

Cotton College State University

Department of Computer Science and Information Technology

Undergraduate Syllabus (Bachelor of Computer Application)

Semester-1

Paper Code	Paper Title	L-T-P	Credits
BCA101C	Programming Principle and Algorithm	2+1+1	4
BCA102C	Digital Logic	3+1+0	4
BCA103C	Introduction to UNIX & Shell Programming	2+1+1	4
BCA104E	Fundamentals of computer	2+1+0	3
BCA105E	Mathematics-I	2+1+0	3
BCA106CMP	Same as B.Sc (Computer Sc.)		

Semester-2

Paper Code	Paper Title	L-T-P	Credits
BCA201C	Programming in C	2+1+1	4
BCA202C	Computer Organization and architecture	3+1+0	4
BCA203C	Data structure	2+1+1	4
BCA204E	Web Technology	2+0+1	3
BCA205E	Mathematics-II	2+1+0	3
BCA206CMP	Same as B.Sc (Computer Sc.)		

Semester-3

Paper Code	Paper Title	L-T-P	Credits
BCA301C	Object Oriented Programming using C++	2+1+1	4
BCA302C	Theoretical Foundation of Computer Science	3+1+0	4
BCA303C	Database Management System	2+1+1	4
BCA304E	GUI Programming	2+0+1	3
BCA305E	System Analysis and Design	2+1+0	3
BCA306CMP	Same as B.Sc (Computer Sc.)		

Semester-4

Paper Code	Paper Title	L-T-P	Credits
BCA401C	Java Programming	2+1+1	4
BCA402C	Operating System	3+1+0	4
BCA403C	Computer Networking	3+1+0	4
BCA404E	Management Information System	2+1+0	3
BCA405E	.Net Framework	2+0+1	3
BCA406CMP	Same as B.Sc (Computer Sc.)		

Semester-5

BCA501C	Software Engineering	3+1+0	4
BCA502C	Advanced Web Technology	2+1+1	4
BCA503C	Major Project (Part- I)	0+2+2	4
BCA504E	Numerical Analysis & Statistical Computing	2+0+1	3
BCA505E	Microprocessor	2+0+1	3
BCA506CMP	Same as B.Sc (Computer Sc.)		

Semester-6

Paper Code	Paper Title	L+T+P	Credits
BCA601C	Data Mining	3+1+0	4
BCA602C	Compiler Design	3+1+0	4
BCA603C	Major Project-(Part-II)	0+2+2	4
BCA604E	Artificial Intelligence	2+1+0	3
BCA605E	Computer Graphics	2+1+0	3
BCA606CMP	Same as B.Sc (Computer Sc.)		

Semester-1

Paper Code	Paper Title	L-T-P	Credits
BCA101C	Programming Principle and Algorithm	2+1+1	4
BCA102C	Digital Logic	3+1+0	4
BCA103C	Introduction to UNIX & Shell Programming	2+1+1	4
BCA104E	Fundamentals of computer	2+1+0	3
BCA105E	Mathematics-I	2+1+0	3
BCA106CMP	Same as B.Sc (Computer Sc.)		

BCA101C: Programming Principle & Algorithm

No. of Lectures-32

UNIT-I

Introduction to 'C' Language

History, Structures of C Programming, Function as building blocks.

Language Fundamentals

Character set, C Tokens, Keywords, Identifiers, Variables, Constant, Data Types, Comments.

UNIT-II

Operators

Types of operators, Precedence and Associativity, Expression, Statement and types of statements

Build in Operators and function

Console based I/O and related built in I/O function: printf(), scanf(), getch(), getchar(), putchar(); Concept of header files, Preprocessor directives: #include, #define.

UNIT-III

Control structures

Decision making structures: If, If-else, Nested If-else, Switch; Loop Control structures: While, Do-while, for, Nested for loop; Other statements: break, continue, goto, exit.

UNIT-IV

Introduction to problem solving

Concept: problem solving, Problem solving techniques (Trail & Error, Brain Storming, Divide & Conquer)

Steps in problem solving (Define Problem, Analyze Problem, Explore Solution)

Algorithms and Flowcharts (Definitions, Symbols), Characteristics of an algorithm

Conditionals in pseudo-code, Loops in pseudo code

Time complexity: Big-Oh notation, efficiency

Simple Examples: Algorithms and flowcharts (Real Life Examples)

UNIT-V

Simple Arithmetic Problems

Addition / Multiplication of integers, Determining if a number is +ve / -ve / even / odd, Maximum of 2 numbers, 3 numbers, Sum of first n numbers, given n numbers, Integer division, Digit reversing, Table generation for n, a^b , Factorial, sine series, cosine series, nC_r , Pascal Triangle, Prime number, Factors of a number, Other problems such as Perfect number, GCD numbers etc (Write algorithms and draw flowchart), Swapping

UNIT-VI

Functions

Basic types of function, Declaration and definition, Function call, Types of function, Parameter passing, Call by value, Call by reference, Scope of variable, Storage classes, Recursion.

Referential Books :

1. Let us C-Yashwant Kanetkar.
2. Programming in C-Balguruswamy
3. The C programming Lang., Pearson Ecl - Dennis Ritchie
4. Structured programming approach using C- Forouzah & Ceilber Thomson learning publication.
5. Pointers in C ó Yashwant Kanetkar
6. How to solve it by Computer ó R.G. Dromy
7. Peter Norton's Introduction to Computers ó Tata MGHill

BCA102C: Digital Logic

No. of Lectures-32

UNIT - I:

Information Representation: Number Systems, Number base conversion, Binary Arithmetic, Fixed-point and Floating-point representation of numbers, BCD Codes, Error detecting and correcting codes, Character Representation ó ASCII, EBCDIC, Gray code, Unicode.

UNIT-II:

Boolean Algebra and Logic Gates : Basic Definitions of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra - Boolean Functions - Canonical and Standard Forms - Other Logic Operations - Digital Logic Gates.

UNIT-III:

Simplification of Boolean Functions: The Map Method - Two and Three Variable Maps - Four Variable Map - Five and Six Variable Maps - Product of Sums Simplifications - NAND and NOR Implementation - Other Two Level Implementations - Don't Care Conditions.

UNIT-IV:

Combinational Logic Introduction - Adders - Subtractors - Code Conversion - Binary Adder ó Encoder - Decoders ó multiplexer and demultiplexure.

UNIT - V:

Sequential Logic: RS, JK, D, and T Flip-Flops - Edge-Triggered - Master-Slave Flip- Flops. Registers: Shift Registers - Types of Shift Registers.

UNIT - IV:

Counters: Asynchronous Counters Ripple, Mod, Up-Down Counters- Decoding Gates - Synchronous Counters - Ring, Decade, Presetable, Shift Counters. Memory: Basic Terms & Ideas - Magnetic Memories - Memory Addressing - Types of ROMs - Types of RAMs.

Referential Books :

1. M.Moris Mano, Digital Logic and Computer Design, PHI, 2001.
2. D.P.Leach & A.P.Malvino, Digital Principles and Applications -TMH - Fifth Edition - 2002.
3. Computer Organization and Architecture; William Stallings, Pearson.

4. T. C. Bartee, Digital Computer Fundamentals, 6th Edition, Tata McGraw Hill, 1991.
5. R. J. Tocci, Digital System Principles and Applications, 8th Edition.

