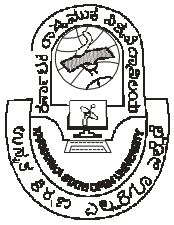

Karnataka State Open University

Mysore,Karnataka – 570006

In Association with BSAITM

Syllabus For Master of Computer Application (MCA)

MASTER OF COMPUTER APPLICATIONS (MCA)

SEMESTER-I

CODE	SUBJECT	CREDITS
MCA11	Mathematics	4
MCA12	Data Structure	4
MCA13	Programming in C	4
MCA14	Financial Accounting	4
MCA15-L	C programming Lab and Windows based Application Lab	1
MCA16-L	Data Structure Lab	1
Total		18

SEMESTER-II

CODE	SUBJECT	CREDITS
MCA21	Discrete Mathematics	4
MCA22	DBMS	4
MCA23	OOPS With C++	4
MCA24	Computer Organization and Architecture	4
MCA25-L	DBMS Lab	1
MCA26-L	OOPS C++ lab	1
Total		18

SEMESTER-III

CODE	SUBJECT	CREDITS
MCA31	Data Communication	4
MCA32	Advanced Computer Graphics	4
MCA33	Advanced operating system	4
MCA34	Unix and Shell Programming	4
MCA35-L	Unix Lab	1
MCA36-L	Operating system Lab	1
Total		18

Semester-IV

CODE	SUBJECT	CREDITS
MCA41	Advanced Software Engineering	4
MCA42	Analysis and Design of Algorithm	4
MCA43	Advanced Java Programming	4
MCA44	System Programming	4
MCA45-L	RDBMS Lab	1
MCA46-L	Advanced Java Programming Lab	1
Total		18

Semester-V

CODE	SUBJECT	CREDITS
MCA51	Advanced Computer Network and Security	4
MCA52	Internet Programming and Web Designing	4
MCA53	Data Warehousing and Data Mining	4
MCA54	Elective-1	4
MCA55-L	Graphics Lab	1
MCA56-L	Web Designing/Internet Lab	1
Total		18

Semester-VI

CODE	SUBJECT	CREDITS
MCA61	Advanced MIS and E-commerce	4
MCA62	Elective-2	4
MCA63	Elective-3	4
MCA64	Project	4
Total		18

Elective-1	CREDITS
1. Compiler Design	4
2. Mobile Computing and Communication	4
3. Simulation and Modeling	4

Elective-2	CREDITS
1. Pattern Recognition	4
2. Operations Research	4
3. Advanced Computer Architecture	4

Elective-3	CREDITS
1. Client Server Architecture	4
2. Artificial Intelligence	4
3. Network Management	4

Detailed Syllabus

Semester I

MCA 11 Mathematics

Section 1 Sets

Unit - 1 Definition of sets, subsets, complement of a set, universal set.
Unit - 2 intersection and union of sets, De-Morgan's laws, Cartesian products, Equivalent sets, Countable and uncountable sets, minset, Partitions of sets.

Section 2 Relations

Unit - 3 Basic definitions, graphs of relations, properties of relations.

Section 3 Matrix

Unit- 4 Introduction of a Matrix, its different kinds.
Unit- 5 matrix addition and scalar multiplication, multiplication of matrices, transpose etc.
Unit-6 Square matrices, inverse and rank of a square matrix.
Unit-7 solving simultaneous equations using Gauss elimination, Gauss Jordan Methods, Matrix Inversion method.

Section 4 Algebra

Unit-8 Algebra of logic, Propositions, connectives.
Unit-9 Tautologies and contradiction, Equivalence and implication, Principle of Mathematical induction, quantifiers.

Reference Books:

1. Discrete Mathematics and Its Applications - Hardcover (July 26, 2006) by Kenneth Rosen
2. Discrete Mathematics with Applications - Hardcover (Dec. 22, 2003) by Susanna S. Epp

MCA 12 Data Structures

Section 1 INTRODUCTION TO DATA STRUCTURES

Unit-1 Basic Concepts, Algorithms, Notations, Data Structure operations.
Unit-2 Implementations of Data Structures, Pseudo-code for Algorithms , Mathematical Notations , Functions and Procedure.

Section 2 ARRAYS

Unit-3 Definitions, Array, Index or Subscript, Dimensions of an Array.
Unit-4 Memory Allocation to Arrays, Memory Allocation to One-dimensional Array, Memory Representation of Two Dimensional Arrays.

Unit-5	Memory Allocation to Three Dimensional Array, Memory Allocation to Multidimensional Array, Static and Dynamic Variables.
Unit-6	Pointer Type Variables ,Pointers in Pascal, Pointers in C, Static and Dynamic Memory Allocation

Section 3 LINKED LISTS

Unit-7	Dynamic Allocation of Memory, Representation of Linked List.
Unit-8	Implementation of Linked List, Insertion of a Node at the Beginning.
Unit-9	Insertion of a Node at the End, Insertion of a Node after a Specified Node.
Unit-10	Traversing the Entire Linked List, Deletion of a Node from Linked List.
Unit-11	Concatenation of Linked Lists, Merging Linked Lists, Reversing of Linked List.
Unit-12	Applications of Linked List, Doubly Linked Lists, Circular Linked List, Generalized List.

Section 4 STACK And Queue

Unit-13	Implementation of Stack, Array-based Implementation.
Unit-14	Pointer-based Implementation, Applications of Stacks.
Unit-15	Maze Problem, Evaluation of Expressions.
Unit-16	Evaluating Postfix Expression, Simulating Recursive Function using Stack.
Unit-17	Passing Arguments, Return from a Function, Simulation of Factorial.
Unit-18	Proving Correctness of Parenthesis in an Expression.
Unit-19	Queue Implementation, Array-based Implementation.
Unit-20	Pointer-based Implementation, Applications of Queues, Priority Queues.

Section 5 Trees and Graphs

Unit-21	Trees, N-ary Tree, Linked Tree Representation, Binary Tree Traversal.
Unit-22	Searching a Binary Tree, Heap Tree, AVL Trees.
Unit-23	Threaded Trees, Splay Trees, B-Trees.

Section 6 Searching and Sorting

Unit-24	Linear or Sequential Search, Binary Search.
Unit-25	Tree Searching, Breadth First Search (BFS).
Unit-26	Depth First Search (DFS), General Search Trees, Hashing.

