

Rajasthan Technical University, Kota
FACULTY OF COMPUTER APPLICATIONS

Master of Computer Applications
SYLLABUS
Session 2016-17

MCA Year 1 Semester I

S.No.	COURSE CODE	SUBJECT	PERIODS			INTERNAL ASSESMENT	ESE	Subject TOTAL
			L	T	P			
1	MCA-101	Discrete Mathematics	3	1		20	80	100
2	MCA-102	Programming in C & C++	3	1		20	80	100
3	MCA-103	Operating System	3	1		20	80	100
4	MCA-104	Computer Architecture	3	1		20	80	100
5	MCA-105	Accounting and Financial Management	3	1		20	80	100
Practicals								
1	MCA-151	Office management Lab			4	20	80	100
2	MCA-152	C & C++ Lab			4	20	80	100
3	MCA-153	Communication Skills			4	20	80	100
4	MCA-154	Microprocessor Lab			4	20	80	100
		Total				180	720	900

Discrete Mathematics

Class: I Sem. MCA

Evaluation

Branch: MCA

Schedule Per Week

Lectures: 3

Examination Time: Three Hours Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Content of the Subject

Introduction to Discrete Mathematical Structures : Sets, Relations and functions- Sets, Types of Sets, Multisets, Operations on Sets, Relations and Properties of Relations, Representation of Relations, Equivalence Relation, Closures of Relations, Functions ,injection, Surjection and Bijective mapping, Composition of functions, Introduction to characteristic functions.

Methods of Proof: Direct Proofs, Indirect Proofs, Mathematical Induction, Method of Contradiction.

Permutations and Combinations, Pigeon Hole Principle, Principle of Inclusion and Exclusion, Sequence and Series, Generating Functions.

Mathematical Logic Proposition and Propositional Calculus: Posets and Lattices: Partial Order Set, Bounding Elements, Well Ordered Set, Topological Sorting, Lattices, Principle of Duality, Bounded, Distributed, and Complemented Lattices

Graph Theory: Types of Graphs, Path and Circuits, Eulerian Path and Circuits, Hamiltonian Path and Circuits, Shortest Path Algorithms

Group: Definitions and Properties, Coset & Subgroup, Normal subgroup, Homomorphism of groups, Cyclic Group, Permutation Group. Matrix Algebra: Matrices, Rank of Matrix, Solving System of Equations-Eigen Values and Eigenvectors-Inverse of a Matrix - Cayley Hamilton Theorem

Text Book:

1. Keneth H. Rosen, "Discrete Mathematics and Its Applications", TMH, 2012

References:

1. C L Liu, "Elements of Discrete Mathematics", TMH, 2012.
2. Kolman, Busby & Ross, "Discrete Mathematical Structures", PHI, 2015.
3. Narsingh Deo, "Graph Theory With Application to Engineering and Computer Science', PHI, 1979

Programming in C and C++

Class: I Sem. MCA

Evaluation

Branch: MCA

Schedule Per Week

Lectures: 3

Examination Time: Three Hours Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Content of the Subject

Programming fundamentals through C: Algorithms and Flowcharts, Data types, constants, variables, operators, data input and output, assignment statements, conditional statements, expressions, string and character handling, data validation examples. Iteration, arrays, strings processing. Defining function, function prototype, passing parameters, recursion.

Pointers: Definition and uses of pointers, pointer arithmetic, pointers and array, pointers and functions, pointer to pointer. Structures, union, pointers to structures, user-defined data types, enumeration.

Introduction to Dynamic Memory Allocation, command line arguments, systems calls.
File Handling in C

OOP Paradigm: Characteristics of OOP, Comparison between functional programming and OOP approach, characteristics of object oriented language - objects, classes, inheritance, reusability, user defined data types, polymorphism, overloading.

Introduction to C++, Identifier and keywords, constants, C++ operators, type conversion, Variable declaration, statements, expressions, input and output, conditional expression loop statements, break control statements.. Classes, member functions, objects, arrays of class objects, pointers and classes, nested classes, constructors, destructors

Inline member functions, static class member, friend functions, and dynamic memory allocation.

Polymorphism and Inheritance: Function overloading, operator overloading, polymorphism, early binding, polymorphism with pointers, virtual functions, late binding, pure virtual functions.

