Department of Computer Science & Application

Bilaspur University, Bilaspur (C. G.)

Five Years Integrated B.Sc./M.Sc.(Computer Science)

Scheme and Syllabus

SEMESTER: I

Course Code	Course Name	T	P /T	C	Sessional Marks	End Semester Marks	Total Marks
MCS 101	Communication Skill	4	1	5	25	75	100
MCS 102	Mathamtics-1	5	-	5	25	75	100
MCS 103	Digital logic and Switching Theory	3	2	5	25	75	100
MCS 104	Information Technology	5	-	5	25	75	100
MCS 105	Programming in C	3	2	5	25	75	100
MCS106	Programming in C Lab	-	3	3			50

MCS 101: COMMUNICATION SKILL

Unit-I Fundamental of Communication: Definition, Importance, Process, Form of Communication, Dimension of Communication, Channels of Communication, Barriers of Communication, Qualities of a good communicator.

Unit-II Verbal and Non-Verbal Communication: Audio/Visual Communication, Effective Speaking, Interpersonal Communication, Non-Verbal Communication: Kinesics, Proximics, Paralanguage, Activity: Short Classroom presentation.

Unit-III Listening Skill and Self Assessment: Definition and Importance, Intelligent Listening, Barriers of Listening and qualities of overcoming barriers, SWOT analysis.

Unit-IV Writing Skills: Use of Grammars, brief description & detailed Illustrations, Business correspondence, Presentations, Report Writing, Projects, notice and Circulars.

Unit-V Effective Use of Communication Skills(Practical Approach) Basics of Phonetics, Presentation Skill-Do's and Dont's, Extempore, Debate, Role Plays, Interview, Group Discussion.

MCS 102: MATHEMATICS-1

UNIT-I

Logic and Propositional Calculus: Introduction, Basic Logical Operations: Conjunction, Disjunction, Negation, Conditional and Bi-conditional statements, Tautology, Contradiction, Logical Equivalence, algebra of Propositions, Argument, Predicate, Quantifiers, Law of duality

UNIT-II

Set Theory: Introduction, Universal and Empty set, cardinality of set, Power set, Cartesian Product, Subset, Venn diagram, Set operation, Inclusion and exclusion principle

UNIT-III

Relation: Introduction, Properties of Binary Relation, Equivalence Relation, Relation Matrix, Relation Graph, Composition of Relation, Partition, Partial Order Relation, Hasse diagram

Function: Introduction, Onto function, Into function, One to One function, Bijective Function, Composition of Function, Inverse of Function

UNIT-IV

Graph- Definition, Finite and Infinite Graph, Incidence and Degree, Matrix Representation: Adjacency Matrix, incidence Matrix; Digraph. Isomorphic Graph, Homeomorphic Graph, Connected , Disconnected and strongly connected graph, Sub Graph, Walk, Path , Circuit, Complement of Graph, Regular Graph, Complete Graph, Weighted Graph, Bipartite Graph, Operations on Graph: Union, Intersection and Ring Sum; Application of Graph

UNIT-V

Cut set, cut Vertex, Eccentricity, Centre , Radius and diameter of a Graph, Depth First Search, Breadth First Search, Dijkstra's Algorithm

TEXT BOOK

1. "Discrete Mathematical structures with Applications to Computer Science", JP Trembly and R. Manohar, TMH International Edition (Latest Edition)
2. "Graph theory and its application to Engineering and Computer Science", Narsing Deo, PHI (Latest Edition)
3. "Advanced Discrete Mathematics" H.K. Pathak, J.P.Chauhan, Shiksha Sahitya Prakashan

REFERENCE BOOK

1. "Discrete Mathematics", Seymour Lipshutz & Marc Lipson, TMH
2. "Discrete Mathematics and Its Applications", Kenneth. H. Rosen, TMH
3. "Discrete Mathematics with Graph Theory" Goodaire and Parmenter, EEE.

MCS 103: DIGITAL LOGIC AND SWITCHING THEORY

UNIT-I:
Number Systems & Codes:Philosophy of number systems, Decimal, Binary, Octal, Hexadecimal, Gray code, Excess-3 code , BCD code. Conversion, number system arithmetic, complements (n-1's and n's), Signed and Unsigned numbers, representation of negative numbers.

UNIT-II:
Boolean Algebra, Fundamental postulates of Boolean algebra, Logic gates: OR, AND, NOT, XOR, Universal (NOR and NAND) Gates.

Minimization of Switching Functions: Standard representation of logic function (SOP and POS), Minimization technique- K Map method, Prime implicants, don't care combinations.

UNIT-III:
COMBINATIONAL LOGIC DESIGN: Design using conventional logic gates, Adder, Subtractor, Encoder, Decoder , Multiplexer (MUX), De-Multiplexer, MUX Realization of switching functions, Code-converters (BCD-EXCESS-3), Hazards and Hazard free realizations.

UNIT-IV:
SEQUENTIAL CIRCUITS: Definition, Basic flip-flops- SR, JK, T and D, Master Slave Flip Flop, race around condition, Steps in synchronous sequential circuit design: Register, modulo-N counter , Ring counter & Shift counters.

UNIT-V
Main memory, semiconductor memory, Flash memory, cache memory, magnetic memory: hard disk, floppy disk, optical memory.

TEXTBOOKS:

1. "Computer Fundamentals Architecture and Organization", B.Ram, New Age Techno Press.
2. "Digital Design", Morris Mano, PHI, 3rd Edition, 2006.

REFERENCE BOOKS:

1. An Engineering Approach To Digital Design – Fletcher, PHI.
2. Digital Logic – Application and Design – John M. Yarbrough, Thomson
3. Fundamentals of Logic Design – Charles H. Roth, Thomson Publications, 5th Edition, 2004.
4. Digital Logic Applications and Design – John M. Yarbrough, Thomson Publications, 2006.
5. Malvino A.P, Digital Principles and Applications, Tata McGraw Hill.
6. Computer Fundamentals: Architecture and Organization

MCS 104: INFORMATION TECHNOLOGY

UNIT-I

Introduction – Basic concept of IT, concept of data and information, History of computer, generation and classification of computer, organization of computers, Input and output devices, storage devices, data and file organization.

UNIT-II

Software and its need, types of software: system software, application software, utility software, firmare. Operating system :Types, job and objective. Language translator. Introduction and evolution of programming language , Types of programming language, Generation of programming languages, programming paradigms: procedural oriented and object oriented programming

UNIT-III:

Communication and network technology: Communication process, Communication and system elements, Analog and digital signal, mode of communication, communication media : wired and wirelesss; computer network: types. Criteria, advantages and disadvantages, Topology, OSI reference model and TCP/IP model

UNIT-IV

Internet: Technical foundation of internet , history of internet, Internet service provider(ISP), ARPANET, Services available on Internet, Internet application : Email, WWW, and file transfer , Internet addressing, Domain name system(DNS), Internet security- Firewall , Encryption.

UNIT-V

Application of IT and latest IT trends : IT in business, Industry, home, education, entertainment, science and engineering and medicine. Ecommerce , M-commerce

Latest IT trends : Artificial intelligence, Data mining, Overview of geographic information system(GIS) , Cloud computing, Big Data.