Section 7 GARBAGE COLLECTION AND COMPACTION, DYNAMIC MEMORY ALLOCATION

Unit-27	Reference Counting Garbage Collection.
Unit-28	When Objects Refer to Other Objects, Why Reference Counting Does Not Work.
Unit-29	Mark-and-Sweep Garbage Collection, The Fragmentation Problem.
Unit-30	Stop-and-Copy Garbage Collection, The Copy Algorithm, Mark-and-Compact Garbage Collection.
Unit-31	The Heap, Singly Linked Free storage, Doubly Linked Free storage, Buddy System for Storage Management.

Reference Books:

1. Purely functional data structures By Chris Okasaki
2. Algorithms and Data Structures :the science of computing by Chris Okasaki

3. Data Structures and Algorithms Bu Alfred V.Aho and Jeffrey D.Ullman

MCA13 Programming in C

Section 1	Origin and Introduction
Unit-1	Programming languages About C,Evolution of C.
Unit-2	Structure of a C Program, Compilers & Interpreters Compiling a C Program.
Unit-3	Pseudo Codes, A Simple C Program.
Section 2	Data Types, Variables and Constants
Unit-4	Data Types Variables, Constants Operators.
Unit-5	Type Modifiers and Expressions Operators Type Modifiers Expressions Type Definitions Using 'typedef'.
Unit-6	Introduction to Input/Output Console I/O Functions Unformatted Console I/O Functions.
Section 3	Control Constructs
Unit-7	Control Statements, Conditional Statements.
Unit-8	Loops in C The break Statement, The Continue Statement.
Section 4	Arrays
Unit-9	Introduction to Arrays One Dimensional Array Strings Two Dimensional.
Unit-10	Array Multi-dimensional Array.
Section 5	Functions
Unit-11	Introduction to Functions, Function Declaration and Prototypes.
Unit-12	Storage Classes Recursion in Function.
Section 6	Pointers
Unit-13	Introduction to Pointers, Pointer Notation.
Unit-14	Pointer Declaration and Initialization, Accessing Variable through Pointer.
Unit-15	Pointer Expressions, Pointers and One Dimensional Arrays.
Unit-16	Arrays of Pointers, Pointer to Pointers, Pointers and Functions.
Section 7	Structures and Unions
Unit-17	Structure Definition, Structure Initialization, Arrays of Structures, Arrays within Structures.
Unit-18	Structures within Structures, Passing Structures to Functions, Structure Pointers.
Unit-19	Union–Definition and Declaration, Accessing a Union Member.
Unit-20	Initialization of a Union Variable, Use of User Defined Type Declarations.
Section 8	Linked List
Unit-21	Dynamic Memory Allocation.
Unit-22	Linked List, Basic List Operations.
Section 9	File Handling in C

Unit-23 What is a File, Defining and Opening a File, Functions for Random Access to Files.

Reference Books:

1. Programming in C By Stephen G. Kochan
2. Programming in C By M.T.Somashekara
3. Let Us C By Yashwant Kanitkar

MCA 14 Financial Accounting

Section 1 Accounting

Unit-1 Principles, concepts and conventions, double entry system of accounting.
Unit-2 introduction to basis books of accounts of sole proprietary concern.
Unit-3 closing of books of accounts and preparation of trial balance.

Section 2 Final Accounts

Unit-4 Trading, Profit and Loss accounts and Balance sheet of sole proprietary.

Section 3 Financial Management

Unit-5 Meaning, scope and role, a brief study of functional areas of financial management.
Unit-6 Introduction to various FM tools: Ration Analysis, Fund Flow statement and cash flow statement (without adjustments).

Section 4 Costing

Unit-7 Nature, Importance and basic principles. Marginal costing: Nature scope and importance, Break even analysis, its uses and limitations.
Unit-8 construction of break even chart, Standard costing: Nature, scope and variances (only introduction).

Section 5 Computerized Accounting

Unit-9 Meaning and advantages, Computer Programs for accounting.
Unit-10 Balancing accounts, Trial balance and final accounts in computerized.
Unit-11 Accounting, control, and Audit, Sub-Modules of computerized accounting systems.

Reference Books:

1. Financial Accounting: Tools for Business Decision Making by Paul D. Kimmel
2. Financial Accounting: An Introduction to Concepts, Methods and Uses by Clyde P. Stickney

Semester II

MCA 21 Discrete Mathematics

Section 1 Set Theory

Unit-1 Relations and functions: Set notations and description.
Unit-2 Subsets, basic set operations. Venn diagrams, laws of set theory.
Unit-3 Partition of sets, min sets, duality principle.

Section 2 Relations

Unit-4 Basic definitions of relations and functions.
Unit-5 Graphics of relations, properties of relations.
Unit-6 Injective, surjective and bijective functions, composition.

Section3 Combinations

Unit-7 Rule of products, permutations, combinations.

Section 4 Algebra Of Logic

Unit-8 Propositions and logic operations, truth tables and propositions generated by set.
Unit-9 equivalence and implication laws of logic, mathematical system, and propositions over a universe.
Unit-10 Mathematical induction, quantifiers. Recursion and recurrence: The many faces of recursion, recurrence, relations, and some common recurrence relations, generating functions.

Section 5 Graph Theory
Unit-11 Various types of graphics, simple and multigraphs.
Unit-12 Directed and undirected graphs, Eulerian and Hamiltonian graph.
Unit-13 Graph connectivity, traversals, graph optimizations.
Unit-14 Graph coloring, trees, spanning trees, rooted trees, binary trees.

Reference Books:

1. Discrete Mathematics and Its Applications by Kenneth H. Rosen
2. Discrete Mathematics with Applications by Susanna S. Epp

MCA22 DBMS

Section 1 Introduction to Databases
Unit-1 Database and its Hierarchies, History of Databases, Types of DBMS.

Section 2 Database Environment

Unit-2 Database and DBMS Software, Database Architectural.
Unit-3 Three Layered Architectural/O Functions.
Unit-4 Characteristics of Database Approach.

Section 3 Relational Model

Unit-5	Logical Data Models, Relational Data Model.
Unit-6	Querying Relational Data, Relational Algebra, Relational Calculus.

Section 4	SQL: Data Manipulation, Data Definition
Unit-7	SQL Language, SQL Database Objects.
Unit-8	SQL Data Types, DDL, DML and TCL Commands, Retrieving Data, Inserting Data, Updating Data, Deleting Data.
Unit-9	Creating and Altering Tables, Views, Sequence, Index.
Section 5	Database Planning, Design And Administration
Unit-10	Database Application Life-cycle, Alternate System Development Methodologies, Database Planning, System Definition.
Unit- 11	Requirements Collections and Analysis, Database Design.
Unit-12	DBMS Selection, Application Design, Database Administration
Section 6	Entity Relationship Modeling, Normalization
Unit-13	Database Design, Entity, Attributes and Entity Sets.
Unit-14	Relationships and Relationship Sets, ER Diagrams.
Unit-15	Additional Features of ER Model, Conceptual Database Design with the ER Model, Anomalies in Databases, Redundancy.
Unit-16	Inconsistency, Update Anomalies, Good Database Designing.
Unit-17	First Normal Form (1NF),Second Normal Form (2NF), Third Normal Form (3NF), Boyce-Codd Normal Form, Fourth Normal Form (4NF).
Section 7	Database Security
Unit-18	Access Control, Discretionary Access Control.
Unit-19	Mandatory Access Control, Additional Issues to Security.