Single inheritance, types of inheritance, types of base classes, types of derivations, multiple inheritances, container classes, member access control.

Exceptions and Templates: Exception syntax, Multiple Exceptions, Function templates, function templates with multiple argument templates. File Handling in C++

Text Book:

1. E Balagurusamy, "Object oriented Programming with C++", Tata McGraw Hill, 2006
2. Kamthane, A.N., "Programming with ANSI and Turbo C", Pearson Education, Delhi, 2006

References

1. Deitel and Deitel "C How to Program", Pearson Education. 2010
2. Yashavant Kanetkar "Understanding Pointers in C", BPB Publications, 2008
3. Reams Thareja, "Programming in C" Oxford University Press, 2011
4. HM Deitel and PJ Deitel "C++ How to Program", Prentice Hall, 2010
5. Kamthane," Object Oriented Programming with ANSI and Turbo C++", Pearson Education, 2003.

Operating system

Class: I Sem. MCA

Evaluation

Branch: MCA

Schedule Per Week

Lectures: 3

Examination Time: Three Hours Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Content of the Subject

Introduction : Definition and types of operating systems, Batch Systems, multi programming, time-sharing, parallel, distributed and real-time systems, Operating system structure, Operating system components and services, System calls, system programs, system boot.

Process Management : Process concept, Process scheduling, Cooperating process, Threads, Inter-process communication, CPU scheduling criteria, Scheduling algorithms, Multiple-processor scheduling and Algorithm evaluation.

Process synchronization and Deadlocks : the Critical-Section problem, synchronization hardware, Semaphores , Classical problem of synchronization, Critical regions, Monitors, Deadlock-system model, Characterization, Deadlock prevention, Avoidance and Detection, Recovery from deadlock, Combined approach to deadlock handling.

Storage Management: Memory Management –Logical and Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation with paging, Virtual Memory, Demand paging and its performance, Page replacement algorithms, Allocation of frames, Thrashing , Page Size and other considerations.

Protection and Security: Goals of protection, Domain of protection, Access matrix, Implementation of access Matrix, Revocation of Access Rights, Language based protection, The security problem, authentication, One Time passwords, Program threats, System threats, Threat Monitoring, Encryption.

File system and secondary storage structure : file concept, access methods, directory implementation, Efficiency and performance, recovery, Disk structure, Disk scheduling methods, Disk management, Recovery , Swap-space management, Dist reliability.

Case Study: Windows NT-Design principles, system components Environmental Subsystems, File system, Networking and program interface.

Text Book:

1. Abraham Silberschalz, Peter B Galvin and G. Gagne, “Operating System Concepts”, Addison Wesley Publishing Co. , 2010

References:

1. Andrew S.Tanenbaum, “Modern Operating System”, PHI Learning Pvt. Ltd., 2008
2. William Stallings, “Operating Systems : Internal and design Principles”, Prentice Hall, 2011
3. H.M. Deital, PJ Deital and DR Chorffines, “Operating System”, Pearson Education, 2011

Computer Architecture

Class: I Sem. MCA

Evaluation

Branch: MCA

Schedule per Week

Lectures: 3

Examination Time: Three Hours Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject

Basic Building Blocks: Gates, Boolean Functions and Expressions Designing Gate Networks, K-map simplification, Useful Combinational Parts, Programmable Combinational Parts, Timing and Control, Latches, Flip-flops, Registers and Counters, Sequential Circuits.

Arithmetic/Logic Unit: Numbers Representation, Arithmetic Operations, Floating-Point Arithmetic.

Register Transfer Language and Micro-operations: Concept of bus, data movement among registers, a language to represent conditional data transfer, data movement from/ to memory. Design of Arithmetic & Logic Unit and Control Unit Control design hardwired control, micro programmed arithmetic and logical operations along with register transfer, timing in register.

Instruction and Addressing: A simple computer organization and instruction set, instruction formats, addressing modes, instruction cycle, instruction execution in terms of microinstructions, interrupt cycle, concepts of interrupt and simple I/O organization, Synchronous & Asynchronous data transfer, Data Transfer Mode: Program Controlled, Interrupt driven, DMA(Direct Memory Access). Implementation of processor using the building blocks.

