Scheme of Instructions & Syllabi

of

Bachelor of Science (Honors)
in Computer Science
First Year

(Effective from session 2020-21)

Department of Computer Applications

INVERTIS UNIVERSITY
Bareilly-243123 U.P.

STUDY AND EVALUATION SCHEME

B. Sc. (Honors) in Computer Science

(Effective from session 2020-2021)

SEMESTER I, YEAR I

Course Code	Course Title	Course Category	L+T+P	CA	EE	Total	Credit
CSH101	Computer Fundamentals	CC1	5+1+0	50	100	150	6
CSH102	Programming using C	CC2	3+1+0	30	70	100	4
CSH103	Digital Electronics and Applications	CC3	3+1+0	30	70	100	4
CSH105	Industrial Applications	AECC	2+0+0	15	35	50	2
LAB							
CSH151	C Programming Lab	CC2(P)	0+0+4	15	35	50	2
CSH152	Digital Electronics Lab	CC3(P)	0+0+4	15	35	50	2
	Total			**155**	**345**	**500**	**20**

SEMESTER II, YEAR I

Course Code	Course Title	Course Category	L+T+P	CA	EE	Total	Credit
CSH**	GE1	GE	2+0+0	15	35	50	2
CSH204	Data Structures using C	CC4	3+1+0	30	70	100	4
CSH205	Operating Systems	CC5	5+1+0	50	100	150	6
CSH206	Programming in C++	CC6	3+1+0	30	70	100	4
LAB							
CSH252	Data Structures Lab	CC4P	0+0+4	15	35	50	2
CSH253	C++ LAB	CC6P	0+0+4	15	35	50	2
	Total			**155**	**345**	**500**	**22**

L – Lecture
T – Tutorial
P – Practical
ESM – End Semester Marks
MSM – Max. Sessional Marks

Program Outcomes (POs)		
PO1	**Engineering knowledge**	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis**	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design / development of solutions**	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems**	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage**	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society**	Apply reasoning informed by the contextual knowledge to assesssocietal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability**	Understand the impact of the professional engineering solutionsin societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics**	Apply ethical principles, responsibility and norms of the engineering practice
PO9	**Individual and team work**	Function effectively as an individual, and as a member or leader indiverse teams, and in multidisciplinary settings.
PO10	**Communication**	Communicate effectively on complex engineering activities with the engineeringcommunity and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
PO11	**Project management and finance**	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. Manage projects in multi-disciplinary environments
PO12	**Life-long learning**	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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CSH 101: Computer Fundamentals	
Teaching Scheme Lectures: 4 hrs/Week Tutorials: 2 hr/Week Credits: 6	**Examination Scheme** Class Test -20Marks Teachers Assessment - 10Marks Attendance – 20 Marks End Semester Exam – 100 marks

Pre-requisites: Fundamentals of IT and Computer Language

Course Objectives:

1. Define the computer, generations ,classification and basic concepts of computer
2. To discussed and solve the binary number and codes like BCD EBDIC
3. Describe the important computer system resources and the role of operating system in their management policies and algorithms
4. Introduction to MS words and various functions and how to work
5. Introduction to MS excel and various elementary functions using tools
6. To add basic objects and design elements to presentations

Detailed Syllabus

Unit-1 Introduction to Computer Fundamentals: Introduction to Computer, Block Diagram of Computer, Generation of Computers, Classifications of computers, Computer Memory, Input and Output Devices. Computer Virus, Types of Viruses, Computer languages: Machine, Assembly and High-level language, Assembler, Compiler and interpreter, Algorithms and flow chart.
Unit-2 Number System: Number System: Binary, Octal, Decimal, and Hexadecimal representation of Characters: ASCII and EBDIC codes.
Unit-3 Basics of Operating System: Definition of Operating System, Functions of Operating Systems Working with Windows Operating System: Introduction, The Desktop, Structure of Windows, Windows Explorer, File and Folder Operations, The Search, The Recycle Bin, Configuring the Screen, Adding or Removing New Programs using Control Panel, Applications in windows (Paint, Notepad, WordPad, Calculator), Comparison of DOS and Windows, Basic DOS Commands..
Unit-4 MS-Office: Introduction to MS-Office and its integrated nature-MS-Word: Starting Word, new documents, entering text, changing text, aligning, underlining, and justifying text. Tables – creation, adding rows and columns, splitting, and combining cells, Borders. Saving, closing, and operating documents, Adding headers and footers.
Unit-5 MS-Excel: Introduction, Starting MS-Excel, Basics of Spreadsheet, MS-Excel Screen and Its Components, Elementary Working with MS-Excel.
Unit-6 MS-Power Point: Introduction, Starting MS-PowerPoint, Basic concept of presentation software. Standard toolbar, formatting toolbar, and drawing toolbars in Power Point and their use. Creating and opening a presentation. Use of slide sorter, adding header/footer. Use of animation features. Inserting