TEXTBOOKS:

1. "Fundamental of computer ", V. Rajaraman, PHI Publication
2. "Introduction to information technology", V. Rajaraman, PHI Publication
3. "Information Technology today" , S. jaiswal
4. "Fundamental of IT", Leon and Leon , Leon Tec world
5. "Introduction to Information Technology", Aksoy and Denardis, Cengage learning

MCS 105: PROGRAMMING IN C

UNIT-I

COMPUTER FUNDAMENTALS, INTRODUCTION TO C: The C character set, identifiers and keywords, data types, constants, variables and array declaration, expressions, statements, symbolic constants.

OPERATORS: Arithmetic, Relational, Logical, Conditional, Bitwise, COMMA operator etc., library functions, data input/output, preparing and running complete C program.

UNIT-II

CONTROL STATEMENTS: preliminaries, if-else, nested if- else, goto statements, switch, break, continue, while, do-while, for, nested loops.

ARRAYS: Definition, array declaration and assignments, processing an array, passing arrays to a function, multi dimensional arrays.

UNIT-III

FUNCTIONS:A brief overview, defining a function, accessing a function, passing arguments to a function, specifying arguments data types, function prototypes, recursion. Program structure, storage classes, automatic variables, external variables, static variables.

STRING: Introduction, Operation function: strlen(), strcmp(), stricmp(), strncmp(), strincmp(), strcpy(), strcat(), strrev() and their implementation.

UNIT-IV

POINTERS: Fundamental, pointer declarations, passing pointers to a function, operations on pointers, pointer to pointer, array of pointers, dynamic memory allocation, preprocessor, macro expansion:#define, macro v/s function, file inclusion:#include.

UNIT-V

STRUCTURES AND UNIONS: user define data types, defining a structure, accessing structure elements, structure pointer, passing structure to a function, self referential structure, union and enumeration.

TEXT/REFERENCES BOOKS:

1. "Programming with C", E. Balaguruswamy, TMH (Latest Edition)
2. "Exploring C", Yashavant P. Kanetkar, BPB, (Latest Edition)
3. "Understanding Pointers in C", Yashavant P. Kanetkar, BPB, (Latest Edition)
4. "Programming with C", Gottfried, Schaum's Outline Series (Latest Edition)
5. "Programming with C", Rajaraman R, PHI (Latest Edition)
6. "Programming with ANSI C", B.T. Holmes, BPB (Latest Edition)
7. "The C Programming Language", Kernighan & Ritchie, PHI (Latest Edition)

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Scheme and Syllabus

SEMESTER: II

Course Code	Course Name	T	P/T	C	Sessional Marks	End Semester Marks	Total Marks
MCS 201	Computer Organization & Architecture	4	1	5	25	75	100
MCS 202	Mathamatics-2	4	1	5	25	75	100
MCS 203	Microprocessor and Assembly Language Programming	4	1	5	25	75	100
MCS 204	Environment Study	4	1	5	25	75	100
MCS 205	Object Oriented Programming with C++	4	1	5	25	75	100
MCS 206	Programming in C++ Lab	-	3	3	-	-	50

MCS 201: COMUTER ORGANIZATION AND ARCHITECTURE

UNIT-I

Computer Organization: Introduction, Von Neumann Architecture, Harvard Architecture, Functional Units and Components in Computer Organization, Program Development Tools, Machine Language, Assembly Language, Instruction Codes, Computer Registers, Computer Instructions, Instruction cycle.

UNIT-II

Central Processing Unit: Stack organization, Instruction formats, Addressing modes, DATA Transfer and manipulation, Program control, Reduced Instruction Set Computer (RISC), Complex Instruction Set Computer (CISC).

UNIT-III

Pipeline & Vector Processing: Basic Concepts in Pipelining, speed-up, throughput, efficiency, instruction pipeline, Instruction Pre-fetch and Branch Handling , Data Buffering, Internal Forwarding, Data Dependant Hazards.

UNIT-IV

The Memory System: Memory Hierarchy, Main memory, Auxiliary memory, Associative memory, Cache memory, Virtual memory, Memory management hardware.

UNIT-V

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer Modes of Transfer, Priority Interrupt, Direct memory Access, Memory mapped I/O, Input –Output Processor (IOP).

TEXT BOOKS:

1. "Computer System Architecture", M.Moris Mano, 3rd Edition, PHI / Pearson, 2006.
2. "Computer Organization and Architecture", William Stallings 7th Edition, PHI/Pearson, 2006.

REFERENCE BOOKS:

1. "Computer Organization", Car Hamacher, Zvonks Vranesic & Safwat Zaky, 5th Edition, TMH, 2002.
2. "Computer Architecture and Organization", John P. Hayes, TMH International Editions, 1998.
3. "Computer Architecture and Organization", Raj Kamal, Nicholas Carter, 2nd Edition, TMH Education, 2009
4. "Introduction to computer architecture", Stones S. Galgotia Publication
5. "Computer Organization and Architecture design for Performance", 4th edition - W. Stallings, PHI
6. "Computer Engineering - Hardware Design", M. Morris Mano, PHI
7. "Computer Architecture and parallel processing", Kai Hwang & Faye Briggs, McGraw hill, 1985

MCS 202: MATHEMATICS-2

UNIT–I

Errors and precision, errors due to round off, Solution of Algebraic and Transcendental Equations, Bisection Method, Method of False Position, Newton-Raphson Method.

UNIT-II

Interpolation: Introduction, Newton's Backward Interpolation formula, Newton's Forward Interpolation formula, Gausses forward Interpolation Formula, Gausses Backward Interpolation formula, Lagrange's Interpolation formula, Newton divided difference formula.

UNIT–III

Curve Fitting: Graphical method, Laws reducible to the linear laws, Principal of least square, Method of least squares, fitting a curve of type $y= a+bx^2$, $y= ax+bx^2$, $y=ax+b/x$, $y= ax^2+bx$, $y=ax^b$, $y=ae^{bx}$, $xy^a=b$, Method of group averages

UNIT-IV

Numerical Differentiation- Forward Difference formula, Backward Difference formula, Numerical Integration : Quadrature formulae , Errors in Quadrature formulae, Rombergs Method, Euler –Maclaurin formula.

UNIT–V

Numerical solution of Ordinary Differential equations: Picards method, Taylors series method, Eulers method, Modified Eulers method, Runges method, Runge-kutta method

TEXT /REFERENCE BOOKS:

1. "Numerical Analysis", S.S. Sastry, PHI
2. "Numerical Method in Engineering and Science", Dr. B.S. Grewal, Khanna Publishers,2010
3. "Computer Oriented Numerical Methods", Rajaraman, PHI
4. "Numerical Computations", Venkataraman
5. "Computer Oriented Numerical Methods", Stoer, Bullrich, Springer Verlag, 1980

MCS-203 MICROPROCESSOR AND ASSEMBLY LANGUAGE PROGRAMMING

UNIT-1

Fundamental definition of Microprocessor, evolution of Microprocessor, Microprocessor Instruction set and Computer Languages, From large scale to single chip microcontrollers, Von Neumann and Harvard architecture, RISC vs. CISC, Application: Microprocessor Controlled Temperature System.