Memory System Design: Memory Origination, Memory Hierarchy, Main Memory (RAM/ROM chips), Auxiliary memory, Associative memory, Cache Memory, Virtual Memory.

Assembly Language Programs, Assembler Directives, Pseudo Instructions, Macroinstructions, Linking and Loading.

Vector and Array Processing: Shared-Memory, Multiprocessing, Distributed Mufti Computing.

Microprocessor Concepts: Pin Diagram of 8085, Architecture of 8085, Addressing Mode of 8085, functional block diagram of 8085 assembly language, instruction set of 8085.

Text Book:

1. M. Morris Mano "Computer System Architecture" Prentice Hall , 2007

References:

1. William Stallings, "Computer Organization & Architecture - Designing for Performance" , 2012
2. John P~ Hayes, "Computer Architecture and Organization" , Tata McGraw Hill, 1998.
3. Svetlana N.Yanushkevich, Vlad P.Shmerko, "Introduction to Logic Design", CRC Press, 2012.

Accounting and Financial Management

Class: I Sem. MCA

Evaluation

Branch: MCA

Schedule per Week

Lectures: 3

Examination Time: Three Hours Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject

Introduction to Accounting: Definition of Accounting and its advantages & limitations, Scope of accounting. Branches of Accounting - Financial Accounting - Cost Accounting - Management Accounting, users of Accounting information, Methods of Accounting, Double Entry Accounting System

Types of Accounts and Rules for Debit and Credit Preparation of Journal, Ledger and Trial Balance

Final Accounts: Preparation of Final Accounts (Sole Proprietorship only), Preparation of Trading A/c, Profit & Loss A/c and Balance Sheet covering simple adjustments.

Accounting Ratios: Meaning, Advantages and Limitations of Accounting ratios, Computation of profitability, liquidity, solvency, and turnover ratios.

Cost Accounting: Meaning and definition of Cost Accounting – its Advantages & Limitations

Marginal Costing: Meaning-Advantages- Limitations, Break Even Point, Margin of Safety, Profit Volume Ratio

Introduction to Financial Management: Meaning of financial management, functions and objectives of financial management- Profit Maximization and wealth maximization, basic finance decisions, changing role of finance.

Text Books:

1. S.N. Maheswari, & S.K. Maheshwari, “Advanced Management Accounting”, Vikas Publishing House, 2010
2. M.Y. Khan and P.K. Jain, “Management Accounting”, Tata McGraw Hill, 2009
3. M Y. Khan and P.K. Jain , “Cost Accounting”, Tata McGraw Hill, 2008

References:

1. Vijay Kumar , “Accounting for Management”, Tata McGraw Hill, 2015
2. Anthony, N. Robert, Hawkins and Merchant , “Accounting: Text and Cases(SIB)”, McGraw Hill, 2013
3. Weston, John. Fred. Thomas, E.Copeland , “Managerial finance”, Dryden press, 1988

Office Management Lab

Class: I Sem. MCA

Evaluation

Examination Time: Three Hours Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject

MS word Basics: Introduction to MSWord; Features & area of use. Working with MS Word. Menus & Commands, Toolbars & Buttons, Shortcut Menus, Wizards & Templates. Creating a New Document; Different Page Views and layouts; Applying various Text enhancements. Working with - Styles, Text Attributes; Paragraph and Page Formatting; Text Editing using various features; Bullets, Numbering, Auto formatting, Printing & various print options.

Advanced Features of MS-Word: Spell Check, Thesaurus, Find & Replace; Headers & Footers

Inserting - Page Numbers, Pictures, Files, Auto texts, Symbols etc., Working with Columns, Tabs & indents; Creation & Working with Tables including conversion to and from text; Margins & Space management in Document; Adding References and Graphics; Mail Merge, Envelops & Mailing Labels.