pictures, resizing pictures. Inserting organization chart. Use of auto content wizard.
Text and Reference Books 1. Computer Fundamentals, P.K. Sinha, BPB Publication, November, 2004. 2. Computer Fundamental and Concepts, V. Raja Raman, PHI, 4 th Edition, January 2010. 3. Go! With Microsoft Office 2010, Shelly Gaskin et.al., Volume 1, 2nd Edition

Course Outcomes:

1. Bridge the fundamental concepts of computers with the present level of knowledge of the students
2. To understand binary, Octal, Hexadecimal and their Arithmetic
3. To understand the main components of an OS & their functions
4. Students will create documents that demonstrate proficiency in the use of word processing,
5. Students will create documents that demonstrate proficiency in the use of Spreadsheets,
6. Students will create documents that demonstrate proficiency in the use of presentation applications.

CSH102: Programming Using C	
Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	**Examination Scheme** Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Prerequisite: - Boolean Algebra, Number System and basic mathematical formulas

Course Objectives:

1. To develop the programming skills of students
2. To know the principles of designing structured programs
3. To write basic C programs using
   - i) Selection statements
   - ii) Repetitive statements
   - iii) Functions
   - iv) Pointers
   - v) Arrays
   - vi) String
   - vii) File handling

Detailed Syllabus

UNIT I (8 Hours)

Introduction & Basic Concepts of 'C' Programming Language: History of 'C' Programming, Assembly language, Machine Language, Editors, Translators (Compiler, Interpreter, Assembler), Programming Rules, Algorithm, Flowcharts, Structure of C program, Executing the C program. C Character Set, C Keywords/Reserve words, Identifiers, Rules to form an Identifier, Variables, Constants, Types of Constants (Numeric, Character, String, Symbolic), Comments in C, Data types in C, Operators- Types of operators(Arithmetic, Relational, Logical, Unary, Assignment, Compound Assignment, sizeof(), Conditional/Ternary, Bitwise) , Precedence and Associativity, Comments, Concept of header files, Types of problems(Sequential, Selective & Repetitive).

UNIT II (10 Hours)

Introductions to Control structures: Control statements- if, if-else, if-else ladder, Nesting of if, break, continue, Switch statement, use of break and default with switch, goto, exit. Program Loops and Iteration: Loops/Iteration, types of loops, for, Nesting of for, while, do-while. Difference b/w while & do-while, break & exit, break & continue.

UNIT III (10 Hours)

Array, Structure and Union: Introductions to Arrays, Structures and Union: Array (Definition, Declaration, Initialization, characteristics), How to store values in an array, How to display values stored in an array, Sorting (Selection, Bubble, Insertion), Searching (Linear, Binary), Multidimensional arrays (Definition, Declaration, and Initialization), Pointers and arrays, Pointer and 2-d arrays, Pointer to an array, Array of Pointers, Dynamic memory allocation. Structure, Structure declaration, Declaration & Initialization of structure variable how to store values in a structure, how to access values of structure elements, Nesting of structures, Array of structure, Differentiate between array & structure, passing structure to function, passing array of structure to function, Structure pointer, Union

UNIT IV (10 Hours)

Functions and Macros: Function (Declaration, Definition, Calling), Function Prototype, types of function, return statement, function calling methods (Call by value, call by Reference), Storage Classes, Recursion. Macro, Macro Declaration, nesting of macros, Macros with argument, Diff between macro & function.

UNIT V (8 Hours)

Strings:Strings-Definition, declaration and initialization of strings, standard library functions: strlen( ), strcpy( ), strcat( ), strcmp( ), etc. Pointer and Strings, Two Dimensional array of characters, Array of Pointers to String.

