analysis and Design Methods": Whitten, Bentley
4. "System Analysis and Design": Award
5. "Analysis and Design of Information Systems": Rajaraman, PHI

Paper 4

Combinatorics and Probability

One paper : 100 marks/3 hour duration Assignments + test: 25 marks

Combinatorics:

1. Recurrence relations, Towers of Hanoi, Iterations, Homogenous linear equations

with constant coefficients, Difference tables and finite order differences, line in a plane in general position.

2. Binomial coefficients, Basic identities including Pascal identity and triangle, binomial theorem, counting objects without and with repetitions, sum of product of binomial coefficients, factorial expansions, upper summation, Vander Monde identities. Applications to sorting.

3. Inclusion – exclusion principals, elementary application to Sieve formulae, derangments , counting permutations with restricted positions, elementary idea of generating functions.

Probability:

1. Sample space, Events, Axioms, Conditional probability. Bays rule

Random variables : Discrete and continuous. Distribution and density functions. Marginal And conditional distributions. Stochastic independence.

2. Discrete Distribution: (Bernoulli, Binomial, Poisson, Geometric, Uniform)

Continuous Distributions: (Normal, Exponential, Rectangular)

3. Expectation: Expectation of a function. Conditional expectation and variance Moment

Generating function. Various applications including hashing

Term work/Assignments: Each candidate will submit a journal in which assignments based on the above syllabus and the internal test paper. Test graded for 10 marks and assignments graded for 15 marks.

References:

1. "Concrete Mathematics: a foundation for Computer Science", R.L. Graham, D.E. Knuth and O. Patashmik, Pearson Education Asian Low Price Asian Edition, 2002.
2. "Probability and its computer applications": Kishore Trivedi, PHI,
3. "Elements of Discrete Mathematics": Liu C.L.,TMH
4. "Discrete Mathematics": Norman L. Biggs, Clarendon Press, Oxford

Paper 5

Principles and Practices of Management

One paper : 100 marks/3 hour duration Assignments + test: 25 marks

1. Development of management thought : Contribution of Taylor, Fayol, Elton Mayo, System, Contingency approaches to management. Management functions and skills, Nature of planning, Mission and objectives, Management by objectives, Strategic Planning, Strategic choices, Policies, Decision making process.

2. Organizational Structures : Forms of organization structure, Line and staff, Functional, Product, Matrix, Flat and vertical structures, Authority relationships

3. HRD : Staffing, Employee Recruitment, selection, Staff training and Development, Job description, performance appraisal, Motivation, Maslow's Herzberg's Mc Clelland's theories, Theory x and Y, Incentive system, Situational Leadership theories.

4. Marketing: Understanding the concept of marketing mix, Product policy, New product development, Product life cycle and new product development, Channels of distribution, Pricing, Advertising and product promotion policies, Marketing research

5. Manufacturing: Production planning and control, Types of manufacturing Systems, Work study, Material management. Concept of Project time calculation through PERT/CPM. Introduction to the concept of Inventory management, Introduction to the concepts of Total Quality management, quality circles standardization.

6. Finance function, Financial control, Understanding about tools of financial analysis, Cash flow, fund flow analysis Ratio analysis, Understanding the concept of working capital, Planning of working capital.

7. International Marketing: Different methods of entering, Global Marketing strategies, Multinational companies 2.5 lectures

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Books:

1. "Principles and Practice of Management" : L.M. Prasad
2. "Marketing Management": V.S. Ramaswamy, S. Namakumari
3. "Production operations management". Dr. BS. Goyal
4. "Essentials of management": Koontz O'Dommell, Weihrich.
5. "Financial Management": Khan and Jain.
6. "International Marketing": Francis Cherunilam