BCA103C: Introduction to UNIX & Shell Programming

No. of Lectures-32

UNIT-I: UNIX/Linux Introduction to Basic Features, Advantages, Installing requirement, Basic Architecture of Unix/Linux system, Kernel, Shell. Partitioning the Hard drive for Linux, Installing the Linux system, System startup and shut-down process, init and run levels. Linux File system-Boot block, super block, Inode table, data blocks, How Linux access files, storage files, Linux standard directories. Commands for files and directories cd, ls, cp, md, rm, mkdir, rmdir, pwd, file, more, less, head, tail, pg, cat and disk related commands.

UNIT-II: Essential Linux commands Understanding shells, Processes in Linux-process fundamentals, connecting processes with pipes, tee, Redirecting input output, manual help, managing multiple processes, changing process priority with nice, scheduling of processes at command, cron, batch commands, kill, ps, who, sleep, Printing commands, find, sort, touch, file, file related commands-ws, sat, cut, dd, etc. Mathematical commands- bc, expr, factor, units. Creating and editing files with vi editor.

UNIT-III: System administration Common administrative tasks, identifying administrative files ó configuration and log files, Role of system administrator, Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes, Temporary disable user's accounts, creating and mounting file system, checking and monitoring system performance file security & Permissions, becoming super user using su. Getting system information with uname, host name, disk partitions & sizes, users, kernel. Backup and restore files, reconfiguration hardware with kudzu, installing and removing packages.

UNIT-IV: Shell programming Basic of shell programming, Various types of shell available in Linux, comparisons between various shells, shell programming in bash, read command, conditional and looping statements, case statements, parameter passing and arguments, Shell variables, system shell variables, shell keywords, Creating Shell programs for automate system tasks.

UNIT-V:

Simple filter commands ó pr, head, tail, cut, paste, sort, uniq, tr. Filter using regular expressions ó grep, egrep, and sed.

Referential Books :

1. B.M. Harwani, Unix and Shell Programming, Oxford University Press
2. Unix and shell Programming Behrouz A. Forouzan, Richard F. Gilberg. Thomson
3. Your Unix the ultimate guide, Sumitabha Das, TMH. 2nd Edition.

4. The Complete Reference Unix, Rosen, Host, Klee, Farber, Rosinski, Second Edition, TMH
5. Unix for programmers and users, 3rd edition, Graham Glass, King Ables, Pearson Education.

BCA104E: Fundamentals of Computer

No. of Lectures-32

UNIT-I

Introduction to Computers:

Evolution of Computers, Generation of Computers, Classification of Computers Analog Digital and Hybrid Computers, Classification of Computers according to size, Super Computers, Mainframe Computers, Personal Computers (Different Types) and Terminals (Different Types), Characteristics of Computers, Block Diagram of a Digital Computer, types of OS.

UNIT-II

Input / Output Devices:

Input Devices-KeyBoard, Mouse, Output Devices ó VDU, Printers. Internet, Multimedia, Computer viruses

UNIT-III

Introduction to Programming Concepts:

Types of Programming Languages, software, Classification of software, Application software and System Software, Structured Programming, Algorithms and Flowcharts with Examples.

UNIT-IV

Memory:

Memory Heirarchy, Primary Memory-Volatile and non-valatile memory, RAM and ROM and their types, Secondary Memory-Floppy Disk and Hard Disk.

UNIT-V

Number Systems: Introduction to Binary, Octal, Hexadecimal system, Conversion, Simple Addition, Subtraction

UNIT-VI

Disk Operating System:

Introduction to DOS Commands, Types of DOS Commands Wild Card Character in DOS Directory Related Commands. File Related Commands and Utilities

UNIT-VII

Introduction of Windows, Features, Application:

MS Windows, and its various elements of application windows title bar, menu bar, maximize and close buttons, borders and corners, scroll bars, windows icon, folder icons, dialog box and its items, starting Microsoft windows, searching the files, copying the files, disk clean up,

deleting unnecessary files, Determining Free space on disk, disk defragmenter, using scan disk, imaging, character map, calculator, notepad, paint, Word Pad.

Referential Books :

1. P.K. Sinha ,Fundamentals of Computers, BPB Publications
2. V. Rajaraman, Fundamentals of Computers, 3rd Edition , PHI Publications
3. Computer Today- By Suresh Basandra

BCA105E: Mathematics-I

No. of Lectures-32

UNIT-I

Sequence and Series

Sequence of real numbers, bounded, convergent and non-convergent sequences. Uniqueness of the limit and bounds of a convergent sequence. Cauchy sequence, Cauchy's general principle of convergence (proof of the necessary part only). Subsequences, convergence and divergence of monotonic sequences. Algebraic operations on limit (statements of the theorems without proof). Infinite series, statements of basic properties of infinite series (without proof). Absolute and conditional convergence. Tests for convergence: Comparison test, Ratio test.

UNIT-II

Trigonometry

Geometrical representation of complex numbers- the Argand plane. Polar form of a complex number. Modulus, amplitude and their various properties. De Moivre's theorem. Expansion of $\cos(x)$ and $\sin(x)$ in positive integral powers of x .

UNIT-III

Abstract Algebra

Group Theory: Definition and examples of groups. Permutation group and Cyclic group. Subgroups and Cosets. Lagrange's theorem on the order of a subgroup of a finite group. Normal subgroups. Quotient groups.

Ring Theory : Definition and examples. Simple properties of Rings.

UNIT-IV

Calculus

Roll's theorem, Lagrange's Mean Value theorem and Taylor's theorem. Meaning of the sign of derivative. Indeterminate forms, maxima and minima (single variable).

UNIT-V

Differential Equations

Differential equations of first order and first degree, solution by variable separable methods. Homogeneous equations; Linear equations and equations reducible to linear forms. Exact differential equations.

Referential Books :

1. Higher Algebra (Classical); S. K. Mapa; Ashok Prakashan, Kolkata.
2. Higher Trigonometry; Das and Mukherjee; U. N. Dhur and Sons.
3. A course in Abstract Algebra; V. K. Khanna & S.K.Bhambri; Vikas Pub House, Pvt Ltd, New Delhi.
4. Modern Algebra; S. Singh and Q. Zameerruddin; Vikas Pub House, Pvt Ltd, New Delhi.
5. Differential Equations; Piaggio.
6. Ordinary Differential Equation; B. C. Deka.

Semester-2

Paper Code	Paper Title	L-T-P	Credits
BCA201C	Programming in C	2+1+1	4
BCA202C	Computer Organization and architecture	3+1+0	4
BCA203C	Data structure	2+1+1	4
BCA204E	Web Technology	2+0+1	3
BCA205E	Mathematics-II	2+1+0	3
BCA206CMP	Same as B.Sc (Computer Sc.)		

BCA201C: Programming in C

UNIT-I

Arrays

Definition, declaration and initialization of one dimensional array; Accessing array elements; Displaying array elements; Sorting arrays; Arrays and function; Two-Dimensional array: Declaration and Initialization, Accessing and Displaying, Memory representation of array [Row Major, Column Major]; Multidimensional array

UNIT-II

Pointers

Definition and declaration, Initialization; Indirection operator, address of operator; pointer arithmetic; dynamic memory allocation; arrays and pointers; function and pointers

UNIT-III

Strings

Definition, declaration and initialization of strings; standard library function: strlen(), strcpy(), strcat(), strcmp(); Implementation without using standard library functions

UNIT-IV

Structures

Definition and declaration; Variables initialization; Accessing fields and structure operations; Nested structures; Union: Definition and declaration; Differentiate between Union and structure

UNIT-V

Introduction C Preprocessor

Definition of Preprocessor; Macro substitution directives; File inclusion directives; Conditional compilation

Bitwise Operators

Bitwise operators; Shift operators; Masks; Bit field

UNIT-VI

File handling

Definition of Files, Opening modes of files; Standard function: fopen(), fclose(), feof(), fseek(), fwind(); Using text files: fgetc(), fputc(), fscanf()

Command line arguments

Referential Books:

1. Let us C-Yashwant Kanetkar.
2. Programming in C-Balguruswamy
3. The C programming Lang., Person Ecl ó Dennis Ritchie
4. Structured programming approach using C-Forouzah & Ceilberg Thomson learning publication.