UNIT VI (10 Hours)

File Handling: File, File operations, Opening and Closing Files, File opening modes, Reading and Writing a data file, Text files Vs Binary files, Command Line Arguments(argc,argv), sprintf() & sscanf(), gets() & puts(), fgetc() & fputc(), fseek() & ftell().

Text and Reference Books

1. Rajaraman V. Fundamental of Computers
2. Ram B. Computer Fundamentals, New Age International
3. Kerninghan B.W. & Ritchie D.M. - The C Programming Language
4. Gottfried - Programming with C Schaum
5. Kanetkar Y. - Let us C
6. Balaguruswamy - Programming in C

Course Outcomes:

1. Understanding the concept and recognize the basic terminology used in computer programming.
2. Write, Compile and Debug programs in C language and use different data types for writing the programs.
3. Design programs connecting decision structures, loops and functions.
4. Understand normal and abnormal combustion phenomena in SI and CI engines
5. Understand the dynamic behavior of memory by the use of pointers
6. Use different data structures and create / manipulate basic data files and developing applications for real world problems.

CSH103 Digital Electronics and Applications

Teaching Scheme	Examination Scheme
Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Prerequisite: - Basic knowledge of Physics of 10+2 standard.

Course Objectives:

1. To describe various types of Number System, basic electronic components and hardware components of computer system.
2. To understand the concept of Boolean algebra, types of digital circuits, memories, addressing modes and I/O interface.
3. To solve problems related to number system conversions and calculation of binary codes.
4. To implement basic Boolean expressions using different Digital Electronic device.
5. To distinguish between types of digital circuit.
6. To design digital circuits for a particular functions using basic electronic components.

Detailed Syllabus

UNIT 1

Introduction- Digital versus Analog Signals, Electrical versus Electronics.

Number System and Codes - Concept of number system bases – binary, octal, decimal and hexadecimal number systems and conversion between each, BCD, Excess-3, Gray Code, and Weighted Codes.

UNIT- II

Binary Arithmetic- Binary Addition and Subtraction. Complements and Subtraction using complements, Multiplication.

Boolean Algebra- Truth table, Boolean operators and precedence, Boolean laws, De-Morgan's Theorem, Principle of Duality, SOP and POS, Conversion from SOP to POS and vice versa, Canonical and standard forms. Reduction of expressions using Boolean laws and K-Map.

UNIT- III

Logic Gates- Primary and Secondary Logic Gates, Designing of circuits using gates, Universal Gates, Implementation of circuits using NAND and NOR.

UNIT- IV

Combinational Circuits- Half and Full Adder/Subtractor, Look-Ahead Carry Adder, Multiplexer, Demultiplexer, Encoder, Decoder and code-converter. Implementation using MUX and decoder.

UNIT- V

Sequential Circuits- Latch, Flip-flop, Edge triggered flip-flop, RS flip-flop, J-K flip-flop D-type flip-flop, T flip-flop Excitation table and characteristic equation of flip-flops, Counters.

UNIT- VI

Memory- General Memory Operation, ROM, RAM (Static and Dynamic), PROM, EPROM, EEPROM.

Text and Reference Books

1. Digital Logic & computer Design, M. Morris Mano, PHI, 2004.
2. Computer System Architecture, M. Morris Mano, PHI, 2004.
3. Computer Organization, Hamachar, Vranesic, McGrawHill, 5th Edition.
4. Computer Organization & Architecture, W. Stallings, PHI, 6th Edition.

Course Outcomes:

1. Differentiate between analog and digital circuits as well as electrical and electronics.
2. Perform number system conversion.
3. Find solution of binary arithmetic problem and understand Boolean algebra.
4. Implement any given Boolean expression using MUX, Decoder as well as Logic Gates.
5. Discrimination among various kind of memory devices with their need.

CSH105 Industrial Applications	
Teaching Scheme Lectures: 1 hr/Week Tutorials: 1 hr/Week Credits: 2	**Examination Scheme** Class Test -6 Marks Teachers Assessment – 3 Marks Attendance – 6 Marks End Semester Exam – 35 Marks

Prerequisite: - English Grammar of 10+2 standard.