MS Excel: Introduction and area of use; Working with MS Excel., concepts of Workbook & Worksheets; Using Wizards; Various Data Types; Using different features with Data, Cell and Texts; Inserting, Removing & Resizing of Columns & Rows; Working with Data & Ranges; Different Views of Worksheets; Column Freezing, Labels, Hiding, Splitting etc.; Using different features with Data and Text; Use of Formulas, Calculations & Functions; Cell Formatting including Borders & Shading; Working with Different Chart Types; Printing of Workbook & Worksheets with various options

MS PowerPoint: Introduction & area of use; Working with MS PowerPoint; Creating a New Presentation; Working with Presentation; Using Wizards; Slides & its different views; Inserting, Deleting and Copying of Slides; Working with Notes, Handouts, Columns & Lists; Adding Graphics, Sounds and Movies to a Slide; Working with PowerPoint Objects; Designing & Presentation of a Slide Show; Printing Presentations

MS Access: Define data needs and types ,define and print table relationships, Add, set, change or remove primary keys Split databases Create databases Create tables Modify tables Enter records using datasheet view, Delete records from a table Change records in a table Create fields and modify field properties Create reports Modify the design of reports and forms.

Computerized Accounting :Use of Accounting Software Tally, Creation Company, Voucher Entry, Types of accounts, Mode of accounting (Day cash book, ledger book, bank reconciliation, Ledgers, Trial balance, Balance Sheet) Analysis of Trial Balance and Final Accounts

C & C++ Lab

Class: I Sem. MCA

Evaluation

Examination Time: Three Hours Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject

Control Statements:-Programs on if-else ladder, iterative statements, Functions and recursions, predefined functions.

Pointer and Dynamic Memory:-Programs on Arrays, sorting (Bubble, selection, insertion) Searching (linear, Binary), 2D Array (Matrix operations), Pointers, Structures, union, enum, Dynamic Memory allocation

Programs on File Handling, Programs on Command Line Arguments.

Objects, Functions and Constructor:- Programs on classes and objects constructors, functions , inline functions, Friend function.

Polymorphism:-Programs on Function Overloading, overriding, Operator overloading, programs on different type of inheritances, virtual function.

Exception Handling and File Handling:- Programs on input/output Streams, Exception Handling, File Handling ,Template Classes.

Communication Skills

Class: I Sem. MCA

Evaluation

Examination Time: Three Hours Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject

Listening and Speaking Skills: Conversational Skills Formal and Informal Conversation

listening to lectures, discussions, talk shows, news programs.

Writing Skills: Formal & Informal writings, report writing, Creative writing seminar, paper, bibliography.

Composition: Resume Writing, Business Letter Writing: Complaint, Job Applications and official correspondence; E-mail messages.

Presentation Skills: Elements of effective presentation, structure of presentation, voice modulation, audience analysis, body language, eye contact, sample videos. Debates, Seminar, Speeches, Lectures. Interviews, mock interviews.

Group Discussion: Structure of GD, Moderator led and other ODs, Strategies in GD, team work body language, mock GD

Microprocessor Lab

Class: I Sem. MCA

Evaluation

Examination Time: Three Hours Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject

Storage Of Data: Implementation of programs related to storage of data in memory, exchange of memory content, addition and subtraction of 8 bit numbers and 16 bit numbers. Finding largest and smallest from given numbers

One's Complement and Two's Complement: Implementation of program for one's complement and two's complement, right shift and left shift of 16 bit data, multiplication and division of two 8 bit numbers. Calculation of factorial and square of a number. Implementation of program for calculation of sum of series of numbers sum of series of even numbers, sum of series of odd numbers.

Data Transfer: Data transfer from one memory block to other in same and reverse order

Array: Implementation of programs to search a number in array, arrangement in ascending and descending order

Conversion Programs: Implementation of program for addition, subtraction of two BCD numbers, BCD to binary and binary to BCD conversion HEX to decimal and HEX to binary conversion

MCA Year 1 Semester II								
S.No.	COURSE CODE	SUBJECT	PERIODS			INTERNAL ASSESSMENT	ESE	Subject TOTAL
			L	T	P			
1	MCA-201	Computer Oriented Numerical and Methods	3	1		20	80	100
2	MCA-202	Data Communication and Computer Networks	3	1		20	80	100
3	MCA-203	Data Structures	3	1		20	80	100
4	MCA-204	Database Management System	3	1		20	80	100
5	MCA-205	System Analysis and Design	3	1		20	80	100
Practicals								
1	MCA-251	Data Structure Lab			4	20	80	100
2	MCA-252	CONM Lab			4	20	80	100
3	MCA-253	SQL Lab			4	20	80	100
4	MCA-255	Communication & Soft Skill Lab			4	20	80	100
		Total				180	720	900