UNIT-2

Register organization of 8086, Architecture, signal description of 8086, Physical memory organization , General Bus operation, I/O addressing capability, Special processor activities, Minimum mode 8086 system and timings, Maximum Mode 8086 system and timings, The processor 8088.

UNIT-3

8086/8088 instruction set and assembler directives: Machine language instruction format, Addressing mode of 8086, Instruction set of 8086/8088, Assembler directives and operators.

UNIT-4

Assembly language programming Examples, Machine coding programs

Special architectural features: stack structure of 8086/8088, interrupt and interrupt services routine , interrupt cycle of 8086/8088, Non maskable interrupt, Maskable interrupt.

UNIT-5

Case study of Intel i series of processors.

TEXT BOOKS:

1. "Advanced microprocessor and Peripherals", A .K. Ray and K.M.Bhurchandi, TMH, 2000.
2. "Micro Controllers", Deshmukh, TMH.
3. "Microprocessors Architecture, Programming and Applications", Ramesh S. Goanker, Wiley Eastern, 1994 or (Latest Edition)

REFERENCE BOOKS:

1. "Micro Processors & Interfacing", Douglas U. Hall, 2007."The 8088 and 8086 Micro Processors", 4th Edition, PHI, 2003.
2. "Micro Computer System 8086/8088 Family Architecture, Programming and Design", Liu and GA Gibson, 2nd Edition, PHI
3. "Introduction to Microprocessors", Aditya P. Mathur, TMH, 1995

MCS 205: OBJECT ORIENTED PROGRAMMING WITH C++

UNIT-I

Introduction, Procedure-Oriented Programming paradigm, Object-Oriented Programming paradigm, Procedure oriented Vs Object oriented, basic characteristics of OOP's: object, class, encapsulation, inheritance, reusability, polymorphism and overloading, static and dynamic binding, message passing, benefits of OOP's and application of OOP's.

UNIT-II

C++ Basics: Overview, Environment Setup, Basic Syntax, Comments, Basic Data types, Tokens, identifiers, Keywords, Constants/Literals, Variables, Variable Scope, Modifier Types, Storage Classes, Operator, array, pointer and reference variable, I/O statements, namespace, typecasting, control statements: if statement, if- else statement, nested if-else statement, ladder if-else, switch statement, for loop statement, while loop statement, do-while loop statement.

UNIT-III

Objects and classes : Basics of object and class and abstract class in C++, private and public members, static data and function members, function prototype, inline functions, function overloading, friend functions, default arguments, constructors and their types, destructors, friend class, dynamic allocation operator new and delete.

UNIT-IV

Inheritance: Concept of Inheritance, types of inheritance: single, multiple, multilevel, hierarchical, hybrid, protected members, overriding, virtual base class, resolving ambiguity.

Polymorphism: Pointers in C++, Pointes to objects, this pointer, virtual class, virtual and pure virtual functions.

UNIT-V

I/O Files and Streams: Concept of streams, cin and cout objects, C++ stream classes, Unformatted and formatted I/O, File stream, C++ File stream classes, File management functions(read(), write(), put(), get(),tellg() tellp(), seekg() seekp()).

TEXT/REFERENCE BOOKS:

1. "Object-Oriented Programming with C++", E. Balaguruswamy, TMH
2. "C++ The Complete Reference", Herbert Shildt, Osborne,TMH, latest
3. "Object-oriented programming with C++", Robert Lafore, Macmillan computer
4. "Tech yourself C++", Herbert Schildt, Osborne, TMH
5. "C & C++ Complete reference", Herbert Shieldt, Osborne, TMH
6. "Object-Oriented programming in C++", Nabajyoti Barkakati, PHI
7. "C++ Primer Plus", Stephen Prata, Galgotia Publications, 1996
8. "Object-Oriented analysis and Design with applications", Grady Booch

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Scheme and Syllabus

2014-15

SEMESTER: III

Course Code	Course Name	T	P /T	C	Sessional Marks	End Semester Marks	Total Marks
MCS 301	Data structure using c and C++	3	2	5	25	75	100
MCS 302	Mathamtics-3	5	-	5	25	75	100
MCS 303	Operating System	3	2	5	25	75	100
MCS 304	Data Communication and networking	4	1	5	25	75	100
MCS 305	Data Structure& Operating System Lab	-	5	5	25	75	100

MCS 301: DATA STRUCTURE USING C AND C++

UNIT 1

Introduction of Data structure, Data types: primitive, non-primitive data types, ADT, Linear and non linear data structure.

List Structures: Arrays: One dimensional, Multidimensional arrays, allocation methods, address calculations, sparse arrays. Linked List: Singly and Doubly Linear link lists, singly and doubly circular linked list: Definitions, operations (INSERT, DELETE, TRAVERSE) on these list. (Insertion operation includes – insertion before a given element, insertion after a given element, insertion at given position, insertion in sorted linked list)

UNIT 2

STACKS: Stack: Definition, Operations PUSH, POP, TRAVERSE, implementations using array and linked list, Applications of stack: Infix, Prefix, Postfix representation and conversion using stack, Postfix expression evaluation using stack.

QUEUES: Introduction, and Types of Queues: Priority Queue, Circular queue, Double Ended Queue, operations (INSERT, DELETE, TRAVERSE), implementation using array and linked list and applications

UNIT 3

Definition of trees and their types, Binary trees, Properties of Binary trees and Implementation operation (Insertion, deletion, searching and traversal algorithm: preorder, post order, in-order traversal), Binary Search Trees, Implementations, Threaded trees, AVL Trees, Balanced multi way search trees: 2-3 tree, Red Black tree, B tree, B+ tree, their applications

UNIT 4

SORTING: Types of sorting, Sequential Sort, Insertion Sort, Bubble Sort, Quick Sort, Merge Sort, Heap Sort, Radix sort.

SEARCHING: Linear search, Binary search, Hashing, collision resolution methods.

UNIT 5:

Definition of Graph and their types, adjacency and incident (matrix & linked list) representation of graphs, Graph Traversal – Breadth first Traversal, Depth first Traversal, Connectivity of graphs; Connected components of graphs, Weighted Graphs, Shortest path Algorithm, spanning tree, Minimum Spanning tree, Krushkal and prims algorithms.

TEXT/REFERENCE BOOKS:

1. "Data structures using C", Tenenbum, PHI, 1996
2. "Fundamentals of Data Structures", Horowitz and Sahani, Computer Science Press, 1978
3. "Data structures and Algorithms", Aefred V. Aho, Jhon E. Joperoft and J.E. Ullman.
4. "An Introduction to Data Structures with Applications", Jean Paul Trembley and Paul Sorenson, TMH, International Student Edition, 1985
5. "Data Structures and Program Design in C", R. Kurse, Leung & Tondo, 2nd Edition, PHI publication

MCS 302: MATHEMATICS

UNIT-1

Matrix Theory: Definition, Type of Matrix, Elementary row and column operations on a matrix, Rank of matrix – Normal form – Inverse of a matrix using elementary operations , Eigen Value and Eigen Vector, - Characteristic roots and vectors of a matrix - Caley-Hamillton theorem and its applications.