BCA202C Computer Organization and Architecture

No. of Lectures-32

UNIT-I

DATA REPRESENTATION: Data types, fixed-point representation, floating ó point representation, other binary codes, error detection codes.

Register Transfer and Micro-operations: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro-operations, Logic Micro-operations, Shift Microoperations, Arithmetic logic shift unit.

UNIT-II

BASIC COMPUTER ORGANISATION AND DESIGN: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Register reference instructions, Input & Output Instructions, Design of Accumulator Logic.

UNIT_III

CENTRAL PROCESSOR ORGANIZATION : Processor bus organization, arithmetic logic unit (ALU) instruction formats, addressing modes, data transfer and manipulation , program control, microprocessor organization.

UNIT_IV

INPUT-OUTPUT ORGANISATION: Peripheral devices . asynchronous data transfer , direct memory access (DMA) ,priority interrupt, input & output processor (IOP).

UNIT_V

MEMORY ORGANIZATION : Auxiliary memory, microcomputer memory hierarchy , associative memory , virtual memory, cache memory.

Referential Books :

1. M.Moris Mano , Computer System, Architecture, 2nd Edition Prentice Hall of India.
2. Heuring and Jordan, Computer systems design and Architecture , Peason Edition
3. William Stallings , Computer Organisation and Archotecture, Peason Education
4. Floyed , Digital Fundamentals, 8th Edition , Peason Education.
5. Andrew S. Temenbauam, Structured Computer Organization , 3rd Edition ; Prentice Hall of India.
6. David Patterson & Hennessy , Computer Organization & Design , Elsevier.

CSC203C Data Structure

No. of Lectures-32

UNIT – I

Introduction:

Basic Terminology, Elementary Data Organization, Structure operations, Algorithm

Arrays:

Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C, Character string operation, Array as Parameters.

UNIT - II

Stacks:

Operations on Stacks: Push & Pop, Array Representation of Stack, Linked Representation of Stack, Operations Associated with Stacks, Application of stack: Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack.

Queues:

Array and linked representation and implementation of queues, Operations on Queue and Circular queues, Concept of D-queues and Priority Queues.

UNIT-III

Linked list: Representation and Implementation of Singly Linked Lists, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to/from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Circular Link List. UNIT ó IV

UNIT-IV

Trees:

Basic terminology, Binary Trees, Binary tree representation, algebraic Expressions, Complete Binary Tree, Extended Binary Trees, Array and Linked Representation of Binary trees, Traversing Binary trees.

Binary Search Trees:

Binary Search Tree (BST), Insertion and Deletion in BST

UNIT – V

Searching and Hashing:

Sequential search, binary search, Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation.

UNIT – VI

Sorting:

Insertion Sort, Bubble Sorting, Selection Sorting Quick Sort, Merge Sort, Heap Sort, Radix Sort.

Referential Books :

1. Seymour Lipschutz, "Data Structures", Tata McGraw Hill
2. Horowitz and Sahani, "Fundamentals of data Structures", Galgotia Publication Pvt. Ltd., New Delhi.
3. R. Kruse et al, "Data Structures and Program Design in C", Pearson Education Asia, Delhi-2002
4. A. M. Tenenbaum, "Data Structures using C & C++", Prentice-Hall of India Pvt. Ltd., New Delhi.
5. K Loudon, "Mastering Algorithms with C", Shroff Publisher & Distributors Pvt. Ltd.
6. Bruno R Preiss, "Data Structures and Algorithms with Object Oriented Design Pattern in C++", John Wiley & Sons, Inc.
7. Adam Drozdek, "Data Structures and Algorithms in C++", Thomson Asia Pvt.

BCA204E: Web Technology**No. of Lectures-32****UNIT – I**

History of the Internet and World Wide Web, Search Engines, News-group, E-mail and its Protocols (SMTP, POP3, IMAP) Web Portal, Browsers ó versions and functions, URLs, web page, web sites, Domain names, Portals.

UNIT – II

Static Web Development: HTML - Introduction to HTML, HTML Document structure tags, HTML comments, Text formatting, inserting special characters, anchor tag, adding images and Sound, types of lists, tables, frames and floating frames, Developing Forms, Image maps.

UNIT – III

Introduction to Java Script: Data Types, Control Statements, operators, Built in and User Defined Functions, Objects in Java Script, Handling Events.

UNIT – IV

Cascading Style Sheet: Types of Style Sheets ó Internal, inline and External style sheets, creating styles, link tag.

Referential Books :

1. The complete reference HTML, by Thomas A powell, TMH publication.
2. Mastering HTML 4.0 by Deborah S. Ray and Erich J. Ray. BPB Publication.
3. Internet and World Wide Web Deitel HM, Deitel ,Goldberg , Third Edition
1. HTML Black Book , Stephen Holzner, Wiley Dreamtech.
2. Rajkamal, õWeb Technologyö, Tata McGraw-Hill, 2001.
3. Jeffrey C. Jackson, õWeb Technologies : A Computer Science Perspectiveö, Pearson.
4. Mastering JavaScript and Jscript by J.Jaworski ;BPB Publication

BCA205E : Mathematics-II

No. of Lectures: 32

UNIT -I

Sets, Relations and Functions:

Sets, relations, properties of binary relations, closures of relation, equivalence relations, equivalence classes and partitions. Partial ordering relations and lattices. Functions, one-to-one and onto, principles of mathematical induction.

UNIT-II

Graph theory:

Basic Definition of graph. connectivity of graph, cut points cycles, Hamiltonian graphs, trees, different characterisation of trees, bipartite graph, Algorithms on graph, Breadth first search, Depth first search.

UNIT-III

Combinatorics:

Basic of counting principles, principle of inclusion-exclusion, application of inclusion and exclusion. Pigeonhole principle, generalized Pigeonhole principle and its application, permutations and combinations, permutations with repetitions, combinations with repetitions, permutations of sets with indistinguishable objects.

UNIT-IV

Matrices :

Row and column operations, vectors and matrices, partitioning of matrices, representing relations using matrices, Determinant of a square matrix, minor, cofactor, the Cayley-Hamilton theorem, inverse of a matrix, product form of inverse. Rank of a matrix. Solutions of simultaneous linear equations, existence of solutions, solution by Gaussian elimination, Eigen values and Eigen vectors.

UNIT-V

Logic:

Connectives, truth tables, Normal forms- CNF, DNF, Converting expressions to CNF and DNF, Theory of inference, Propositional calculus. Boolean Algebra. Predicate calculus (only introduction), predicates and quantifiers.