Computer Oriented Numerical Methods

Class: II Sem. MCA

Evaluation

Branch: MCA

Schedule Per Week

Lectures: 3

Examination Time: Three Hours Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Content of the Subject

Data Representation - Floating point Arithmetic – Addition, Subtraction, Multiplication and Division operation. Pitfall of floating point representation, Errors in numerical computation Iterative Methods, Measurement of Accuracy by using Absolute Error and Relative Error

Solution of Non Linear equations- Bisection Method, Iteration Method, Regula-Falsi method, Newton Raphson method, Secant method, Method of Successive Approximation, Rate of convergence of iterative methods.

Solutions of system of Linear equations- Direct Method - Gauss Elimination method and pivoting, Ill Conditioned system of equations. Iterative method- Gauss Seidal Method.

Interpolation and approximation: Finite Differences, Difference tables, Polynomial Interpolation: Newton's forward and backward formula, Central Difference Formulae: Gauss forward and backward formula, Stirling's, Bessel's, Everett's formula.

Interpolation with unequal intervals: Lagrange's Interpolation, Newton Divided difference formula.

Numerical Differentiation and Integration: Introduction, Numerical Differentiation- Differentiating a Graphical Function, Differentiating a Tabulated Function. Numerical Integration-Trapezoidal rule, Simpson's rules, Weddle's Rule Euler- Maclaurin Formula.

Curve Fitting - Curve fitting and Approximation: Method of least squares, fitting of Linear Function, fitting of Nonlinear Function- polynomials, exponential curves.

Solution of differential equations: Picard's Method, Euler's Method, Taylor's Method, Runge-Kutta methods, Predictor-corrector method, Automatic error monitoring, stability of solution.

Algorithm of each numerical method mentioned in Lab Syllabus

Text Books:

1. Salaria, R.S.: "Computer Oriented Numerical Methods", Khanna Book Publishing Co. (P.) Ltd., New Delhi. 2003
2. Rajaraman, V., "Computer Programming in C", Prentice Hall of India, 2004

References

1. Balaguruswami, E., "Computer Oriented Statistical and Numerical Methods", Mac. Million, 2000
2. Krishnanmurthy, E.V. & Sen, S. K., "Computer Based Numerical Algorithms", East West Press, 1984
3. Rajaraman, V., "Computer Oriented Numerical Methods", 3rd Ed., Prentice Hall, India, 1980

Data Communication and Computer Networks

Class: II Sem. MCA

Evaluation

Branch: MCA

Schedule Per Week

Lectures: 3

Examination Time: Three Hours Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Content of the Subject

Networking Fundamentals:

Introduction, Data & Information, Data Communication-Characteristics of Data Communication, Components of Data Communication, Data Representation, Data Flow- Simplex, Half Duplex, Full Duplex, Computer Network- Categories of a network, Protocol- Elements of a Protocol, Networking Standards, Reference Models- OSI Model, TCP/IP Model, Comparison of OSI and TCP/IP Model.

The Physical Layer

Transmission Media- Guided & Unguided, PSTN: Structure of the Telephone System, Data & Signals- Data types, Signal types- Analog & Digital, Modulation Techniques, Modem, Cable Modem, Protocols: DSL, ISDN.

The Data Link Layer

Design Issues: Framing, Error Control, Flow Control, Protocols: FDDI, CDDI, Frame Relay, ATM, 802.11, PPP, HDLC.

The Medium Access Sub-Layer

Multiple Access Protocols: ALOHA, CSMA, Ethernet: Switched Ethernet, Fast Ethernet, Gigabit Ethernet, DLL Switching: Internetworking, Repeaters, Hubs, Bridges, Switches, Routers, Gateways, Virtual LANs.

The Network Layer

Design Issues, Routing Algorithms: Link State Routing, Distance Vector Routing, Flooding, Routing Protocols: RIP, IGRP, EIGRP, OSPF, Internetworking: Tunneling, Fragmentation, IPV4, IPV6 Basics, BGP.