UNIT-2

Successive differentiation, Leibnitz Theorem and applications, Taylor's and Maclaurin's series, curvature, asymptotes, curve tracing.

UNIT-3

Functions of two or more variables, partial derivatives, total differential and differentiability, derivatives of composite and implicit functions, Jacobians, higher order partial derivatives, homogeneous functions, Euler's Theorem and applications.

UNIT-4

Probability and Distribution – Definition, set notation of probability, Addition & Multiplication law of probability, Bayes theorem, Discrete & continuous probability distribution, Binomial distribution, Poisson Distribution and Normal Distribution.

UNIT-5

Sampling and Inference- Sampling Distribution, Testing of Hypothesis, Students t distribution, Chi-square Test, F Distribution, Fishers z Distribution.

TEXT/REFERENCE BOOKS:

1. Higher engineering Mathematics, B.S. Garewal, Khanna Publishers

MCS 303: OPERATING SYSTEM

UNIT-I: INTRODUCTION
Introduction: Definition, Computer-System Architecture, Types of Operating System, Micro Kernel and Monolithic Operating System, Special-Purpose Systems, Operating-System Operations, Computing Environments, operating system services, User Operating System Interface, System Calls and their types.

UNIT-II: PROCESS MANAGEMENT
CPU Scheduling: concepts, scheduling criteria, scheduling algorithms.

Inter-process communication, Mutual exclusion problem and critical section. Process synchronization, Classical IPC problems: Producer Consumer problem, Dinning Philosophers problem, semaphores.

Deadlock: Necessary Conditions, deadlock handling methods: Deadlock Prevention, Deadlock detection and recovery, Deadlock avoidance, Bankers Algorithm.

UNIT-III: MEMORY
Memory Management: Background, Swapping, Contiguous Memory allocation, Paging, Segmentation.

Virtual Memory Background, Demand Paging, Page Replacement, Thrashing.

UNIT-IV: FILE MANAGEMENT
File System Implementation, File Concept, Access Methods, Directory Structure, File Sharing, Protection. File System Structure, File System Implementation, Directory Implementation, Allocation Methods, Free-space Management, Recovery.

UNIT-V: I/O MANAGEMENT
I/O Hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O to Hardware Operations, Disk Structure, Disk Scheduling, Disk Management.

TEXT/REFERENCE BOOKS:

1. "An Introduction to Operating Systems", H. M. Dietal, Addition Wesley
2. "Modern Operating Systems", Andrew S Tanenbaum.
3. "Operating System Concepts", 2nd Edition - Peterson & Silberschatz, Addison Wesely
4. "Operating Systems", Mardrick and Donovan, Mcgraw Hill
5. "Principles of Operating Systems", Ullman, Galgotia Publications.
6. "Operating System Concepts", Galvino & Silberschatz, Addison Wesely,(Latest Edition)

MCS- 304 COMPUTER NETWORKS

UNIT-I OVERVIEW OF DATA COMMUNICATION AND NETWORKING:

DATA COMMUNICATIONS: components, data representation, direction of data flow (simplex, half duplex, full duplex); Networks: distributed processing, network criteria, physical structure (type of connection, topology), categories of network (LAN, MAN, WAN),

INTERNET: brief history, internet today; Protocols and standards; Reference models: OSI reference model, TCP/IP reference model, their comparative study.

UNIT-II PHYSICAL LEVEL:

ANALOG & DIGITAL TRANSMISSION: transmission Impairments, Data Rates Limits, Digital to Digital Conversion, Line coding Scheme,

ANALOG TO DIGITAL CONVERSION: PCM, PAM, Delta Modulation, Transmission Modes, Parallel, Serials Asynchronous and Synchronous Communication

DIGITAL TO ANALOG CONVERSION: ASK, FSK, PSK, QPSK Constellation Diagram, QAM

ANALOG TO ANALOG CONVERSION: AM, FM, PM, Bandwidth Utilization, Multiplexing: FDM, WDM and TDM

Switching

TRANSMISSION MEDIA: Guided Media: Twisted Pair, Coaxial and Fiber Optic, Unguided Media: Wireless, Radio Waves, Microwaves and Infrared

UNIT-III DATA LINK LAYER:

FLOW CONTROL: Protocols: Stop & wait ARQ, Go-Back- N ARQ, Selective repeat ARQ, HDLC;

MEDIUM ACCESS SUB LAYER: Point to point protocol, LCP, NCP, FDDI, token bus, token ring; Reservation, polling, concentration;

MULTIPLE ACCESS PROTOCOLS: Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, FDMA, TDMA, CDMA; Traditional Ethernet, fast Ethernet.

UNIT-IV NETWORK LAYER:

INTERNETWORKING & DEVICES: Repeaters, Hubs, Bridges, Switches, Router, Gateway;

ADDRESSING: Internet address, classful address, subnetting, classless address

ROUTING: techniques, static vs. dynamic routing, and routing table for classful address

ROUTING ALGORITHMS: shortest path algorithm, flooding, distance vector routing, link state routing

PROTOCOLS: ARP, RARP, IP, ICMP, IPV6; Unicast and multicast routing protocols.

UNIT-V TRANSPORT LAYER AND APPLICATION LAYER:

PROCESS TO PROCESS DELIVERY: UDP; TCP; Congestion control algorithm: Leaky bucket algorithm, Token bucket algorithm, choke packets; Quality of service: techniques to improve Qos DNS; SMTP, SNMP, FTP, HTTP, Firewalls.

MODERN TOPICS: Wireless LAN: IEEE 802.11; Introduction to blue-tooth, VLAN's, Cellular telephony & Satellite network.

TEXT BOOKS:

1. "Data Communications and Networking", B. A. Forouzan, TMH, (Latest Edition)
2. "Computer Networks", A. S. Tanenbaum, 4th Edition, Pearson Education/PHI
3. "Data and Computer Communications", W. Stallings, 5th Edition, PHI/ Pearson Education

REFERENCE BOOKS:

1. "Computer Networking -A top down approach featuring the internet", Kurose and Rose, Pearson Education
2. "Communication Networks", Walrand, TMH (Latest Edition)
3. "Internetworking with TCP/IP, vol. 1, 2, 3", Daglous E. Comer, 4th Edition Pearson Education/PHI

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Scheme and Syllabus

SEMESTER: IV

Course Code	Course Name	L	P/T	C	Sessional Marks	End Semester Marks	Total Marks
MCS 401	Introduction to Java	4	1	5	25	75	100
MCS 402	Operations Research	4	1	5	25	75	100
MCS 403	System Analysis and Design	4	1	5	25	75	100
MCS 404	Database Management System	4	1	5	25	75	100
MCS 405	Java and DBMS Lab	-	5	5	25	75	100

MCS-401 INTRODUCTION TO JAVA

UNIT-1

Overview of JAVA : The genesis of java, An overview of java, Java virtual machine (JVM) ,Java development kit (JDK) ,Java Vs C++, Data types, Literals, Variables, and Arrays, Operators, Control statements.