Referential Books :

1. Discrete Mathematics, S.K. Sarkar, S Chand.
2. Elements of Discrete Mathematics, C. L. Liu, Mc-Graw Hill International Ed.
3. Discrete Mathematics and its Applications, K. H. Rosen, Mc-Graw Hill International Ed.
4. Discrete Mathematics structures with applications to Computer Science, J. P. Tremblay and R. Manohar, Mc-Graw Hill
5. Discrete Mathematics, N. Ch.SN Iyengar, K.A. Venkatesh, V. M. Chandrasekaran, P. S. Arunachalam, Vikash Publishing House Pvt Ltd.
6. Logic for Computer Science, J. H. Gallier, J. Wiley and sons.

Semester-3

Paper Code	Paper Title	L-T-P	Credits
BCA301C	Object Oriented Programming using C++	2+1+1	4
BCA302C	Theoretical Foundation of Computer Science	3+1+0	4
BCA303C	Database Management System	2+1+1	4
BCA304E	GUI Programming	2+0+1	3
BCA305E	System Analysis and Design	2+1+0	3

BCA301C Object Oriented Programming using C++

No. of Lectures-32

UNIT – I

Different paradigms for problem solving, need for OOP, differences between OOP and procedure oriented programming, abstraction, overview of OOP principles- encapsulation, inheritance and data binding polymorphism. abstraction. C++ basics: structure of a C++ program, data types, declaration of variables, expressions, operators, type conversions, pointers and arrays, strings, structures, references, flow control statement, functions-scope of variables, parameter passing, recursive functions, default arguments, inline functions, dynamic memory allocation and deallocation operators.

UNIT II

Encapsulation, information hiding, abstract data types, Object & classes, attributes, functions, C++ class declaration, member functions, State identity and behavior of an object, static data members and member functions, friend functions, constant member functions. Constructors and destructors, instantiation of objects, Default parameter value, object types, C++ garbage collection, Metaclass/abstract classes.

Operator overloading: Overload unary, binary operators, overloading binary operators using friends, manipulation of strings using operators.

UNIT – III

Inheritance: defining a class hierarchy, different forms of inheritance, defining the base and derived classes, access to the base class members, base and derived class construction, destructors, virtual base class. Polymorphism: static and dynamic bindings, base and derived class virtual functions, dynamic binding through virtual functions, virtual function call mechanism, pure virtual functions, abstract classes, implications of polymorphic use of classes, virtual destructors.

UNIT-IV

Exception handling: benefits of exception handling, throwing an exception, the try block, catching an exception, exception objects, exception specifications, rethrowing an exception, catching all exceptions. File handling : stream classes hierarchy, stream I/O, file streams,

opening and closing data file, creating a data file, read and write functions, error handling during file operations, formatted I/O, sequential and random file processing.

Referential Books :

1. Herbert Schild, ÷ The complete reference to C++ö, Osborn McGraw Hill
2. R. Lafore, ÷Object Oriented Programming using C++ö, Galgotia Publications
3. Ian Graham, ÷Object Oriented Methodsö, Addison Wesley..
4. E. Balaguruswamy, ÷Object Oriented Programming with C++ö, Tata McGraw Hill

BCA302C Theoretical Foundation of Computer Science

No. of Lectures-32

UNIT-I

Finite Automata :

DFA, NFA, NFA with ϵ -moves. Equivalence of DFA and NFA. Reduction of the number of states in a finite automata.

UNIT-II

Regular Languages and Regular Grammar:

Concept of languages and grammar. Regular expressions. Connection between regular expressions and regular languages. Regular grammars, Right and Left-Linear Grammars. Equivalence between Regular languages and Regular grammars.

UNIT-III

Properties of Regular Languages:

Closure under simple set operations- union, intersection, concatenation, complementation and star-closure. Decision algorithms for emptiness, finiteness and infiniteness, equality. Proof of non-regularity using Pigeonhole principle and using pumping lemma for regular languages.

UNIT-IV

Context free languages :

Context-free grammars, leftmost and rightmost derivations, derivation trees. Parsing and Ambiguity in grammars and languages. Simplification of Context free Grammars- removing useless productions, empty-productions and unit-productions. Normal forms- Chomsky and Greibach normal forms.

UNIT-V

Pushdown Automata:

Definition and language accepted (acceptance by empty stack and final state and their equivalence). Pushdown Automata and Context free languages. Deterministic PDA and Deterministic Context free Languages.

UNIT-VI

Properties of Context free Languages:

Pumping Lemma for CFL. Using Pumping Lemma to show certain languages not to be Context free. Closure properties of CFL ó closure under union, concatenation and star-closure. and showing that CFLs are not closed under intersection and complementation. Decision algorithms for emptiness, finiteness and infiniteness.

Referential Books :

1. An introduction to Formal Languages and Automata, Peter Linz, Narosa.
2. Introduction to Automata Theory, Languages and Computation, Hopcroft and Ullman, Addison Wesley.
3. K. L. P. Mishra, N. Chandrasekaran; Theory of Computer Science (Automata, Languages and Computation), P. H. I.
4. T. H. Cormen, C. E. Leiserson and R. L. Rivest, Introduction to Algorithms, Tata-Mcgraw Hill Publishers.

BCA303C: Database Management System

No. of Lectures-32

UNIT-I

Introduction:

An overview of database management system, database system Vs file system, Database system concepts and architecture, data models schema and instances, data independence and database language and interfaces, Data definitions language, DML, Overall Database Structure.

Data Modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationships of higher degree.

UNIT- II

Relational data Model and Language:

Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus. Introduction to SQL: Characteristics of SQL. Advantage of SQL. SQL data types and literals. Types of SQL commands. SQL operators and their procedure. Tables, views and indexes. Queries and sub queries. Aggregate functions. Insert, update and delete operations. Joins, Unions, Intersection, Minus

UNIT- III

Data Base Design & Normalization:

DFD, Functional dependencies, Full functional dependency, Partial dependency, Transitive dependency, normal forms, first, second, third normal forms, BCNF.

UNIT- IV

File structure:

Record storage and primary file organization: memory hierarchies and storage devices, Storage of DataBases, Placing file records on disks: Records and its Types, Files, Fixed length records and variable length records, Record Blocking, allocating file blocks on disks, operation on files.

Issues in Physical Design: Concept of indexes

Referential Books :

1. Date C J, "An Introduction To Database System", Addison Wesley
2. Korth, Silbertz, Sudarshan, "Database Concepts", McGraw Hill
3. Elmasri, Navathe, "Fundamentals Of Database Systems", Addison Wesley
4. Leon & Leon, "Database Management System", Vikas Publishing House.
5. Bipin C. Desai, "An introduction to Database Systems", Galgotia Publication
6. Majumdar & Bhattacharya, "Database Management System", TMH

7. Ramakrishnan, Gehrke, Database Management System, McGraw Hill

BCA304E: GUI Programming

No. of Lectures: 32

UNIT -I

Introduction:

Basic idea of GUI based applications, advantages, IDE and its use; User Interface design principles, Event Driven Programming.

UNIT -II

Review of Data Types Control Statements:

Data Types, Variables & Constant, Arrays, Procedures, Methods, Arguments Passing, Functions Return Values. Control Flow Statements: - If-then, if-then-else, select case; Looping Statements- For, While, Do-while; and Nested Control Structure.

Multiple Document interface & Parent & child forms & method

UNIT -III

Working With Forms & Standard Controls:

Form designing; adding controls to forms: Text Box, Command Button, Combo Box, List Box, Radio buttons, Check boxes, Pull-down and Pop-up Menus, File list, other Controls.

Error Handling: - Types of errors, Error handling methods and Functions.