Course Objectives:

The objectives of this course are:

1. To understand the concepts, process and importance of communication.
2. To equip students with verbal and non-verbal communication skills.
3. To enhance their communication skills in real life situations.
4. To develop awareness regarding appropriate communication and presentation skills.
5. To encourage students by developing their critical thinking through activities.
6. To assist students with employability and job search skills.

Detailed Syllabus

Unit-1

Communication Skills: Verbal, Non-Verbal, Listening Skills, Writing Skills, Questioning Skills **Business Etiquette:** Making the First Impression, Importance of Handshakes, Business Card Etiquette, Grooming and Personal Hygiene, Body Language, Telephone and email Etiquette

Unit-2

Presentation Skills: Fundamentals of an Effective Presentation, 5 P's of an Effective Presentation, Importance of Visual Aids, Understanding and Overcoming Fear of Public Speaking, Importance of Managing Voice and Language, Managing Question and Answer Session

Unit-3

Interpersonal and Team Skills: Initiating Small Talks, Managing Relationships, Understanding the Cultural Diversity, Teambuilding Process and Techniques, Coordination in Teams, Assertive Communication while Dealing with Teams, Balancing Team Needs and Individual Needs, Importance of Feedback in Team Building

Conflict Management: Conflict Resolution Strategies, Tools and Techniques for Conflict Management.

Unit-4

Facing Interview: Preparing to face interviews, Group Discussion, Resume Building, Role of Attitude: Positive mental attitude, Career Planning, Goal Setting: Establishing SMART Goals, Importance of Mission Statement, Formulation of Goals, understanding and overcoming Procrastination.

Text and Reference Books

1. Business Communication, Bovee & Thill, McGraw Hill, fifth edition, 2007.
2. Business Communication, Raymond V. Lesikar, McGraw Hill, 7th edition, 2009.
3. Soft Skills, Dr.K.Alex, S.Chand 8. Basic English Usage, Michael Swan, Oxford Indian Edition.
4. Business Communication, K.K. Sinha, Galgotia Publications.
5. Effective Speaking, Comfort, Jeremy, Cambridge University Press, 2002.
6. Essentials of Business Communication, Rajendra Pal, J.S. Korlahalli Sultans, Chand and Sons Company.

Course Outcomes:

After completing the course, students will be able to:

1. Understand the process of communication and various Business Etiquettes.
2. Exhibit better presentation skills and speak confidently.
3. Apply effective communication skills in a variety of public and interpersonal settings.
4. To draft effective correspondence with brevity and clarity.
5. Demonstrate his verbal and nonverbal communication ability through presentations
6. Know how to confidently face interview and group discussions.

CSH 201: Discrete Structures	
Teaching Scheme Lectures: 1 hrs/Week Tutorials: 1 hr/Week Credits: 2	**Examination Scheme** Class Test – 6 Marks Teachers Assessment – 3 Marks Attendance – 6 Marks End Semester Exam – 35 Marks

Prerequisite: Sets, Relations, Trees, Graphs, Boolean Algebra etc.

Course Objectives:

1. **Mathematical reasoning:** Students are expected to use use mathematical reasoning in order to read, comprehend, and construct mathematical arguments. Students will learn basic concepts of mathematical logic and proof.
2. **Combinatorial analysis:** Students will count or enumerate objects and perform combinatorial analysis.
3. **Discrete structures:** Students will learn the basic concepts of sets, permutations, relations, graphs, trees and finite state machines. Students will represent discrete objects and relationships using abstract mathematical structures.
4. **Algorithmic thinking:** Students will verify whether an algorithm works well and perform analysis in terms of memory and time.
5. **Applications and modeling:** Discrete mathematics has been used in numerous applications. Students will formulate and model problems with the concepts and techniques of discrete mathematics.