UNIT-II

Introducing Class: Class fundamentals, Closer look at Methods and class ,Nested and inner class ,Exploring Java.lang, String handling ,Constructor ,this keyword, Garbage collection and finalize() method. Writing simple JAVA program.

UNIT-III

Inheritance: Basics ,Types of inheritance ,Access specifier ,using super, method overriding ,Abstract class ,constructor in multilevel inheritance ,using final with inheritance ,Dynamic method dispatch ,Abstract class ,

UNIT-IV

Package and Interface: Defining package, CLASSPATH, Access protection ,Importing package ,Defining and implementing interface ,Variable in interface ,Extending interface, Nested interface.

UNIT-V

Exception handling and Multithreading: Using try and catch ,multiple catch classes, Nested try statements , throw ,throws and finally ,Built in exception ,Uncaught exception , Creating own exception class , Java Thread Model: Main thread ,Creating own Thread ,Life cycle of thread, Thread priorities ,Synchronization and messaging, Interthread communication ,Suspending ,Resuming and stopping thread.

TEXT/REFERENCE BOOK

1. Java: The complete reference By Naughton P and schildt H. ,Osborne Tata Mcgraw-Hill. 2. Java Programming By E.Balguruswami
3. Core JAVA for beginners By Rashmi Kanta Das ,Vikas Publication.
4. Core JAVA : A Comprehensive Study by Mahesh P. Matha , PHI publication.

MCS 402: OPERATIONS RESEARCH

UNIT-I

Introduction to Operations Research: Introduction and History, Definition and concept, Characteristics or significant features of Operations research, General methods for solving Operations Research Models, Phases of Operations Research methods, Scope, Shortcomings, Applications, Techniques.

UNIT-II

Linear Programming: Introduction, Salient features of Linear programming (Terminology), Advantages, Limitations, Applications, Formulation of linear programming model, Simplex method.

UNIT-III

Transportation Problems: Introduction, North West Corner Method, Vogel's Approximation Method, Optimality test: Stepping stone method and MODI method.

UNIT-IV

Assignment Models: Introduction, mathematical formulation of the problem, Hungarian method, Sample Problems, Special case in assignment.

UNIT-V

Sequencing Problems: Introduction, general sequencing formula, Processing n jobs through two machines, Processing n jobs through three machines, Processing n jobs through m machines.

TEXT BOOKS:

1. Manohar Mahajan, "Operations Research", Dhanpat Rai & Co., 2013.
2. P. Sankara Iyer, "Operations Research", Tata McGraw-Hill, 2008.
3. A.M. Natarajan, P. Balasubramani, A. Tamilarasi, "Operations Research", Pearson Education, 2005.

REFERENCE BOOKS:

1. J K Sharma., "Operations Research Theory & Applications , 3e", Macmillan India Ltd, 2007.
2. P. K. Gupta and D. S. Hira, "Operations Research", S. Chand & co., 2007.
3. J K Sharma., "Operations Research, Problems and Solutions, 3e", Macmillan India Ltd.
4. N.V.S. Raju, "Operations Research", HI-TECH, 2002.

MCS-403: SYSTEM ANALYSIS AND DESIGN

UNIT-I

THE SYSTEM CONCEPT; Elements of a system, types of system. Introduction to system development life cycle, Recognition of need, prototyping.

UNIT-II

Introduction to system analysis, determining the users information requirements, problem definition, Background analysis, fact-finding, fact analysis.

Introduction to structured analysis, the tools of structured analysis, Feasibility study; oral representation, Data analysis, Cost/ Benefit analysis

UNIT-III

INTRODUCTION TO SYSTEM DESIGNS: The Process and stages of Systems Design, Design methodology, structured design, structured walkthrough, Major development activities, Data validation, Introduction Input/output and forms Design

UNIT-IV

INTRODUCTION TO SYSTEM TESTING: The Test Plan, Quality assurance, Post implementation review, Software maintenance, Procedure for Hardware/Software selection

UNIT-V

Project Management and Control, Project Control, Gantt Chart, PERT and CPM, System Security.

TEXT BOOKS:

1. System Analysis and Design, Elias. M. Awad, Galgotia Publication.

REFERENCE BOOKS:

1. Kendall and Kendall, System analysis and Design, PHI.
2. Igor Hawryszkiewycz, Introduction to System analysis and Design, PHI

MCS 404: DATA BASE MANAGEMENT SYSTEMS

UNIT-1

Introductory Concepts: Introduction, Instance and schema, View of Database system, Database languages, Data Base architecture, Database Administrator

UNIT-2

Database Design and ER- Model – Introduction, Entity, Relationship, Attributes, Constraints, ER Diagram, Reduction to Relational Schema, Specialization, Generalization, Aggregation.

UNIT-3

Relational Database Design: Functional Dependency, 1NF, 2NF, 3NF, BCNF, 4NF, 5NF, Comparison of BCNF and 3NF, Closure of set of functional Dependency, Closure of Attribute Sets, Canonical Cover, Lossless Decomposition, Dependency Preservation

UNIT-4

Relational Database-Structure of Relational Database, Schema, Keys, Relational Operation- Selection, Projection, Natural Join, Cartesian Production, Union, Intersection and Minus operation

UNIT-5

SQL- Basic Data Types, Create Table, Drop Table Alter Table, Queries on Multiple Relation, Join Operation, String Operation, Set Operation, Grouping, Nested Sub queries

TEXT/REFERENCE BOOKS:

1. "Fundamentals of Database System", R. Elmasri & S. Navathe
2. "Data Base Management System", Henry F. Korth & Abraham Silberschats, TMH, 1991.
3. "An Introduction to Database Management System", Vol I &II, Date C.J., Addison Wesley, 1981, 1983

Department of Computer Science & Application

Bilaspur University, Bilaspur (C. G.)

Five Years Integrated B.Sc./M.Sc.(Computer Science)

Scheme and Syllabus

SEMESTER: V

Course Code	Course Name	L	P/T	C	Sessional Marks	End Semester Marks	Total Marks
MCS 501	Theory of Computation	4	1	5	25	75	100
MCS 502	Web Technology	4	1	5	25	75	100
MCS 503	Software Engineering	4	1	5	25	75	100
MCS 504	Artificial Intelligence and Expert system	4	1	5	25	75	100
MCS 505	Web Technology Lab	-	5	5	25	75	100

MCS 501: THEORY OF COMPUTATION

UNIT I:
Sets, Relations and Functions, Fundamental Proof Techniques, Introduction of alphabets, Strings and Languages; Automata, Finite automata (FA), Transition System & Function and their properties; Deterministic Finite Automata (DFA) -Formal definition, simplified notations (state transition diagram, transition table), Non-deterministic Finite Automata (NFA -Formal Definition, Acceptability of a String by a DFA & NFA,), Minimizing number of state of a DFA, Finite Automata with output (Moore and Mealy Machine, Procedure for Transforming a Mealy Machine into a Moore Machine and vice versa

UNIT-2
FORMAL LANGUAGES: Definition of a Grammar, Derivations and the Language Generated by a Grammar, Chomsky Classification of Languages, Languages and Their Relation, Recursive and Recursively Enumerable Sets, Operations on Languages, Languages and Automata

UNIT 3:
Regular expressions (RE)- Definition, FA and RE, Transition System Containing A-moves, NFAs with A-moves and Regular Expressions, NFA to DFA conversion, Algebraic Method Using Arden's Theorem, Construction of Finite Automata Equivalent to a Regular Expression and vice versa, Equivalence of two FA, Equivalence of two RE, Pumping Lemma for Regular Sets, Application of Pumping Lemma, Closure Properties of Regular Sets, Regular Sets and Regular Grammars, Closure Properties of Regular languages, emptiness, finiteness, membership.