UNIT -IV

Graphics Controls:

Graphics Controls, Image Handling, Coordinate System, Graphic methods- Text Drawing, Lines & Shape, Filling Shapes, and Grid Methods.

UNIT -V

Database Connectivity:

Connecting to databases; addition, retrieval, deletion, and updation of data into database tables; adding data controls in applications;

Referential Books :

1. J. Weber; Special Edition Using Java 2 Platform; PHI.

2. M. P. Bhawe, S. A. Patekar; Programming with Java; Pearson education.
3. Joshua Bloch; Effective Java: Programming Language Guide; Sun Microsystems

BCA305E: SYSTEM ANALYSIS AND DESIGN

1. Introduction

System definition and concepts: Characteristics and types of system, Manual and automated systems

Real-life Business sub-systems: Production, Marketing, Personal, Material, Finance

Systems models types of models: Systems environment and boundaries, Real-time and distributed systems, Basic principles of successful systems

2. Systems analyst

Role and need of systems analyst ,Qualifications and responsibilities ,Systems Analyst as and agent of change,

3. System Development cycle

Introduction to systems development life cycle (SDLC) :

Various phases of development :Analysis, Design, Development, Implementation, Maintenance

Systems documentation considerations: Principles of systems documentation , Types of documentation and their importance,Enforcing documentation discipline in an organization .

4. System Planning

Data and fact gathering techniques: Interviews, Group communication, Presentations, Site visits. Feasibility study and its importance Types of feasibility reports System Selection plan and proposal Prototyping

Cost-Benefit and analysis: Tools and techniques

5. Systems Design and modeling

Process modeling, Logical and physical design, Design representation, Systems flowcharts and structured charts , Data flow diagrams , Common diagramming conventions and guidelines using DFD and ERD diagrams. Data Modeling and systems analysis , Designing the internals: Program and Process design ,Designing Distributed Systems .

6. Input and Output

Classification of forms: Input/output forms design, User-interface design, Graphical interfaces

7. Modular and structured design

Module specifications , Module coupling and cohesion , Top-down and bottom-up design .

8. System Implementation and Maintenance

Planning considerations, Conversion methods, producers and controls, System acceptance Criteria, System evaluation and performance, Testing and validation, Systems qualify Control and assurance, Maintenance activities and issues.

References: -

1. System Analysis and Design Methods, Whitten, Bentley and Barlow, Galgotia Publication.
2. System Analysis and Design Elias M. Award, Galgotia Publication
3. Modern System Analysis and Design, Jeffrey A. Hofer Joey F. George Joseph S. Valacich Addison Weseley.

Semester-4

Paper Code	Paper Title	L-T-P	Credits
BCA401C	Java Programming	3+1+0	4
BCA402C	Operating System	3+1+0	4
BCA403C	Computer Networking	3+1+0	4
BCA404E	Management Information System	2+1+0	3
BCA405E	.Net Framework	2+0+1	3

CSC401C: Java Programming**No. of Lectures-32****UNIT-I**

Introduction to Java:

Byte code, features of Java, data types, variables and arrays, operators, control statements.

Objects & Classes:

Object Oriented Programming, defining classes, static fields and methods, object construction

UNIT-II

Inheritance:

Basics, using super, method overriding, using abstract classes, using final with inheritance.

Packages and Interfaces:

Defining a package, importing package, defining an interface, implementing and applying interfaces.

UNIT-III

Exception Handling:

Fundamentals, exception types, using try and catch.

Multithreaded Programming:

Creating a single and multiple threads, thread priorities, synchronization.

UNIT-IV

Applets:

Applets basics, applets architecture, applets skeleton, the html applet tag, passing parameters in applets.

Graphic Programming: Basics, Introduction to swings.

Event Handling: Event classes and event listener interfaces.

UNIT – V

Networking :

Socket overview -- datagram socket and TCP/IP based server socket, Internet Addressing --- DNS, URL.

UNIT – VI

Java Database Connectivity:

Establishing a connection(JDBC, ODBC connectivity) , transactions with database.

Recommended Books :

1. P. Naughton and H. Schildt: The complete reference to Java, Tata Mc-Graw Hill.
2. Deitel and Dietel: How to program in Java
3. E. Balaguruswamy : Programming in Java, Tata McGraw Hill.

CSC402C Operating System

No. of Lectures-32

Introduction:

Operating systems overview: Operating systems as an extended machine & resource manager, operating systems classification; Operating systems and system calls; Operating systems architecture.

UNIT-II

Processes:

Process Concept, Thread, design issues of thread, user space thread and kernel space thread. Usage of thread. Process states, Operation on Processes:- creation and termination. Implementation of process:- process table.

UNIT-III

Process Synchronization:

Race condition, Critical-Section, mutual exclusion. Solution to race condition and synchronization: - disabling interrupt, test-and-set-lock, Peterson's solution, semaphore, mutex, monitor, message passing. Classical problems:- The Dining philosopher, sleeping barber and readers-and-writers (bounded buffer) problems and their solution.

UNIT-IV

Scheduling:

Basic Concepts, preemptive and non preemptive scheduling. Scheduling Algorithms. Types of scheduling: - batch, interactive and real-time. Goals of scheduling algorithms. FCFS, SJF, RR, priority, multiple queues, three-level scheduling.

UNIT-V

Deadlocks:

System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock. Banker's algorithm.

UNIT-VI

Memory management:

Multiprogramming. Address binding (relocation), and protection. Swapping. Virtual memory: - logical versus physical address space, paging, page fault, page table and its entries, demand paging, multi level page table, TLB, its entries and working. Page replacement algorithms: - LRU, optimal, NRU, FIFO, second chance, clock, NFU. Working set. What is segmentation, what are its benefits and drawbacks.

UNIT-VII

File system:

What is file, file naming, file types(directory, regular, device), sequential access and random access files, file attributes, operations on file, hierarchical directory structure, path name(relative and absolute), operation on directories, disk layout, disk partition, file system layout, disk block allocation:-contiguous allocation linked list allocation, FAT, i-nodes, directories in UNIX, file system security

UNIT-VIII

I/O management:

Basic principles and overall structure of I/O management subsystem, Device controllers, layers of the I/O subsystem:- interrupt handlers device driver, device independent I/O software and user space I/O software.

Referential Books :

1. Modern Operating System, Tanenbaum, PHI Publication.
2. Operating System Principles by Abraham Silberschatz, Peter Baer Galvin, Greg Gagne.
3. G. Nutt Operating Systems: A Modern Perspective, Pearson Education.
4. W. Stallings Operating Systems, Prentice Hall of India.

BCA403C: Computer Network

No. of Lectures-32

UNIT 1

Introduction:

Usage of Computer Network, study of topology, concept of protocol, Connection less and connection Oriented Service, Layered architecture, study of OSI and TCP model.

UNIT-II

Physical layer:

Introduction to Guided and Unguided media, physical description of twisted pair, coaxial cable, and fiber optic cable, Maximum data rate of a channel (Nyquist and shannons law), Basic concepts of Modulation and demodulation, Data encoding techniques (Manchester and Differential Mancestar encoding) Network connecting devices hub, repeater, bridge, switch, router, and gateway

UNIT-III

Data Link Layer:

Functions and services of DLL, Framing and Framing Methods, Concept of Error Control, Error Correcting code(Hamming code), Error detecting code(CRC), Concept of Flow Control, Piggybacking, Stop-and-Wait sliding window protocol, Pipelining techniques(Go backN, Selective Repeat).