The Transport Layer Protocols: UDP, TCP, Headers.

The Application Layer

DNS: The DNS Name Space, Name Servers, E-Mail: SMTP, POP3, HTTP, FTP, Telnet, Network Management: SNMP.

Network Security

Cryptography: Encryption, Decryption, Private/Public Key, Digital Signatures, SSL, Firewalls, PGP, S/MIME.

Text Books:

1. Computer Networks, Andrew S.Tanenbaum, Prentice Hall, 5th Edition, October, 2010.
2. Data Comm. & Netw.5e Global Ed (English), A. BehrouzForouzan, McGraw Hill Education (India) Private Limited, 5th Edition, 2013.

References

1. Computer Networks and Internets with Internet Applications, Douglas E.Comer& M. S. Narayana, Pearson Education, 4th Edition, 2009.
2. Data Communications, Computer Networks and Open Systems, Fred Halsall, Addison Wesley, 4th Edition, 2001.
3. William Stallings, "Cryptography and Network Security: Principles and Practice" Pearson Education, 5th Edition, 2011.

Data Structures

Class: II Sem. MCA

Evaluation

Branch: MCA

Schedule Per Week

Lectures: 3

Examination Time: Three Hours Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Introduction: Basic data structures such as arrays, linked list, stack, trees and queues and their applications, linked and sequential representation Basic Terminology, Elementary Data organization, Data Structure operations.

Queues, Stack implementation through Arrays: Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation (row major and column major), Applications of arrays - Character Strings and string operations, Ordered Lists.

Stack: Implementation of stack, operations on stack. Applications of stack: Conversion of infix-expressions to prefix and postfix expressions, evaluation of postfix expression.

Queues: implementation of queues, Operations on Queue, Types of Queues - Circular queue, Deque and Priority Queue.

Recursion: recursion in C, example of recursion, Tower of Hanoi Problem, simulating recursion, Backtracking, recursive algorithms, principles of recursion.

Linked list: Representation and Implementation of Singly Linked Lists, Two-way Header List, Traversing and Searching of Linked List, insertion and deletion to/from Linked Lists, insertion and deletion Algorithms, Doubly linked list, Header lists, circular lists, sorted lists.

Trees: Basic terminology and definitions. Array and Linked Representation of Binary trees, Traversing Binary trees. **Binary Search Trees:** Binary Search Tree (BST), Traversal, Insertion and Deletion in BST, and Introduction to balanced BST (AVL Trees).

Searching: Sequential search, binary search, comparison and analysis.

Sorting: Insertion Sort, Bubble Sort, Quick Sort, Two-Way-Merge Sort, Heap Sort, Sorting on Different Keys, Practical consideration for internal Sorting.

Graphs: Terminology & Representations, Graphs & Multi-graphs, Directed Graphs, Sequential Representations of Graphs, Adjacency Matrices, Traversal, Connected Component and Spanning Trees, Minimum Cost Spanning Trees

Text Book:

1. Abraham Silberschalz, Peter B Galvin and G. Gagne, "Operating System Concepts", Addison Wesley Publishing Co. , 2010

References:

2. Andrew S.Tanenbaum, “Modern Operating System”, PHI Learning Pvt. Ltd., 2008
3. William Stallings, “Operating Systems : Internal and design Principles”, Prentice Hall, 2011
4. H.M. Deital, PJ Deital and DR Chorffnes, “Operating System”, Pearson Education, 2011

Database Management System

Class: II Sem. MCA

Evaluation

Branch: MCA

Schedule per Week

Lectures: 3

Examination Time: Three Hours Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject

Introduction: Overview of DBMS, Advantages of DBMS, Basic DBMS terminology, Database System v/s File System, Data Independence, Architecture of DBMS, Introduction to data models: Relational Model, Network Model, Hierarchical Model, Entity-Relationship Model, Comparison of network, hierarchical and relational models.

Data modeling using the Entity Relationship Model: ER model concepts, Types of Relationships, notation for ER diagram, Reduction of ER-Diagrams to Relational Model, mapping constraints, Generalization, Aggregation, Specialization, Extended ER model, relationships of higher degree

Relational model: Storage Organizations for Relations, Relational Algebra, Set Operations, Relational Calculus, Concepts of Alternate key, candidate key, primary key, Foreign key, Integrity Rules, Data Dictionary.