UNIT 4:
Context-free Grammars (CFGs)-Formal definition, sentential forms, leftmost and rightmost derivations, The language of CFG, Derivation tree, Ambiguity in grammars and Languages, Ambiguity in CFG, Simplification of CFG, Normal Forms for CFG (Chomsky Normal Form, Greibach Normal Form), Pumping Lemma for Context-free Languages, Closure Properties of CFG's

UNIT 5:
Pushdown Automata (PDA):Formal definition, acceptance by PDA, PDAs and CFGs, CFG to PDA, PDA to CFG, DPDAs -Definition, DPDAs and Regular Languages, DPDAs, and CFLs, Languages of DPDAs, DPDAs.
Context Sensitive Grammar, Linear Bounded Automata, Turing Machines -Formal definition and behaviour, Transition diagrams, acceptance by TM, Multi tape Turing Machine, Universal Turing Machine, Halting Problem of Turing Machine

TEXT/REFERENCE BOOKS:

1. "Elements of The Theory of Computation", H.R.Lewis & C.H. Papadimitriou, P.H.I.
2. "Introduction To Automata Theory, Language and Computation" J.E.Hopcroft, R.Motwani J.D.Ullman, Pearson Education
3. "Theory of Computer Science(Automata, Languages And Computation)", K.L.P.Mishra, N.Chandrasekaran:,PHI
4. "Introduction to languages and Theory of Computation", John Martin, McGraw Hill
5. "Introduction To Computer Theory", D.A.Cohen (J.Wiley)

MCS 502: WEB TECHNOLOGY

UNIT-1

WEB BASICS : What is web, Characteristics of good web design, URL, Web Browser, WWW, Web Server ,HTTP, search engine, Tools for web site creation.

UNIT-2

HTML/DHTML :Introduction , Elements, Attributes, Headings, Paragraphs, Styles Formatting, Quotations, Comments , Hyper-Links, Images, Tables, Lists, Frames, Forms, Input Types, Input Attributes

UNIT-3

CSS : Introduction, Syntax, measurement units, colors, Backgrounds, Font, Text, position, Align, Images, Link, Table, List, Padding, Cursor, Rounded corner, Borders, Multi Background

UNIT-4

JAVASCRIPT: Overview, syntax, Enabling Java script, Variables, Operators, Decision control statement: If-else, Switch Case; Looping statement: while loop, for loop, for..in Loop

UNIT-5

JavaScript functions, events, Cookies, Page Redirect, Dialog Boxes, Page printing, Error handling, Validation, Debugging, Image Map,
XML: Introduction to XML, Difference between XML and HTML

TEXT/REFRENCE BOOKS:

1. "Internet and Internet Engineering", Daniel Minoli, TMH (Latest Edition)
2. "Java Script", Gosslin, Vikas (Latest Edition)
3. "HTML The Definite Guide", Chuckmusiano & Bill Kenndy, O Reilly (Latest Edition)
4. "Dynamic HTML", Joseph Schmuller, BPB, 2000.

MS 503: SOFTWARE ENGINEERING

UNIT I

Introduction to Software Engineering: Definition, Evolution, Principles, Exploratory style of software development, Need of software engineering, Emergence of software engineering, Computer systems engineering.

UNIT II

Software Life Cycle Models: Definition, Classical Waterfall model, Iterative Waterfall model, V-model, Prototyping model, Incremental development model, Evolutionary model, Rapid Application Development(RAD), Agile model, Extreme programming model, Spiral model.

UNIT III

Software Project Management (SPM): SPM complexities, responsibilities of a software project manager, project planning, metrics for project size estimation, project estimation techniques, COCOMO model, Scheduling: Work breakdown structure, Activity networks, Critical Path Method (CPM), PERT, risk management, software configuration management.

UNIT IV

Requirements Analysis and Specification: Requirements gathering, requirements analysis, Software Requirements Specification (SRS): Users of SRS Document, Need of SRS, Characteristics of SRS Document, functional requirements, non-functional requirements, goals of implementation; **Software Design:** Characteristics, Outcome of the Design process, Cohesion and Coupling, Approaches to software design, Data Flow Diagram (DFD), Data dictionary.

UNIT V

Coding and Testing: Coding standards and guidelines, code review, software documentation, Testing: Basic concepts and terminologies, verification, validation, testing process, unit testing, black-box testing, white-box testing, Control flow graph, cyclomatic complexity, mutation testing, debugging, integration testing, system testing.

TEXT/ REFERENCE BOOKS:

1. "Fundamentals of Software Engineering", Rajib Mall, PHI
2. "Software Engineering, A Practitioner's Approach", Roger Pressman", 4th Edition, TMH.
2. "Software Engineering", P.S.Pressman, TMH
3. "An Integrated Approach of Software Engineering", Pankaj Jalote, Galgotia
4. "Software Engineering", M.Shooman, TMH

MCS-504 ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEM

UNIT -I

Introduction: Overview of Artificial Intelligence (AI), Foundations of A.I., History of AI, Areas and state of the art in A.I. ,Knowledge: Introduction ,Knowledge Based system ,Knowledge representation techniques.

UNIT II

A.I. Programming languages –Introduction to LISP ,Basic list manipulation functions, Input/output and local variables, Lists and Arrays, simple program in LISP , Introduction to PROLOG.

UNIT III

Problems and Heuristic Search Techniques: Problem solving as state space search, production system, control strategies and problem characteristics; Search techniques: Breadth First , Depth-first search, Hill-climbing, Heuristics search, Best-First search.

UNIT IV

Knowledge Representation – Approaches and Issues ,Frame, Conceptual dependency , Semantic Net ,Scripts etc. ,Propositional Logic , First order , Propositional Logic (FOPL), Conversion to clausal form, Inference rules, Resolution principal.

UNIT V

Expert System- Introduction ,Application ,Existing Expert systems. Components of typical expert system ,Rule based system architecture,

TEXT/REFRENCE BOOKS

1. Dan W. Patterson, Introduction to Artificial Intelligence and Expert Systems , PHI Publication.
2. Elaine Rich and Kevin Knight , Artificial Intelligence ,TMH publication.
3. V.S. Jankiraman ,K. Sarukesi and P.Gopalakrishnan ,Foundations of Artificial Intelligence and Expert Systems , Macmillan Series in Computer Science.