UNIT-IV

Medium Access Control:

What is MAC? Static Channel Allocation, Dynamic Channel Allocation, Pure ALOHA, Slotted ALOHA, Carrier Sense Protocol, 1-persistent CSMA, Non-PersistentCSMA, CSMA/CD, Ethernet(IEEE 802.3) and Ethernet Frame Format, Basic concept of Wireless LAN(IEEE 802.11), Binary Exponential Backoff Algorithm.

UNIT-V

Network Layer:

Services and Functions of Network Layer, Virtual Circuit and Datagram Subnet, Routing, Distance Vector Routing, the Count-to-Infinity problem, Link State Routing, Congestion (definition and factors of congestion only), Definition of Quality of Service, Traffic shaping, Leaky Bucket and token Bucket Algorithm, Concept of IP Address.

UNIT-VI

Transport Layer:

Functionality of transport Layer, Establishment and release of connection, TCP and UDP(Overview), Introduction to Sockets, port numbers.

UNIT VII

Application Layer:

Concept of E-mail, Telnet, WWW, DNS, HTTP, FTP, URL, SMTP, MIME.

Referential Books :

1. Computer Networks, Andrew S. Tanenbum, PHI Publication
2. Data and Computer Communication, 8th edition, William Stallings, Pearson Publication.
3. Computer Networkö , by S.S. Shinde, NAI Publisher.

BCA404E: Management Information System

No. of Lecture-32

UNIT – I:

The meaning and role of MIS: What is MIS? Systems approach, the systems view of business, MIS Organization within the company.

Management Organizational theory and the systems approach: Development of organization theory, definition of a system, general model of a system, types of system, information system.

UNIT – II

Information Systems for decision making: Evolution of an information system, Basic Information Systems, decision making and MIS, MIS as a technique for making programmed decisions, decision assisting information systems.

Strategic and project planning for MIS: General business planning, appropriate MIS response, MIS planning ó general, MIS planning ó details.

UNIT – III

Conceptual system design: Define the problems, set system objectives, establish system constraints, determine information needs, determine information sources, develop alternatives, conceptual designs and select one, document the system concept, prepare the conceptual design report.

UNIT – IV

Implementation, evaluation and maintenance of the MIS: Plan the implementation, acquire floor space and plan space layouts, organize for implementation, develop procedures for implementation, train and operating personnel, computer related acquisitions, develop forms for data collection and information, dissemination, develop the files, test the system, cut over, document the system, evaluate the MIS, control and maintain the system.

UNIT V:

Quality assurance and evaluation of information system, the concept of quality in information systems, organizational functions for control and quality assurance, quality assurance for applications, conditions for quality assurance, quality assurance in application development, application design for quality, maintenance of application quality, maintenance of data quality.

Referential Books :

1. Murdick, Ross and Classett, Information system for modern management, PHI
2. Davis and Olson , Management Information system
3. James A OoBrian , Management Information Systems, Galgotia

BCA405E: .Net Framework**No. of Lectures:32****UNIT-1**

.Net framework, Common language runtime, Framework Base classes, User and Program Interfaces, Visual Studio. NET, NET languages, Benefits of . NET Application C# and .NET.

UNIT-2

Name Spaces, Main Returning a value, passing string objects write line method. Command line arguments, using mathematics functions, Literals, Variables, Operators, Expressions. Decision making (if, ifí .else, Nested if, elseí . If ladder, Switch? : Operator) Looping (While, do, for, for each Jumps in loops)

UNIT-3

Methods, Parameters, Pass by value, Pass by reference, Methods overloading, Arrays, Strings, Structures, Enumerations, Difference between class & structure. Classes, access modifiers, accessing class members, constructors, overloaded constructors, copy constructors, destructors.

UNIT-4

Classical Inheritance, Containment inheritance, Subclasses constructors, Multilevel, Hierarchical Inheritance, Abstract classes, Defining and Implementation of Interfaces, Interfaces and Inheritances, Overloading unary and binary operators. Delegates and events, exceptions, multiple catches, finally statement, throwing and own exception.

Referential Books :

1. Shibi Panikkar and Kumar Sanjeev, õMagic of C# with .NET FrameWorkö, Laxmi Publication
2. P. Jalota, õAn Intergrated Approach to software Engineeringö, Narosa Publishing House.
3. The Complete Reference ASP.NET TATA McGRAW-HILL

4. ASP.NET Black Book

5. Tay Vaughan - 1999 Multimedia: Making it work ó Fourth Edition ó Tata McGraw ó Hill Edition.

6. John F koegel Buford ó Multimedia Systems ó Addison Wesley ó First Indian Reprint.

Semester-5

Paper Code	Paper Title	L-T-P	Credits
BCA501C	Software Engineering	3+1+0	4
BCA502C	Advanced Web Technology	2+1+1	4
BCA503C	Major Project (Part- I)	0+2+2	4
BCA504E	Numerical Analysis & Statistical Computing	2+0+1	3
BCA505E	Microprocessor	2+0+1	3

BCA501C: Software Engineering

No. of Lectures-32

UNIT-I

Software Engineering Fundamentals:

Definition of Software, Software characteristics, Software Applications.

Software Process:

Software Process Models - Waterfall model, prototyping model, spiral model, incremental model, concurrent development model.

Project management Concepts:

The Management Spectrum - The People , The Product , The Process , The Project.

UNIT-II

Software Process and Project Metrics:

Measures , Metrics and Indicators , Software measurement : Size - Oriented Metrics , Function - Oriented Metrics , Extended Function point metrics

Software Project Planning:

Project Planning Objectives, Software Project Estimation , Decomposition Techniques - Problem Based Estimation , Process Based Estimation ,Empirical Estimation Models- The COCOMO Model

Risk Analysis and Management:

Software risks, Risk identification, Risk Projection, Risk Refinement, Risk Mitigation , Monitoring and Management.

UNIT-III

Software Quality Assurance:

Basic concepts- Quality, Quality Control, Quality Assurance, Cost of Quality , Software Quality Assurance (SQA) , Formal Technical Review

Software Configuration Management:

Baselines, Software Configuration Items, The SCM Process, Version Control, Change Control, Configuration Audit, Status Reporting.

Analysis Concepts and Principles:

Requirements Elicitation for Software ,Analysis Principles - The Information Domain, Modeling, Partitioning, Essential and Implementation Views, Specification: Specification Principles, Representation, The Software Requirement Specification (SRS)

UNIT-IV

Design Concepts and Principles:

Design Principles , Design Concepts ó Abstraction, Refinement, Modularity, Software Architecture, Control Hierarchy, Structural Partitioning, Data Structure, Software Procedure, Information Hiding , Effective Modular Design- Cohesion , Coupling

Software Testing:

Testing Objectives & principles, Unit Testing, Integration Testing (Top Down Integration , Bottom Up Integration , Regression Testing, Smoke Testing), Validation Testing (Alpha and Beta Testing), System Testing (Recovery Testing, Security Testing, Stress Testing, Performance Testing).

UNIT-V

Reengineering:

Software Reengineering, Reverse Engineering, Restructuring, Forward Engineering

CASE Tools:

What is CASE, Building Blocks of CASE, A Taxonomy of CASE Tools, Integrated CASE Environments, The Integration Architecture, The CASE Repository.

Referential Books :

1. R. Pressman: Software Engineering, McGraw-Hill.
2. K.K. Agrawal and Y. Sing: Software Engineering, New Age International.
3. P. Jalote: Software Project Management in Practice, Pearson.
4. R. Mall: Fundamentals of Software Engineering, PHI.
5. R.K. Malu: Software Engineering, Scitech Publications.