Reference Books:

1. Database design for mere mortals. Hernandez
2. Database management by Watson

MCA23 OOPS with C++

Section 1	Classes And Objects
Unit-1	Introduction, Class , Object.
Unit-2	Nature of Class, Types of Relationships, "Kind of" Relationship, "Is a" Relationship, "Has a" Relationship/Part of Relationship, Classification of Classes, Abstraction.
Section 2	Constructors And Destructors And Operators Overloading
Unit-3	Introduction, Constructors, Destructors.
Unit-4	Introduction-Operators Overloading, Example, Type Conversion.

Section 3 Inheritance, Polymorphism And Virtual Functions
Unit-5 Introduction- Inheritance.
Unit-6 Type of Inheritance, Introduction- Polymorphism.
Unit-7 Virtual Functions, Need for Virtual Functions, Rules for Virtual Functions.

Section 4 File Handling

Unit-8 Introduction, files, Stream Input/Output, Buffering and Flush.
Unit-9 Exception Handling, String Handling, Sequential Fixed Length Structure.
Unit-10 Linked List Fixed Size Nodes, Strings Manipulations.
Unit-11 Character String Output Functions ,String Handling Functions Postfix Expression, Simulating.

Section 5 Arrays
Unit-12 Introduction, Arrays, Array Declaration.
Unit-13 Important Points about Arrays , Multidimensional Arrays.

Reference Books:

1. Object Oriented Programming With C++ - E Balagurusamy
2. Object Oriented Programming Using C++, Sanjeev Sofat, Cyber Tech. Publication

MCA24 Computer Organization and Architecture

Section 1 Introduction
Unit-1 Computer System, Components of a Computer System.
Unit-2 Computer Organization, Data Representation, Performance Factors.

Section 2 Central Processing Unit
Unit-3 Introduction, General Register Organization.
Unit-4 Stack Organization, Instruction Formats.
Unit-5 Addressing Modes, Program Control, Program Interrupt.

Section 3 Control Unit
Unit-6 Introduction, Control Memory, Microprogramming.
Unit-7 Computer Configuration, Design of Control Unit , Overview of RISC/CISC.

Section 4 Memory Organization
Unit-8 Memory Hierarchy, Main Memory or Primary Memory.
Unit-9 Design of Main Memory ,Auxiliary Memory.
Unit-10 Virtual Memory, Memory Management ,Associative Memory.

Section 5 Input-Output Devices
Unit-11 Introduction, Peripheral , Asynchronous Communication.
Unit-12 Asynchronous Serial Transfer, Asynchronous Communication Interface.
Unit-13 Synchronous Communication, Character-Oriented Protocol.
Unit-14 Input-Output Interface, Modes of Data Transfer.
Unit-15 Interrupt , Multiple Interrupts ,Direct Memory Access (DMA).

Section 6 Hardware Interfacing Issues

Unit-16 Introduction, I/O Processing.
Unit-17 Bus Interface, I/O versus Memory Bus.
Unit-18 Data Transfer Techniques , Mode of Transfer , Software Routines.
Unit-19 Direct Memory Access (DMA), Input-output Processor (IOP), CPU-IOP Communication, Channel.

Reference Books:
1. Computer organization and architecture by William Stallings
2. Essentials of Computer Organization and Architecture, Second Edition by Linda Null and Julia Lobur

Semester III

MCA31 Data Communications

Section 1 Basic Concepts

Unit-1 Introduction, Data Communication Concepts.
Unit-2 Data Communication Systems, Networks Network Models.
Unit-3 Protocols and Standards, Introduction- Open Systems Interconnection (OSI) Reference Model.
Unit-4 Layers in OSI Model, TCP/IP Reference Model.

Section 2 Physical Layer and Media Data and Signals

Unit-5 Introduction, Analog and Digital Signals.
Unit-6 Periodic Analog Signal, Digital Signal, Transmission Impairments.
Unit-7 Date Rate Limits, Performance.
Unit-8 Physical Media: Transmission Media, Introduction.
Unit-9 Transmission Concepts and Terms, Bounded Media, Unbounded Media.

Section 3 Analog Transmission

Unit-10 Introduction, Modem Modulation Techniques.
Unit-11 Telephone Modems, Modulation of Analog Signal.

Section 4 The Data Link Layer

Unit-12 Introduction, Data Link Layer Design Issues.
Unit-13 Error Detection and Correction, Types of Errors.
Unit-14 Elementary Data Link Protocols, Sliding Window Protocols.
Unit-15 Protocol Verification, Example Data Link Protocols.
Unit-16 Point-to-Point Protocol (PPP), Multiple Access Protocols.

Section 5 Local Area Networks
Unit-17 Introduction-Local Area Network (LAN),Baseband versus Broadband.
Unit-18 IEEE Standards for Local Area Networks, IEEE 802.3 Ethernet Technologies.
Unit-19 LAN Hardware, IEEE 802.4 Token Bus, IEEE 802.5 Token Ring, IEEE 802.6 Distributed Queue Dual Bus.

Unit-20 Connecting Lans And Backbone Networks, Switching In Networks, Internetworking and Routing.

Reference Books:

1. Data communications and networking by Behrouz A. Forouzan
2. Data and computer communications by William Stalling

MCA 32 Advanced Computer Graphics

Section 1 Computer Graphics
Unit-1 Introduction to computer graphics, Mathematical foundations.

Section 2 Transformations
Unit-2 2D translation, scaling, rotation, and shear.
Unit-3 Windowing transformations, Instance transformations.
Unit-4 Structured graphics, 3D, translation, scaling, rotation.

Section 3 Introduction To Multimedia
Unit-5 Introduction to Multimedia, Presentation Graphics, Desktop.
Unit-6 Publishing, Production Planning and Design, User Interface Design.

Section 4 Hypermedia
Unit-7 Hypermedia Authoring Concepts,Multimedia Sound.
Unit-8 File Compression, JPEG, MPEG.

Section 5 Web-Based Multimedia
Unit-9 Digital Video, Designing Web-based Multimedia, Multimedia Distribution.