Department of Computer Science & Application

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Scheme and Syllabus

SEMESTER: VI

Course Code	Course Name	T	P / T	C	Sessional Marks	End Semester Marks	Total Marks
MCS 601	Introduction to Artificial Neural Networks	4	1	5	25	75	100
MCS 602	Computer Graphics	4	1	5	25	75	100
MCS 603	ASP.NET	4	1	5	25	75	100
MCS 604	Major Project	-	-	-	-	200	200

MCS-601 - INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS

UNIT-1

Introduction: History, Definition and meaning, Different areas of Artificial Intelligence, Applications, Essence and benefits of neural networks.

UNIT-2

Basic Neural Network Model: Biological model, Artificial neuron Vs Biological neurons, Types of Neural Network, Model of an artificial Neuron, Activation function, Weights, bias, meaning of learning and training, Types of learning.

UNIT-3

Neural network architecture: Single layer and multilayer perceptrons, transfer functions Training of a simple perceptron: Training of a single layer neural network with simple example like AND, OR logic gates.

UNIT-4

Multilayer Neural Network: Types of Multi Layer Neural Network, Feed forward neural network, Delta learnig rule, Back propogation network, Error back propogation Algorithm.

UNIT-5

Application of ANN: Application of ANN in various domains.

Reference Books

1. Neural Networks: A comprehensive Foundation (2e preferred): Simon Haykins, Prentice Hall of India.
2. Sivanadam and Deepa: Principal of Soft Computing, John wiley and sons.
3. Neural Networks for Pattern Recognition: Christopher M Bishop: Oxford Press
4. Introduction to Artificial Neural Systems:J.M.Zurada, West Publishing Company, St. Paul, Minnesota, 1992 / Jaico Publishing House, Bombay, 1994
5. K.Vinoth Kumar and R. Saravana Kumar, Neural Network and Fuzzy Logic, Katsoon Books.

MCS 602: COMPUTER GRAPHICS

UNIT-I

Introduction to Computer Graphics, Application of Graphics, Display Devices: Refresh Cathode-Ray Tubes, Raster Scan Displays, Random Scan Displays, Color CRT Monitors and Flat Panel Displays. Video cards/display cards. Graphic Software, Graphics Software Standard and Software Packages

UNIT-II

Line Generation Algorithms: DDA algorithm, Bresenham's algorithm; **Circle Generation Algorithms:** Midpoint Circle algorithm

Polygon filling Algorithms: Scan Line Polygon fill algorithm, Inside - Outside Tests, Boundary-Fill algorithm, Flood - Fill algorithm. Fundamentals of aliasing and Antialiasing Techniques.

UNIT-III

Two Dimensional Viewing: Window to Viewport coordinates transformation.

Clipping: Clipping operations, Point clipping**, Line clipping:** Cohen Sutherland Algorithm, Liang Barsky Algorithm, Nicholl-Lee-Nicholl Algorithm, **Polygon clipping:** Sutherland- Hodgeman Algorithm, Weiler Atherton Algorithm,

Text clipping, Exterior clipping

Two Dimensional Transformations: Translation, Scaling, Rotation, Reflection, Shear

UNIT IV

Three Dimensional Viewing: 3D Geometry, 3D display techniques, transformations. **Projections:** Parallel Projection, Perspective Projection. Orthogonal Projection

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UNIT V

Color Models and Color Application: Color Model, Standard Primaries and the Chromaticity Diagram, XYZ Color Model, CIE Chromaticity Diagram. RGB Color Model, YIQ Color Model, CMY Color Model, HSV Color Model. Conversion between HSV and RGB Models. HLS Color Model, Color Selection and Application.

Case study of OpenGL

TEXT/REFERENCE BOOKS:

1. "Principles of Interactive Computer Graphics", Newman, W. Sproul, R.F., TMH,1980
2. "Fundamentals of Interactive Computer Graphics", Foley J.D., Van Dome, Addison Wesley,1982
3. "Computer Graphics", Hearn D., Baker, PHI, 1986
4. "Procedural Elements for Computer Graphics", Rogers D. F., TMH, 1986
5. "Computer Graphics using OpenGL", F. S. Hill Jr., Pearson Education, 2003.

MCS 603: ASP.NET using C#

UNIT-I

Evolution of Web Development, .NET framework, .NET languages, Common Language Runtime, .NET class library, ASP.NET: introduction and evolution

UNIT-II

C# language: Basic, variable and Data Types, math and type conversion operation, conditional statements, loop statements, Methods, class, object, static member, overloading, inheritance, constructor, events, partial class, namespace and assemblies

UNIT-III

Visual studio: Visual studio IDE, Code editor, Visual Studio Debugging, Creating Websites, Designing Web form, Anatomy of a Web Form, Writing Code, Visual Studio Debugging. Page class, Application events,ASP.NET configuration; Web controls: List Controls, Input Validation Controls, Master Page Basics, Website Navigation: Site Maps, TreeView Control, Menu Control

UNIT IV

Error Handling: Common Error, Exception Handling, Handling Exceptions, Throwing Your Own Exceptions, Logging Exceptions; ADO.NET Fundamentals: ADO.NET architecture, Connection class, Command class, Data reader class, DataSet, DataAdopter class, DataView class.

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UNIT V

Data Binding: Basic Data Binding, Data Source Controls, SqlDataSource, ObjectDataSource; Rich Data Controls: GridView, Formatting the GridView, GridView Row Selection, Sorting the GridView, Paging the GridView, GridView Templates, ListView, DetailsView and FormView.

TEXT/REFERENCE BOOKS:

1. "Pro ASP.NET 4 in C# 2010", Matthew MacDonald, Apress
2. "ASP .NET 3.5 Website Programming Problem-Design -solution", Chris Love, Wiley Publication
3. "Beginning ASP.NET 4 in C# 2010 Matthew MacDonald, Apress
4. "Pro C# 5.0 and .Net 4.5 Framework", Andrew Troelson, Apress

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Scheme and Syllabus

SEMESTER: VII

Course Code	Course Name	T	P/ T	C	Sessional Marks	End Semester Marks	Total Marks
MCS 701	Cryptography and network security	4	1	5	25	75	100
MCS 702	Compiler Design	4	1	5	25	75	100
MCS 703	Analysis and Design of algorithm	4	1	5	25	75	100
MCS 704	Advance computing technologies	4	1	5	25	75	100
MCS 705	Analysis and Design of algorithm Lab	-	5	5	25	75	100

MCS-701 - Network Security and Cryptography

UNIT-I

Classical Encryption Technique- Basics of computer network, TCP/IP model, Foundations of Cryptography and security trends, Secret key Vs public key cryptography, Symmetric cipher model, substitution techniques, Transportation techniques, Mathematical tools for cryptography: modular arithmetic, Euclidean algorithm, finite fields, polynomial arithmetic.

UNIT-II

Symmetric cipher -Symmetric cipher model, Traditional block cipher: Stream and block cipher, Feistel cipher network structure, Design Principles of Block Ciphers, Data Encryption Standard (DES), Strength of DES Triple DES, Block cipher design principal, Block cipher operation, Advance encryption Standard (AES), Evaluation criteria of AES,AES transformation function, key distribution.