BCA502C: Advanced Web Technology

No. of Lectures: 32

UNIT I

Internet Basics:

Basic concepts, Communication on the Internet, Internet Domains, WWW, MIME, TCP/IP and Internet, UDP, Idea of Web Server, Web browser, Idea on protocols like HTTP, SMTP, TELNET, FTP. Introduction to HTML, Basic tags and attributes, Tags used for text formatting, image, creating hyperlink, List, Ordered List and Unordered List, Table, Clickable Map, Frame, Designing Forms & Controls ,DHTML.

UNIT-II

Introduction to VBScript:

Adding VBScript Code to an HTML Page - VB Script Basics - VBScript Data Types - VBScript Variables - VBScript Constants - VBScript Operators ó mathematical-comparison-logical - Using Conditional Statements - Looping Through Code - VBScript Procedures ó type casting variables - math functions ódate functions ó string functions óother functions .

UNIT-III

Introduction to Javascript:

Advantages of Javascript ó Javascript syntax - Data type óVariable - Array ó Operator & Expression ó Looping ó control structures - Constructor Function ó user defined function Dialog Box .

UNIT-IV

Javascript document object model ó Introduction ó Object in HTML ó Event Handling ó Window object ó Document object ó Browser object ó Form object ó Navigator object ó Screen object ó Build in object ó User defined object ó Cookies.

UNIT-IV

ASP.NET Language Structure ó Page Structure ó Page event , Properties & Compiler Directives HTML server controls ó Anchor, Tables, Forms, Files . Basic Web server Controls ó Label, Text box, Button, Image Links, Check & radio Button, Hyperlink, Data List Web Server Controls ó Check box list. Radio button list, Drop down list, List box, Data grid, Repeater.

Referential Books :

1. Deitel & Deitel, Goldberg, "Internet and World Wide Web- How to Program", Pearson Education Asia, 2001.
2. The Internet óComplete M.L Young; Tata McGraw Hill Using CGI by J.Dwight , M.Erwin, R. Niles: Prentice Hill.
3. Mastering JavaScript and Jscript by J.Jaworski; BPB Publication.
4. Dynamic HTML óthe definitive references by D.Godman: Shroff Publishers.
5. Understanding XHTML by D.P Nagpal: Wheeler Publishing.
6. Rebecca M. Riordan, "Head First Ajax", SPD, O'REILLY.
7. Kongent S., "Java Server Programming (JEE 6) Black Book, Platinum Edition", 2008, Dreamtech Wiley India Pvt. Ltd.
8. I.Bayross, 2000, Web Enable Commercial Application Development Using HTML, DHTML, Javascript, Perl CGI, BPB Publications.
9. A.Russell Jones, Mastering Active Server Pages 3, BPB Publications.

BCA503C Major Project (Part- I)

BCA504E: Numerical Analysis & Statistical Computing

No. of Lectures: 32

UNIT-I

Representation of numbers:

Floating point representation, single and double precision, round off errors and truncation errors.

UNIT-II

Solution of non-linear equation:

Bisection method, Newtons method, Regula Falsi method, secant method, fixed point algorithm.

UNIT-III

Solution of simultaneous linear equation:

Basic elimination method, Gaussian elimination method, Gauss Jordan method, method of successive approximation.

UNIT-IV

Ordinary differential equation:

Euler's method, Runge Kutta method, Milnes method.

UNIT-V

Interpolation:

Newton's interpolation, Lagrange's interpolation, Newton's divided difference method.

UNIT-VI

Numerical integration:

Trapezoidal rule, Simpson rule, Newton's Cotes method.

UNIT-VII

Statistical methods:

Measure of central tendency: Mean, Median and Mode.

Probability, probability distribution, Binomial, Poisson and normal distribution.

Mathematical expectations, moments, correlation, regression.

Referential Books :

1. M.K.Jain, S.R.K.Iyenger, R.K.Jain, *Numerical methods for Scientific and Engineering Computation*, Wiley Easterns.

2. K.E. Atkinson, *An introduction to numerical analysis*, J.Willey and Sons.

BCA505E: Microprocessor

No. of Lectures-32

UNIT-I

Internal Organization of 8085A microprocessor:

User Programmable registers, PC, SP, accumulator, flags, data bus, address bus, control bus, instruction word size, opcode format, data format, memory addressing, I/O addressing, address decoding for memory and I/O.

UNIT-II

8085A microprocessor architecture:

Pinout of 8085A microprocessor, multiplexed address/data bus, control and status signal, demultiplexing of control signals, other signals, bus timings, fetch decode and execute cycle, timing diagram for opcode fetch memory read and memory write, interfacing memory and I/O.

UNIT-III

Assembly language programming in 8085A microprocessor:

Complete instruction set in detail, programming examples, logic operation, counters and time delays, stack and subroutine, processing arrays, bit manipulation.

UNIT-IV

Interfacing:

In and OUT instruction, decoding addresses, Interfacing LED, relay, seven segment display, switch, keyboard,

cache memory and cache controllers, timer, interrupt controller, DMA controller, video controllers, communication interfaces.

UNIT-V

Interrupts:

Vectored interrupts, interrupt priorities, general purpose programmable peripheral devices, 8255A control and status registers, programming 8255A, introduction to 8279, 8254 and 8237 (block diagrams and basic functions).

Referential Books :

1. Microprocessor Architecture, Programming and Application with the 8085 by Ramesh S.Gaonkar

2. Microprocessor and Microcomputer by B.Ram.
3. B. Brey, Microprocessor Programming and Interfacing, Prentice Hall of India.

Semester-6

Paper Code	Paper Title	L+T+P	Credits
BCA601C	Data Mining	3+1+0	4
BCA602C	Compiler Design	3+1+0	4
BCA603C	Major Project-(Part-II)	0+2+2	4
BCA604E	Artificial Intelligence	2+1+0	3
BCA605E	Computer Graphics	3+1+0	3

BCA601C: Data Mining

No. of Lectures- 48

UNIT-I

Data Warehousing

Overview and concepts: Need for Data Warehousing, Basic elements of Data Warehousing, differences between Database Systems and Data Warehouse.

Planning and Requirements: Project planning and management, collecting the requirements.

Architecture and Infrastructure: Data Warehouse Architecture and its components, Infrastructure and metadata.

Data Design and Data Representation: Principles of dimensional modeling, advanced topics- data extraction, transformation and loading, data quality.

Information Access and Delivery: Matching information to classes of users, OLAP in Data Warehouse, Data warehousing and the web.

Implementation and Maintenance: Physical design process, Data Warehouse deployment, growth and maintenance.

UNIT-II

Data Mining

Introduction:

Basics of data mining, Different definitions of Data Mining and related concepts, Data mining process- Data preparation, data cleaning and data visualization. KDD process. Data mining techniques: Clustering, Association rules and Decision trees.

UNIT-III

Clustering:

Partitional versus Hierarchical Clustering, types of data in clustering. Partitional clustering methods ó k-means, k-medoids, PAM, CLARA, CLARANS. Hierarchical clustering methods ó BIRCH, CURE. Density based clustering methods- DBSCAN. Categorical clustering ó DBSCAN.

UNIT-IV

Rule Mining:

What is an association rule? Mining association rules, frequent sets and border sets, algorithms for mining association rules ó Apriori algorithm, Pincer-Search algorithm, Border algorithm. Generalized association rule, quantitative association rule, association rule with item constraint.