Reference Books:

1. Advanced Computer Graphics: Proceedings of Computer Graphics by Tosiyasu L. Kunii
2. Advanced Computer Graphics. Economics, techniques and applications by Robert Douglas

MCA 33 Advanced Operating System

Section 1 User Level Specification Of Os.
Unit-1 User Level Specification of OS, Fundamental Concepts of multi programmed OS.
Unit-2 Basic Concepts and Techniques for Implementation of Multi programmed OS.
Unit-3 Processes and the Kernel, Micro kernel, Architecture of OS.

Section 2 Processor
Unit-4 Multiprocessor, Multimedia, and Real-Time OS.
Unit-5 POSIX Standards, Management and Control of Processes.

Section 3 Basic Concept Of Threads
Unit-5 Types of Threads, Models of Thread Implementations.
Unit-6 Traditional and Real-Time Signals. Clocks.
Unit-7 Timers and Callouts, Thread Scheduling for Unix.

Section 4	Windows, And Real-Time Os
Unit-8	Real-Time Scheduling. Inter process / Inter, thread Synchronization and Communication.
Unit-9	Mutual Exclusion/Critical Section Problem, Semaphores, Monitors, Mailbox Deadlocks.
Unit-10	Concepts and Implementation of Virtual Memory(32-bit and 64-bit), Physical Memory Management.
Section 5	File System
Unit-11	File Organization, File System Interface and Virtual File Systems.
Unit-12	Implementation of File Systems. I/O Software: Interrupt Service Routines and Device Drivers.
Unit-13	Protection and Security. Case Study of Unix, Windows, and Real-Time OS.

Reference Books:

1. Advanced Concepts In Operating Systems by Mukesh Singhal and Niranjan Shivaratri
2. Operating Systems: Advanced Concepts by Mamoru Maekawa

MCA 34 Unix and Shell Programming

Section 1	Introduction To Unix
Unit-1	Architecture of Unix, Features of Unix.
Unit-2	Unix Commands – PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip.Unix Utilities.
Unit-3	Introduction to unix file system, vi editor, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, unlink, du, df, mount.
Unit-4	umount, find, unmask, ulimit, ps, w, finger, arp, ftp, telnet, rlogin.Text processing utilities and backup utilities.
Unit-5	detailed commands to be covered are tail, head , sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, cpio.
Section 2	Introduction To Shells
Unit-6	Unix Session, Standard Streams.
Unit-7	Redirection, Pipes, Tee Command, Command Execution, Command-Line Editing, Quotes.
Unit-8	Command Substitution, Job Control, Aliases, Variables.
Unit-9	Predefined Variables, Options, Shell/Environment Customization.
Section 3	Filters
Unit-10	Filters and Pipes, Concatenating files.
Unit-11	Display Beginning and End of files, Cut and Paste, Sorting.
Unit-12	Translating Characters, Files with Duplicate Lines.
Unit-13	Count characters, Words or Lines, Comparing Files.
Section 4	Awk
Unit-14	Execution, Fields and Records, Scripts.
Unit-15	Operations, Patterns, Actions.
Unit-16	Associative Arrays, String Functions, String Functions.
Unit-17	Mathematical Functions, User – Defined Functions, Using System commands in awk.
Unit-18	Applications, awk and grep, sed and awk.

Section 5 Interactive C Shell And C Shell Programming
Unit-19 C shell features, Two Special Files.
Unit-20 Variables, Output, Input, Exit Status of a Command, eval Command.
Unit-21 Environmental Variables, On-Off Variables, Startup and Shutdown Scripts.
Unit-22 Command History, Command Execution Scripts, Basic Script concepts, Expressions.
Unit-23 Decisions: Making Selections, Repetition.
Unit-24 Special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.

Reference Books:

1. UNIX and Shell Programming by Richard F. Gilberg and Behrouz A. Forouzan
2. Unix Shell Programming by Stephen G. Kochan and Patrick Wood

Semester IV

MCA 41 Advanced Software Engineering

Section 1 Software
Unit-1 Characteristics, Components Applications.
Unit-2 Software Process Models: Waterfall.
Unit-3 Spiral, Prototyping, Fourth Generation Techniques.
Unit-4 Concepts Of Project Management, Role Of Metrics And Measurement.

Section 2 S/W Project Planning
Unit-5 Objectives, Decomposition Techniques: S/W Sizing, Problem Based Estimation.
Unit-6 Process Based Estimation, Cost Estimation Models: COCOMO Model, The S/W Equation.

Section 3 System Analysis
Unit-7 Principles Of Structured Analysis, Requirement Analysis.
Unit-8 DFD, Entity Relationship Diagram, Data Dictionary.

Section 4 S/W Design
Unit-9 Objectives, Principles, Concepts.
Unit-10 Design Mythologies: Data Design, Architecture Design.
Unit-11 Procedural Design, Object – Oriented Concepts.

Section 5 Testing Fundamentals
Unit-12 Objectives, Principles, Testability.
Unit-13 Test Cases: White Box & black box Testing.
Unit-14 Testing Strategies: Verification & Validation.
Unit-15 Unit Test, Integration Testing, Validation Testing, System Testing.

Reference Books:

1. Advanced Software Engineering by Sergio F. Ochoa and Gruia-Catalin Roman
2. Advanced Software Testing by Rex Black

MCA 42 Analysis and Design of Algorithm

Section 1	System
Unit-1	Definition, Characteristics, elements and types of system.
Unit-2	System Development Life Cycle, Role of system analyst.
Unit-3	Initial investigation, Feasibility study-Technical.
Unit-4	Economic and behavioral feasibility, Cost and Benefit analysis.
Section 2	System Analysis
Unit-5	Problem Definition, Information requirements.
Unit-6	Information gathering tools, Tools of structured Analysis – Data Flow Diagrams.
Unit-7	Data Dictionary, Decision Tree, Decision tables and structured English.
Section 3	System Design
Unit-8	Structured Design, Input design, and Output design.
Unit-9	Form Design. File Organization: Sequential Indexed Sequential.
Unit-10	Chaining and Inverted list organization.
Section 4	System Testing
Unit-11	Test Plan AND test data.
Unit-12	Tpe s of system test.
Section 5	System Implementation
Unit-13	Implementation Plan, activity network for conversion.
Unit-14	Combating resistance to change.
Unit-15	Hardware/Software Selection: Procedure for selection, Major phases in selection, Make v/s buy decision, Criteria for software selection.