UNIT-III

Public Key cryptography and Hash Function- Principles of public key cryptosystem, requirement, RSA algorithm. Hash function, Key management: Diffie-Helman Key exchange, Man in the middle attack, elliptic curve arithmetic, elliptic curve cryptography, Application of cryptographic hash function, Hash and Message authentication Code (MAC), Hash and MAC algorithms, MAC based on hash function, Digital signature and Authentication protocol. Key management and distribution: Distribution of symmetric key and public key, Public key Infrastructure (PKI).

UNIT-IV

IP and Web security protocols-User authentication: principle, Remote user authentication using symmetric and asymmetric encryption, Kerberos, E-mail security: Pretty Good Privacy (PGP), S/MIME, IP security: IPsec, transport layer Security: Secure Socket layer (SSL), Secure Electronic Transaction (SET).

UNIT-V

System Security- Firewall, Intrusion Detection and prevention system (IDPS), Malicious Software.

Reference/Text Books

1. Cryptography and Network Security By William Stallings, 4th Edition Pearson Publication.
2. Network security and cryptography by Bernard Menezes, Cenage Learning India Pvt. Ltd. First edition 2010.
3. Applied cryptography - protocols and algorithm By Buce Schneier, Springer Verlag 2003.
4. Cryptography and Network Security By Atul Kahate , TMH Publication.
5. Cryptography and Network Security By Behrouz A. Forouzan, First Edition, TMH Publication.
6. Network Security: Private Communication in Public World By Charlie Kaufman ,Radia Perlman and Mike Speciner, PHI Publication.

MCS-702 Compiler Design

UNIT I

Introduction: Introduction to Compiler, Analysis of the source program, phases of compiler, cousins of compiler, grouping of phases, compiler construction tools. Lexical Analysis: Role of Lexical Analyzer, Specification of tokens, Recognition of tokens, Regular expression, Finite automata, from regular expression to finite automata transition diagrams, Lex.

UNIT II

Syntax Analysis And Parsing Techniques: Context free grammars, Bottom-up parsing and top down parsing. Top down Parsing : elimination of left recursion, recursive descent parsing, Predictive Parsing ,Bottom Up Parsing : Operator precedence parsing, LR parsers, Construction of SLR, canonical LR and LALR parsing tables, Construction of SLR parse tables for Ambiguous grammar, the parser generator – YACC.

UNIT III

Syntax Directed Translation & Intermediate Code Generation : Synthesized and inherited attributes, dependency graph, Construction of syntax trees, bottom up and top down evaluation of attributes, S-attributed and L-attributed definitions ,Postfix notation; Three address codes, quadruples, triples and indirect triples, Translation of assignment statements, control flow, Boolean expression and Procedure Calls.

UNIT IV

Runtime Environment: Storage organization, activation trees, activation records, allocation strategies, Parameter passing symbol table, dynamic storage allocation.

UNIT V

Code Optimization & Code Generation: Basic blocks and flow graphs, Optimization of basic blocks, Loop optimization, Global data flow analysis, Loop invariant computations. Issue in the design of Code generator, register allocation, the target machine, and simple Code generator.

Text Books:

1. Compilers-Principles, Techniques and Tools, Alfred V. Aho, Ravi Sethi and Ullman J.D., Addison Wesley, 2 nd Ed.
2. Principle of Compiler Design, Alfred V. Aho, and J.D. Ullman, Narosa Publication.

Reference Books:

1. Compiler design in C, A.C. Holub, PHI.
2. Compiler construction (Theory and Practice), A.Barret William and R.M. Bates, Galgotia Publication.
3. Compiler Design, Kakde.

MCS-703 Design and Analysis of Algorithms

UNIT -I

Introduction of Algorithm, Analysis of algorithms, asymptotic notations, Standard notations and common functions, Recurrence solution: Substitution method, iteration method and the master method, algorithm design techniques: basic

UNIT -II

DIVIDE AND CONQUER: Binary search, Min-Max Problem, merge sort, quick sort, and Matrix Multiplication.

Introduction to NP-Completeness: The class P and NP, Polynomial reduction, NP-Completeness Problem, NP-Hard Problems

UNIT -III

Graph Algorithms: Undirected Graph, Directed Graph, Traversing Graphs, Representation of graphs, Breadth-first search, Depth-first search, strongly connected components, topological sort.

String Matching: Introduction, The naïve string matching algorithm, Rabin-Karp algorithm, String Matching with finite automata.

UNIT -IV

GREEDY METHOD: Knapsack problem, Huffman codes, job sequencing with deadlines, Minimum Spanning trees: Prim's and Kruskal's algorithms, Single Source Shortest path: Dijkstra's algorithm and Bellman Ford algorithms.

UNIT -V

DYNAMIC PROGRAMMING: O/1 Knapsack problem, all Pair's shortest paths: Warshal's and Floyd's algorithms, Single source shortest paths, Backtracking, Branch and Bound: Travelling Salesman Problem.

TEXT /REFERENCE BOOKS:

1. "Introduction to Algorithms ", Thomas H. Cormen et al., PHI
2. "Fundamentals of computer algorithms", Ellis Horowitz, Sartraj Sahni and Rajasekaran, Galgotia
3. "Design Methods and Analysis of Algorithms", Prof S.K.Basu, BHU, PHI
4. "Data Structures,Algorithms and Applications in C++", Sahni, TMH
5. "Design and analysis of computer algorithms", Aho A.V, Hopcroft, J.E. Ullman, , Addision-wesley
6. "Fundamentals of Algorithmics", Brassard and Bratley, PHI
7. "Data Structure in C", Andrew.S.Tanenbaum, PHI

MCS-704 Advance Computing Technologies

Unit-I

Distributed System - Introduction, Advantages of Distributed Systems over Centralized Systems, Distributed System architecture, Design Issues of Distributed Systems

Unit-II

Grid- Grid computing overview, Application, benefits and limitation, Basic Constituent Elements: Functional view, Physical View, Service view, Open Grid Service Architecture, Open Grid Services Infrastructure

Unit-III

Cluster Computing- Cluster computing overview, architecture, Application, benefits and limitation, Types of cluster, Cluster components, Programming environment and tools

Unit-IV

Cloud Computing- Cloud Computing Overview, Architecture, Applications, Benefits & Limitations of Cloud Computing, Cloud Computing Models including Infrastructure/Platform/Software – as-a-service, Public cloud, private cloud and hybrid clouds, Cloud OS, Performance measure of cloud: Scalability, Performance, QoS.

Unit-V

Advance computing trends: DNA Computing, Quantum Computing, Parallel Computing, Ubiquitous Computing, Context aware computing, Fog computing, now computing, Internet of Thing

Reference/Text Books

1. Cloud Computing-A Practical Approach, Anthony T. Velte, Toby J. Velte, Robert Elsenpeter. McGrawHill.
2. Grid Computing, Joshy Joseph and Craig Fellenstein, Pearson Education 2004.
3. The Grid Core Technologies, Maozhen Li, Mark Baker, John Wiley and Sons , 2005.
4. Beowulf Cluster Computing with Linux, William Gropp, Ewing Lusk, Thomas Sterling, MIT Press, 2003.
5. Distributed and Cloud Computing, Kaittwang Geoffrey C.Fox and Jack J Dongrra, Elsevier India 2012