UNIT-V

Decision Trees:

Introduction, tree construction principle, decision tree generation algorithms ó CART, ID3.

UNIT-VI

Applications:

Application and trends in Data Mining: Data Mining Application, Data Mining system products and research prototypes, additional themes on data mining and social impacts of Data Mining.

Referential Books :

1. A.K. Puzari, Data Mining Techniques, University Press.
2. J. Han and M. Kamber. Data Mining: Concepts and Techniques. Morgan Kaufman. 2001.
3. P. Tan, M. Steinbach and V. Kumar; Introduction to Data Mining; Pearson Education (LPE); 2009.
4. J.Han and M. Kamber, 2001,Data Mining Concepts and Techniques,Harcourt India Pvt. Ltd-New Delhi.

Website, E-learning resources

a. [http:// www.academicpress.com](http://www.academicpress.com)

b. <http://www.mkp.com>

BCA602C: Compiler Design

No. of Lectures-32

UNIT -I

Overview of Compilation:

Phases of Compilation ó Lexical Analysis, pass and Phases of translation, interpretation, bootstrapping, data structures in compilation ó LEX lexical analyzer generator.

UNIT II:

Finite Automata

DFA, NFA, NFA with ϵ -moves. Equivalence of DFA and NFA.

Regular Languages and Regular Grammar

Concept of languages and grammar. Regular expressions. Connection between regular expressions and regular languages. Regular grammars, Right and Left-Linear Grammars. Equivalence between Regular languages and Regular grammars.

UNIT III

Top down Parsing:

Context free grammars, Top down parsing ó Backtracking, LL (1), recursive descent parsing, Predictive parsing, Preprocessing steps required for predictive parsing.

UNIT IV

Bottom up parsing

Shift Reduce parsing, LR and LALR parsing, Error recovery in parsing , handling ambiguous grammar, YACC ó automatic parser generator.

UNIT V

Code generation:

Symbol table contents, implementation. Type checking. Syntax directed translation. Forms of intermediate codes. Abstract Syntax Trees, Directed Acyclic Graph, Three address code. Intermediate code generation for different language constructs , boolean expressions, if, if-

else, while, case or switch, function calls. Target code generation issues, register allocation, Runtime storage management.

UNIT VI

Code optimization :

Consideration for Optimization, Scope of Optimization, local optimization, loop optimization, frequency reduction, folding, DAG representation. Flow graph, data flow equation, global optimization, redundant sub expression elimination, Induction variable elements, Live variable analysis, Copy propagation.

Referential Books :

1. Principles of compiler design -A.V. Aho . J.D.Ullman; Pearson Education.
2. Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University Press.

BCA603C: Major Project-(Part-II)

BCA604E: Artificial Intelligence

No. of Lectures-32

UNIT: I

Definition of artificial intelligence, Numerical computation, information storage, repetitive operations, other definitions of artificial intelligence, numeric versus symbolic, algorithm versus non algorithms, area of artificial intelligence, expert system, natural language processing, speech recognition, automatic programming, organization of artificial intelligence system, the underlying assumptions, artificial intelligence techniques.

UNIT : II

Is the good solution absolute or relative, production systems, production system characteristics, problem solving: defining the problem as a state space search, Water Jug Problem , Basic problem solving methods : Reason forward from the initial states , Reason backward from the goal states, Problem trees versus Problem Graphs, Knowledge representation: Matching and Indexing.

UNIT: III

Heuristic search, Heuristic functions, OR graph, AND OR graph, Weak methods: Generate and Test, Hill Climbing, Breadth first search, Best first search OR graph, Problem reduction, Constraints satisfaction, Means End Analysis.

UNIT: IV

Game playing: The Minimax Procedure , Adding Alpha Beta Cutoffs, Knowledge Representation using predicate logic, Representing simple facts in logic, Augmenting the representation with computable functions and predicates, Resolution, Conversion to clause form, The basis of resolution, Resolution in propositional logic , The Unification algorithm, Resolution in predicate logic , Resolution algorithm for predicate logic, Introduction to Nonmonotonic Reasoning, Statistical and probabilistic reasoning.

UNIT: V

Natural language Understanding, Introduction to Understanding, What makes understanding hard, Understanding single sentences , Keyword matching , Syntactic analysis , semantic analysis , semantic grammars , Case grammars Learning: Introduction to learning, Random learning and Neural nets, Learning by parameter adjustment, Learning in General Problem Solver (GPS), Concept Learning.

Referential Books :

1. Artificial Intelligence Elaine Rich McGraw Hill book Co. 1982.
2. Artificial Intelligence PH Winston, Addison Wesley, 1983.
3. Artificial Intelligence Concepts, Techniques and Applications Yoshikai Shirai & Junichi Tsujii, John Wileysons.
4. Artificial Intelligence A knowledge based application MW Richaugh , PWS Rent Publishing, Boston.

BCA 605E: Computer Graphics

No. of Lectures-32

UNIT-I

Brief Survey of Computer Graphics ó Graphics Systems: Video Display Devices ó Types ó Raster-Scan Systems and Random-Scan Systems ó Input Devices ó Hard-Copy Devices ó Graphics Software

UNIT-II

Line-Drawing (DDA and Bresenham's) Algorithms ó Circle-Generating (Midpoint) Algorithm ó Ellipse-Generating (Midpoint) Algorithms ó Area-Filling (Boundary-Fill and

Flood-Fill) Algorithms - Line Attributes - Color and Grayscale Levels ó Character Attributes ó Inquiry Functions .

UNIT-III

Line-Drawing (DDA and Bresenham's) Algorithms ó Circle-Generating (Midpoint) Algorithm ó Ellipse-Generating (Midpoint) Algorithms ó Area-Filling (Boundary-Fill and Flood-Fill) Algorithms - Line Attributes - Color and Grayscale Levels ó Character Attributes ó Inquiry Functions

UNIT-IV

Three-Dimensional Display Methods: Parallel and Perspective Projections ó Depth Cueing - Visible Line and Surface Identification ó Polygon Surfaces: Polygon Tables, Plane Equations and Polygon Meshes - Three-Dimensional Transformations: Basic, Other and Composite Transformations.

UNIT-V

Viewing Pipeline and Coordinates ó Transformation from World to Viewing Coordinates ó Projection Transformations - Matrices - View Volumes - Hidden Surface and Hidden Line Elimination Methods: Back-Face Detection , Depth-Buffer and A-Buffer Methods ó - Wireframe Methods.

Referential Books :

1. D.Hearn and M.P. Baker, 2005, Computer Graphics , C Version,2nd Edition , Pearson Education, New Delhi.
2. .M.Newman and R.F.Sproull, 1997, 2nd Edition, Principles of Interactive Computer Graphics, Tata McGraw-Hill Publishing Co. Ltd.
3. Ii .D.P.Mukherjee,1999, Fundamentals of Computer Graphics and Multimedia,1st Edition, Prentice-Hall of India Pvt. Ltd. ó 1999.
4. .N. Krishnamurthy, 2002, Introduction to Computer Graphics, 1st Edition, Tata McGraw-Hill Publishing Co. Ltd..
5. D.F.Rogers , 2001, Procedural Elements for Computer Graphics , 2nd Edition , Tata McGraw-Hill Publishing Co. Ltd..
6. Xiang and R.A. Plastock, 2002, Computer Graphics , Schaum's Outline Series, Tata McGraw-Hill Publishing Co.