Normalization: Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependencies, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design.

Introduction to SQL: Characteristics of SQL, Advantages of SQL, SQL data types and literals, Types of SQL commands: DDL, DML, TCL, DCL, SQL operators, Tables, views and indexes, Constraints Group By and Having Clause, Order By Clause, Queries and sub queries, Aggregate Functions, Numeric Functions, String Functions, Date & Time Functions, Insert, Update and Delete operations, Unions, Intersection, Minus, Joins: Equi-Join, Natural Join, Self-Join, Inner Join, Outer Join

Text Books:

1. Elmasri, Navathe, "Fundamentals of Database Systems", Addison Wesley, 6th Edition, 2011
2. Korth, Silberschatz, Sudarshan, "Database Concepts", McGraw Hill, 6th Edition, 2010

References

1. Thomas Connolly and Carolyn Begg, "Database Systems: A Practical Approach to Design, Implementation, and Management, Addison Wesley, 5th Edition, 2010
2. Ramakrishnan, Gehrke, "Database Management System", McGraw Hill, 3rd Edition, Jan 2007
3. Date C J, "An Introduction to Database System", Addison Wesley, 8th Edition 2003
4. Bipin C. Desai, "An Introduction to Database Systems", Galgotia Publication, Revised Edition, 2010
5. Majumdar & Bhattacharya, "Database Management System", TMH, 2005
6. Paul Beynon Davies, "Database Systems", Palgrave Macmillan, 3rd Edition, 2003

System Analysis and Design

Class: II Sem. MCA

Evaluation

Branch: MCA

Schedule per Week

Lectures: 3

Examination Time: Three Hours Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject

System Concept and Information System Environment

System Concepts and Information Systems Environment: The System Concept: Definition, Characteristics of Systems, Elements of a System, Open and Closed System, Formal and Informal Information Systems, Computer based Information Systems, Management Information System, Decision Support System, General Business Knowledge, and Interpersonal Communicational System.

System Development Life Cycle

System Development Life Cycle: Recognition of needs, Impetus for System Change, Feasibility Study, Analysis, Design, Implementation, Post implementation and Maintenance. Role of the Systems Analyst, The Analyst/User Interface, Behavioral issues. Case Study on SDLC.

System Planning and Information Gathering

Systems Planning and Initial Investigation: Strategies for Determining Information Requirement, Problem Definition & Project initiation, Background Analysis, Fact Analysis, Review of Written Documents, Onsite Observations, Interviews and Questionnaires, Fact Analysis, Performance Analysis, Efficiency Analysis, Service Analysis.

Information Gathering: need, Information about the firms, Information gathering tools, Interviewing, Arranging the Interview, Guides to a Successful Interview, Types of Interviews and Questionnaires, The Structured and Unstructured Alternatives. Case Study on Information Gathering.

Feasibility Study and System Analysis

Feasibility Study: System performance, Economic Feasibility, Technical Feasibility, Behavioral Feasibility, Steps in Feasibility Analysis.

Tools of Structured Analysis: The Dataflow Diagram (DFD), Data Dictionary, Decision Trees and Structured English. Case Study on Tools.

System Design and System Security

Input/Output and Forms Design: Input Design, CRT Screen Design, Output Design, and Requirements of form Design.

H/W / S/W Selection, Make V/s Buy decision and Maintenance. Documentation: Importance, Types of documentation, Security, Disaster/ Recovery and Ethics in System Development: Threats to System Security, Control, Measures, Disaster/ recovery planning.

Text Books:

1. System Analysis & Design, Shelly Cashman Series, Thomson Press 10th Edition, 2013
2. System Analysis and Design, Kendall and Kendall, Prentice Hall, 9th Edition, 2013

References

1. Systems Analysis and Design, Howryskiewycz, PHI, 5th Edition, 2000
2. Structured System Analysis and Design, S.A Kelkar, Prentice Hall, India, 2004
3. System Analysis and Design Methods, Whitten, Bentley, 9th Edition, 2005
4. System Analysis and Design, Elias M. Awad, 2nd Edition, 2003