Reference Books:

1. Introduction to the Design and Analysis of Algorithms by Anany Levitin
2. Design and Analysis of Distributed Algorithms by Nicola Santoro

MCA 43 Advanced Java Programming

Section 1	Java Awt
Unit-1	Jva AWT package Containers (Component, Container, Panel, Window, Frame, Canvas).
Unit-2	Basic User Interface components (Labels, Buttons, Check Boxes, Radio Buttons, Choice, Text Fields, Text Areas, Scrollbars).
Unit-3	Layouts (Flow Layout, Grid Layout, Border Layout, Card Layout.
Section 2	Event Handling And Java I/O Handling
Unit-4	Event delegation Approach.
Unit-5	Action Listener, Adjustment Listener.
Unit-6	Mouse Listener and Mouse Motion Listener.
Unit-7	Window Listener, Key Listener I/O File Handling(Input Styream & Output Streams.
Unit-8	File Input Stream & File Output Stream, Data I/P and O/P Streams, Buffered I/P and O/P Streams, File Class, Reader and Writer Streams, Random Access File.

Section 3	Multithreading And Socket Programming
Unit-9	Overview of Multithreading, The Thread control methods.
Unit-10	Thread life cycle, Newly created threads.
Unit-11	Main thread, Creating a Thread (Implementing Runnable Interface.
Unit-12	Extending the Thread Class), Thread Synchronization.
Unit-13	Writing Applets with Threads, Introduction, TCP/IP Protocol, UDP Protocol, Ports, Using TCP/IP Sockets, Using UDP Sockets.
Section 4	Java Database Connectivity (JDBC)
Unit-14	JDBC/ODBC bridge, Driver Manager Class.
Unit-15	Java.SQL Package (Connection Interface.
Unit-16	Statement Interface, Prepared Statement Interface.
Unit-17	ResultSet Interface, ResultSetMetaData Interface), SQL Exception class.
Section 5	Remote Method Invocation
Unit-18	Tier Architecture, Distributed object technologies.
Unit-19	Locating & loading Remote classes, Locating remote objects & providing references to them.
Unit-20	Enabling remote method class, RMI Architercture (Application Layer, Proxy Layer, Remote Reference Layer, Transport Layer).
Unit-21	Naming, Remote Interface, Unicast Remote Object, Socket Vs RMI programming.

Reference Books:

1. Core Java Advanced Features by Cay S. Horstmann and Gary Cornell
2. Advanced Java Programming with Data Structures by Robert Cook

MCA 44 System Programming

Section 1	Introduction To Software Processors
Unit-1	Elements of assembly language programming.
Unit-2	Assembly scheme; single pass and two pass assembler.
Unit-3	General design procedure of a two pass assembler.
Section 2	Macros And Microprocessor
Unit-4	Macro definition, macro expansion, Nested macro calls.
Unit-5	Features of macro facility, design of a macro preprocessor.
Section 3	Interpreters And Loaders
Unit-6	Use of interpreter, pure and impure interpreter.
Unit-7	Loaders: Compile and go loader, Absolute loader, Relocating loader, and direct linking loader.
Section 4	Compilers
Unit-8	Aspects of compilation, lexical analysis, syntax analysis, memory allocation.
Unit-9	compilation of expressions; intermediate code for expressions.
Unit-10	compilation of control structures, Code optimization – local and global optimization.
Unit-11	Linkers – translated linked and load time addresses, relocation and linking concepts.
Unit-12	Design of a linker, self relocating programs.

Section 5 Basic Concept So F An Operating System And Its Functions
Unit-13 Memory management: contiguous, non-contiguous memory allocation.
Unit-14 Paged allocation, Demand paged allocation, segmented paged allocation.
Unit-15 Processor management: Scheduler, traffic controller, race condition.

Reference Books:

1. System Programming with C and Unix by Adam Hoover
2. Windows System Programming by Johnson M. Hart

Semester V

MCA 51 Advanced Computer Network and Security

Section 1 Introduction
Unit-1 Overview of computer networks, seven-layer architecture.
Unit-2 TCP/IP suite of protocols, MAC protocols for high-speed LAN.
Unit-3 MAN, and wireless LANs, (For example, FDDI, DQDB, HIPPI, Gigabit, Ethernet, Wireless Ethernet, etc.

Section 2 Fast Access Technologies
Unit-4 Fast access technologies (For example, ADSL, Cable Modem).
Unit-5 IPv6:Why IPv6, basic protocol, extensions and options, support for QoS.

Section 3 Routing
Unit-6 Neighbor discovery, auto-configuration, routing.
Unit-7 Application Programming Interface for IPv6. 6bone.

Section 4 Mobility In Networks.
Unit-8 Mobile IP. Security related issues.
Unit-9 IP Multicasting. Multicast routing protocols, adderss assignments, session discovery, etc.
Unit-10 TCP extensions for high-speed networks, transaction-oriented, applications.

Section 5 Network Security
Unit 11 Network security at various layers.
Unit 12 Authentication header, Key distribution protocols.
Unit 13 Digital signatures, digital certificates. distributed system taxonomy.
Unit 14 Service models, naming and binding remote, procedure calls (RPC).
Unit 15 object brokers, distributed file system design distributed file system case studies.
Unit 16 NFS, AFS, clock synchronization, distributed transactions, mutual exclusion, election algorithms.
Unit 17 Distributed shared memory and memory consistency models, distributed deadlocks.

Reference Books:

1. Advanced Security Technologies in Networking by Borka Jerman-Blazic, Wolfgang
2. Security And Privacy In Advanced Networking Technologies by Borka Jerman-Blazic

MCA 52 Internet Programming and Web Designing
Section -1 Getting Started With Active Server Pages
Unit 1 What are Active Server Pages ? (Understanding the Client Server Model.

Unit 2	How ASP differs from Client-Side Scripting Technologies).
Unit 3	Running ASP Pages (Setting Up Personal Web Server, Setting Up Internet.
Unit 5	Information Server, Using ASP without IIS or PWS).
Unit 6	Creating You First ASP Pages. Understanding ASP Scripts (What Does Response.Write Do ?.
Unit 7	The <%=Shortcut, What's with the <%@ LANGUAGE=VBSCRIPT%>?, Writing ASP Code Without Using <%...%>, Comments, Line Continuation Character); What You ASP Script Returned to the Browser; The ASP Process.
Section -2	Vbscript Control Structures
Unit 8	What Is a Control Structures.
Unit 9	Types of Controls (Conditional Logic, Looping Logic, Branching Logic).
Unit 10	Control Structure Typecasting Variables (What is Typecasting and Why Should I Typecast?.
Unit 11	How to Typecast Your Variables); Formatting Functions.
Unit 12	Math Functions; Date Functions (Working with Date Values, Breaking Down Date Values).
Unit 13	String Functions; Other Functions.
Section -3	Working With Objects Using The Response Object
Unit 14	What is the Response Object.
Unit 15	Dissecting the Response Object (Sending HTML to the Browser, Buffering ASP Pages, Sending the User to Another Page, Cookies, Caching Your ASP Pages).
Unit 16	Communicating with the User :- Receiving Information from the User (What are Forms?, Creating Forms, Designing Forms, Submitting Forms, Reading Form Values from an ASP Page).
Unit 17	Using Advanced Form Techniques (Revisiting the ACTION Property, Client-Side Form Validation); Using the Different Form Fields (Text Boxes, List Boxes, Check Boxes, Radio Buttons, Choosing your Checkboxes and Radio Buttons).
Unit 18	Collecting the Form Information :- Retrieving the Results of a Form (Using the Request Object); Using the Querystring to Send Information.
Unit 19	Working with the Request Object :- Accessing the HTTP Headers (Useful HTTP Headers, Reading the HTTP Headers with Request.
Unit 20	ServerVariables); Accessing the Environment Variables (Useful Environment Variables, Reading the Environment Variables Using Request. ServerVariables); Using Cookies (What are Cookies?, How to Read Cookies Using the Request Object, How to Write Cookies Using the Response Object, Advantages and Disadvantages of Using Cookies.
Unit 21	Maintaining Persistent Information on the Web :- It's a Fact: The Web Is Stateless (Ways to Maintain State).
Unit 22	The Session Object (Using Session Variables, Pitfalls of Session Variables, Session Variables Without Cookies).
Unit 23	The Application Object (Using Application Variables, Pitfalls of Application Variables); Initializing Application and Session Variables (Creating a Global. asa File).
Unit 24	Debugging You ASP scripts and Handling Errors :- Debugging Your ASP Scripts (Debugging Fatal Bugs, Debugging Nonfatal Bugs).
Unit 25	Handling ASP Errors Gracefully (Using the Err Object, Using the ASPError Object); Handling Non-ASP Errors Gracefully.
Section -4	Using Databases
Unit 26	What Are Relational Databases ?(Common Relational Databases).
Unit 27	Why Use Databases ?; Working with Databases Using ASP,Reading from a Database Using ASP :- Databases and ASP (Communicating with a Database Using ActiveX Data Objects (ADO)); Connecting to a Database (The Connection Object, Using a System DSN, Using a

DSN-less Connection, Opening the Connection, Closing the Connection, Properties of the Connection); Reading Data from a Database (The Recordset Object, Using adovbs.inc, Reading and Displaying the Contents of a Database Table).

Unit 28 Inserting, Updating, and Deleting Database Records :- Inserting Records (Lock Types, Add New and Update); Updating Records; Deleting Records.

Unit 29 Examining the Record set Object :- Enhancing Information Retrieval (Using the Fields Collection); Understanding the Cursor Type and Cursor Location Properties; Sorting Record sets; Filtering Record sets (Filtering Record sets Bases on User Input).

Unit 30 Using SQL Statements to Query Data :- What is SQL ? (Executing SQL Statements Using ASP and ADO); The SELECT SQL Statement (Using the WHERE Clause, Iterating Through Record sets Generated by SQL Statements); Allowing Users to Query Data.

Section -5 Xml

Unit 31 The History Of XML;The Origins Of XML; Comparison Of XML And Html

Unit 32 Components Of XML; Anatomy Of An XML Document : A Sample XML Document,; XML Declaration; The Root Element ; An Empty Element; Attributes, Markup Delimiters; Element Mark Up; Attribute Mark Up; Naming Rules; Character References; Predefined Entities; Entity References; Cdata Sections; Processing Instructions.

Unit 33 Creating Welformed And Valid Documents : XML And Structured Information ; Document Type Declaration ; Welformed And Valid Document; DTD And Validation ;Internal DTD Subset ;External DTD; Developing The DTD ; Elements And Attributes Of DTDs; More About Elements ; Empty Element ; Element-Only Element; Mixed Elements; Any Element. ;More About Attributes; String Attributes; Enumerated Attributes; Tokenised.

Reference Books:

1. Designing for the Social Web by Joshua Porter
2. Designing Web Interfaces by Bill Scott and Theresa Neil

MCA 53 Data Warehousing and Data Mining

Section -1 Introduction

Unit 1 Data warehousing and OLAP.

Unit 2 Overview of mining operations

Section -2 Classifiers

Unit 3 Decision tree classifiers, I.nstance-based learners, Bayesian classifiers, Learning hyper planes, Meta learning, Classifier evaluation.

Section -3 Case Study

Unit 4 KDD Cup Case study, Clustering, Active learning, Duplicate elimination, Similarity functions, Min hash, Set joins, Sequence mining

Section -4 Mining

Unit 5 Hidden Markov Models, Collaborative Filtering, Association rule mining, Surprising item set mining, Temporal item set mining.

Section -5 Selection Methods

Unit 6 Feature selection methods, Intrusion detection, Forecasting.

Reference Books:

1. Data Warehousing and Data Mining for Telecommunications by Rob Mattison
2. Date Warehousing and data mining by Oboulo

MCA 54 Compiler Design

Section -1 The Structure Of A Compiler

Unit 1 Phase of A Compiler, Compiler Tools, Finite Automata, Regular Expressions. Conversion From Regular Expression To Finite Automata.

Section -2 Syntax Analysis

Unit 2 Context Free Grammars, Top Down & Bottom Up Parsing Techniques.

Section -3 Construction

Unit 3 Construction of LR, SLR&LALR Parsers.

Unit 4 Syntax Directed Translation & Their Implementation. Intermediate Code, Postfix Translation, Phase Trees, Syntax Trees.

Section -4 Run Time Environment

Unit 5 Storage Organization Allocation Strategies, Parameter Passing, Symbol Tables, Code Generation, Problem In Code Generation.

Section -5 Code Generation & Code Optimization

Unit 6 Principle Sources, Loop Optimization, DAG Representation.

Reference Books:

1. Compilers: Principles, Techniques, and Tools by Alfred V. Aho,
2. Engineering a Compiler by Keith Cooper and Linda Torczon

MCA 54-2 Mobile Computing and Communication

Section -1 Cellular Networks

Unit 1 Channel allocation, multiple access, Location management, Handoffs.

Section -2 Wireless

Unit 2 Networking Wireless Transmission Basics, MAC protocols, Routing, Transport.

Section -3 Ad-Hoc Networking.

Unit 3 Applications Mobility adaptations, disconnected operations, Data broadcasting, Mobile agents.

Section -4 Security

Unit 4 Security issues.

Section -5 Efficient Computing

Unit 5 Energy efficient computing, Impact of mobility on algorithms.

Reference Books:

1. Mobile Computing by Shambhu Upadhyaya
2. Charging for Mobile All-IP Telecommunications by Dr. Yi-Bing Lin

MCA 54-3 Simulation and Modelling

Section -1	System Models Concept
Unit 1	Environment, Continues and discrete systems,; Subsystems,
Section -2	Types Of models
Unit 2	System Analysis, System design; System simulation: Technique, method types.
Section -3	Probability Concepts In Simulation
Unit 3	Stochastic variables and probability functions; Discrete system simulation; fixed time step v/s event-to-event model, Generation of Random numbers, Monte Carlo Computation V/S Stochastic simulation.
Section -4	Case Study
Unit 4	Simulation of Queuing system, Simulation of single and two server queue, Network Model of a project. Case study: Simulation of an autopilot.
Section -5	Inventory System
Unit 5	Telephone system & Inventory system. ,Introduction to GPSS.

Reference Books:

1. Simulation Modeling and Analysis with Expertfit Software by Averill Law

Semester VI

MCA 61 Advanced MIS and E-Commerce

Section -1	Introduction
Unit 1	Introduction to Systems and Basic Systems Concepts, Types of Systems.
Unit 2	The Systems Approach, Information Systems: Definition & Characteristics, Types of Information.
Unit 3	Role of Information in Decision - Making, Sub - Systems of an Information system: EDP and MIS, management levels, EDP/MIS/DSS.
Section -2	An Overview Of Management Information System
Unit 4	Definition & Characteristics, Components of MIS, Frame Work for Understanding MIS: Robert Anthony's Hierarchy of Management Activity, Information requirements & Levels of Management.
Unit 5	Simon's Model of decision- Making, Structured Vs Un-structured decisions, Formal Vs. Informal systems.
Section -3	Developing Information Systems
Unit 6	Analysis & Design of Information Systems: Implementation & Evaluation, Pitfalls in MIS Development.
Unit 7	Functional MIS: A Study of Marketing, Personnel, Financial and Production MIS.
Section -4	E-Commerce
Unit 8	Introduction, Definition of E-Commerce, History of E-Commerce.

Unit 9 Conceptual & Architectural framework, Types of E-Commerce.
Unit 10 Consumer-to-Business e-commerce, Business-to-business e-commerce.

Section -5 Edi
Unit 11 Virtual Private networks, Extranets, Electronic Data Interchange (EDI).
Unit 12 Electronic Payment Systems, Security Issues.

Reference Books:
1. Electronic Commerce by Gary Schneider

MCA 62-1 Pattern Recognition

Section -1 Pattern Recognition
Unit 1 Statistical Pattern Recognition, Feature Selection, Syntactic Pattern Recognition, Segmentation Techniques.

Section -2 Analysis Scene
Unit2 Analysis, Analytical Description of Region Boundaries, Shape Description by Region Analysis.

Section -3 Approaches
Unit 3 Fuzzy Mathematical Approach to Pattern Recognition, Classificatory Analysis.

Section -4 Features
Unit 4 Preprocessing, Feature Selection and Primitive Extraction, Adaptive Classification, Fuzzy Grammar.

Section -5 Un-Supervised Learning And Clustering
Unit 5 Introduction, mixture densities and identifiability, maximum likelihood estimates, application to normal mixtures.
Unit 6 K-means clustering. Date description and clustering – similarity measures, criteria function for clustering.

Reference Books:
1. Pattern Recognition by William Gibson
2. Pattern Recognition, Fourth Edition by Sergios Theodoridis and Konstantinos Koutroumbas

MCA 62-2 Operations Research

Section -1 Linear Programming
Unit 1 Formulation of L.P. problems, Graphic Solution.
Unit 2 Simplex Methods & Duality, Emphasis will be on Formulation & interpretation.

Section -2 Elementary Transportation Problem
Unit 3 N.W. Corner rule, Vogels approximation method (VAM), Assignment problems.

Section -3 Decision Theory
Unit 4 Pay off table, opportunity loss table, decision trees for sequential decisions,

Section -4 Expected value of perfect information and sample information
Unit 5 Decision under certainty. Uncertainty and risk.

Section -5 Game Theory
Unit 6 Inventory Control-EOQ, EOQ with price breaks, ABC analysis.

Reference Books:-

1. Operations Research: Applications and Algorithms (with CD-ROM and InfoTrac®) by Wayne L. Winston (Hardcover - Jul 25, 2003)
2. Schaum's Outline of Operations Research by Richard Bronson and Govindasami Naadimuthu (Paperback - Jul 1, 1997)
3. Operations Research: An Introduction (8th Edition) by Hamdy A. Taha (Hardcover - Apr 4, 2006)

MCA 62-3 Advanced Computer Architecture

Section -1 Introduction to Digital Computer :
Unit 1 Introduction; Evolution of Computers (Abacus (5000 B.C.).
Unit 2 Pascal and Leibniz Calculators, Babbage Difference Engine, Difference/Analytical Engine, Herman Hollerith Punch Cards, Howard Aiken (1937):IBM Mk1, ENIAC (1946), UNIVAC-1(1951), Second Generation (1959-65), Third Generation (1965-70), Fourth Generation (since 1970), Fifth Generation (under development)).

Section -2 Basic Computer Design
Unit 3 Introduction; Computer Registers (General Purpose Registers, Accumulator.
Unit 4 Status Register, Program Counter, Stack Pointer (SP), Word Size and Register Size); Main Memory; Interfacing Various Registers (Data Movement among Registers, Selection Control Variables).
Unit 5 Computer Instructions (Direct Addressing Mode, Memory Reference Instructions, Register Reference Instructions, Input and Output Instructions); Timing Signals; Timing and Control (Sequence Counter, Control Logic Gates for Inputs/Outputs, Timings, How Fetch Cycle Works?, How Execution Cycle Works?, How an Instruction is Executed?).
Unit 6 Micro operations (Memory Reference Instructions, Register-Reference Instructions); Concept of Interrupt (Interrupt Cycle); Design of a Basic Computer and its Working (Control of Registers, Control of Memory, Control of Common Bus, Control of Flip-flops).

Section -3 Central Processing Unit (CPU) Organization
Unit 7 Introduction; Addressing Modes; Instruction Formats (Instruction Types).
Unit8 Stack Organized CPU (How POP and PUSH functions are performed in Stack?, Reverse Polish Notation or Postfix Notation, How to convert Infix Expression into Postfix Expression?).
Unit 9 What are the factors affecting instruction Length?; Program Control (External interrupts, Internal Interrupts, Software interrupts); General Register Organization; Arithmetic Logic Unit (Status Register, Design of Accumulator Logic Unit).

Section -4 Input-Output Organization
Unit 10 Introduction; Peripheral Devices (Input Devices, Output Devices); Synchronous and Asynchronous Communications.

Unit 11 I/O (Input/Output) Interface (Parallel and Serial Ports); Modes of Data Transfer (Programmed I/O, Interrupt-initiated, I/O, Polling, Direct Memory Access (DMA)); Interrupt (Software Interrupt, Hardware Interrupt).

Unit 12 Priority Interrupt (Vectored Interrupt, Non-vectored Interrupt, Priority Interrupt, Daisy Chain); I/O Processor; DMA (Data Transfer through DMA, DMA controller).

Section -5 Memory Organization

Unit 13 Introduction; Memory Hierarchy (Why Hierarchical memory system?).

Unit 14 Main Memory or Primary Memory (RAM, ROM, Memory Unit, Design of Main Memory); Auxiliary Memory (Magnetic Tape, Magnetic Disk).

Unit 15 Cache Memory (Locality of Reference, Hit Ratio, Mapping Process, How to Write Data into Cache Memory?); Virtual Memory (Paging, Page Replacement).

Unit 16 Memory Management Hardware (Segmentation, How Multiprogram Management is done?, Memory Protection); Associative Memory.

Reference Books:-

1. Advanced Computer Architecture: Parallelism, Scalability, Programmability by Kai Hwang (Hardcover - Dec 1, 1992)
2. Advanced Computer Architecture and Parallel Processing (Wiley Series on Parallel and Distributed Computing) (v. 2) by Hesham El-Rewini and Mostafa Abd-El-Barr (Hardcover - Jan 18, 2005)
3. Computer Architecture: A Quantitative Approach, 4th Edition by John L. Hennessy and David A. Patterson (Paperback - Sep 27, 2006)

MCA 63-1 Client Server Architecture

Section -1 Introduction

Unit 1 Network Architecture, Review of data communication, ISDN, Medium access sublayer, LAN.

Section -2 Data link layer

Unit 2 Data link layer, Elementary data link protocols, Finite State Machines and Petri Nets.

Section -3 Network layer

Unit 3 Network layer, Flooding, Congestion control algorithms, Internetworking, Example system.

Section -4 Transport layer

Unit 4 Transport layer, Flow control and buffering, Example system, Domain name system.

Unit 5 TCP connection establishment and termination, UDP.

Section -5 Session layer

Unit 6 Session layer, Presentation layer, Application layer, Case study.

Unit 7 File Transfer Protocol(FTP), World Wide Web(WWW).

Reference Books

1. Client/Server Architecture (J. Ranade Series on Computer Communications) by Alex Berson (Hardcover - Sep 1992)
2. Thin Clients: Web-Based Client/Server Architecture and Applications by Dawna Travis Dewire (Paperback - May 26, 1998)

3. The Guru's Guide to SQL Server Architecture and Internals by Ken Henderson (Paperback - Nov 1, 2003)

MCA 63-2 Artificial Intelligence

Section -1	Introduction to AI
Unit 1	Definitions, Basic Elements of AI, AI application Areas.
Unit 2	Introductory Concepts of AI - clausal form, Resolution, Unification, Inference Mechanisms.
Section -2	AI Language PROLOG
Unit 3	Operators, Data Structures, Input & Output.
Unit 4	Controlling Program Flow, Strings, and Recursion.
Section -3	Knowledge Based Systems
Unit 5	Knowledge representation, acquisition, organization & Manipulation.
Section -4	Basic Components & architecture of Expert systems
Unit 6	ES-Shells, Dealing with uncertainty.
Section -5	Natural language processing
Unit 7	Syntactic processing, semantic analysis, Morphological, discourse and pragmatic processing.

Reference Books:-

1. Artificial Intelligence: A Modern Approach (3rd Edition) by Stuart Russell and Peter Norvig (Hardcover - Dec 11, 2009)
2. Artificial Intelligence: A Systems Approach (Computer Science) by M. Tim Jones (Hardcover - Dec 26, 2008)
3. Artificial Intelligence: A Modern Approach (2nd Edition) by Stuart J. Russell and Peter Norvig (Hardcover - Dec 30, 2002)

MCA 63-3 Network Management

Section -1	Basic Concepts and OSI and TCP/IP Models
Unit 1	Components of Data Communication, Distributed processing.
Unit 2	Standards and Organisations, Line Configuration.
Unit 3	Topology and Types of Topology, Transmission Mode, Categories of Networks.
Unit 4	What is Protocol, OSI Model, Layers and their functions.
Unit 5	Transport Protocol: Introduction to TCP/IP, Internet Protocol. Protocols forming part of IP, Internet Upper-Layer Protocols: FTP, TELENT.
Unit 6	Comparison of different models (TCP/IP vs. OSI Model)
Section -2	Digital Transmission Interfaces and Modems
Unit 7	Types of Data: Digital Data, Analog Data., Data Transmission: Difference between digital data and analog data transmission, Digital to Analog conversion, Interfaces and Modems: DTC-DCE Interface.
Unit 8	Modem: Analog Modem, Digital Modem, Asynchronous Modems, Cable Modem.

Section -3	Transmission Media and Introduction to Signals
Unit 9	Noise absorption, Radiation, Attenuation, Bandwidth.
Unit 10	Guided and Unguided media.
Unit 11	Comparison of media, Analog and Digital Signals, Periodic and Aperiodic Signals, Time and Frequency domains. Composite signals.
Section -4	LANS and MANS
Unit 12	Local area network: Advantages, disadvantage, characteristics.
Unit 13	Metropolitan area network.
Unit 14	IEEE 802. Ethernet: Physical layer, Physical layer interface, Data link layer, system configurations, 10Base-5, 10Base-2, 10Base-T.
Unit 15	Physical network topology used for Ethernet.
Unit 16	Token passing Networks. Fiber distributed data interface for MANs. Switched multimegabit data services.
Section -5	Switching and Point to Point Protocols
Unit 17	What is switched network? Circuit Switching, Packet switching, Message switching, What is remote access?.
Unit 18	RAS, Transmission states, Point to Point layers, Link control protocol, Authentication, Network control protocol.

Reference Books:-

1. Network Management Fundamentals by Alexander Clemm (Paperback - Dec 1, 2006)
2. Network Management: Principles and Practice by Mani Subramanian (Paperback - Dec 12, 1999)
3. The Practice of System and Network Administration, Second Edition by Thomas A. Limoncelli, Christina J. Hogan, and Strata R. Chalup (Paperback - Jul 15, 2007)

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