Detailed Syllabus:

Unit-1 **Set Theory:** Introduction of sets, Subsets, Proper Subset, Disjoint Set, Power Set, General identities on sets, Set Operations, Venn-Diagram, Principle of Inclusion and Exclusion. **Relations:** Definition, Operations on relations, Composite Relations, Properties of relations, Equality of relations, Order of relations. **Functions:** Definition, Classification of functions, Operations on functions.
Unit-2 **Algebraic Structures:** Definition, Groups, Subgroups and order, Cyclic Groups, Cosets, Normal Subgroups, Permutation and Symmetric groups. Group Homeomorphisms, Definition and elementary properties of Rings and Fields.
Unit-3 **Partial order sets:** Definition, Partial order sets, Combination of partial order sets, Hasse diagram. **Lattices:** Definition, Properties of lattices – Bounded, Complemented, Modular and Complete lattice. **Boolean algebra:** Introduction, Axioms and Theorems of Boolean algebra, Simplification of Boolean Functions, Karnaugh maps, Logic gates, Digital circuits and Boolean algebra.
Unit-4 **Propositional Logic:** Proposition, well formed formula, Truth tables, Tautology, Satisfiability, Contradiction, **Predicate Logic:** First order predicate, well formed formula of predicate, quantifiers, Inference theory of predicate logic.
Unit-5 **Trees:** Definition, Binary tree, Binary tree traversal, Binary search tree. **Graphs:** Definition and terminology, Representation of graphs, Multigraphs, Bipartite graphs, Planar graphs, Isomorphism and Homeomorphism of graphs, Euler and Hamiltonian paths.
Unit-6 **Combinatorics:** Introduction, Counting Techniques, Pigeonhole Principle.Recurrence Relation &

Generating function: Recursive definition of functions, Recursive algorithms, Method of solving recurrences.

Suggested Readings:

1. Liu and Mohapatra, "Elements of Distcrete Mathematics", McGraw Hill
2. Jean Paul Trembley, R Manohar, Discrete Mathematical Structures with Application to Computer Science, McGraw-Hill
3. R.P. Grimaldi, Discrete and Combinatorial Mathematics, Addison Wesley,
4. Kenneth H. Rosen, Discrete Mathematics and Its Applications, McGraw-Hill,
5. B. Kolman, R.C. Busby, and S.C. Ross, Discrete Mathematical Structures, PHI

Course Outcomes:

1. Write an argument using logical notation and determine if the argument is or is not valid.
2. Demonstrate the ability to write and evaluate a proof or outline the basic structure of and give examples of each proof technique described.
3. Understand the basic principles of sets and operations in sets.
4. Prove basic set equalities.
5. Apply counting principles to determine probabilities.
6. Demonstrate an understanding of relations and functions and be able to determine their properties.
7. Determine when a function is 1-1 and "onto".
8. Demonstrate different traversal methods for trees and graphs.
9. Model problems in Computer Science using graphs and trees.

CSH 207: Principles of Management	
Teaching Scheme Lectures: 1 hr/Week Tutorials: 1 hr/Week Credits: 2	**Examination Scheme** Class Test -6 Marks Teachers Assessment – 3 Marks Attendance – 6 Marks End Semester Exam – 35 marks

Prerequisite: - Fundamental of Managerial skills.

Course Objectives:

1. To understand the functions and responsibilities of managers.
2. To provide tools and techniques to be used in the performance of the managerial job.
3. To analyze and understand the environment of the organization.
4. To develop the awareness about the principles of management.
5. To maintain competitive advantages.

Detailed Syllabus

Unit-1 **Management:** - Concept, Nature, Scope & Importance. Management: Art and Science, As a Profession, Management Vs Administration Management Skills, Managerial Roles & Levels of Management.
Unit-2 **Evolution & Development of Management Thought:** Contribution of Taylor, Fayol & Weber Social System and Decision Theory Approach.
Unit-3 Planning: Nature, Scope & Objectives; Types of plans; planning process; Business forecasting &Planning Premises; MBO: Concept & Process. Techniques & Process of decision-making.
Unit-4 **Organizing:** Concept, Importance and Principles, and Process of Organizing. Formal & Informal Organizational Structure, Depart mentation Span of Control, Delegation of Authority, Authority & Responsibility, Centralization and Decentralization.
Unit-5 **Staffing:** Concept, Manpower Planning, Job Analysis, Recruitment & Selection, Training & Development. **Directing:** Concept, Importance, Direction & Supervision, Role of Supervisor, Techniques of directing. Nature and Scope of Co-ordination, Principles, Techniques and Barriers to Co-ordination.
Unit-6 **Leadership:** Concept, Importance & Leadership Styles, Controlling: Concept, Process, Principles & Techniques of Controlling, Types of Control, Effective Control System.

Text and Reference Books

1. Essentials of Management, Harold Koontz, Heinz Weihrich, Tata McGraw-Hill, 1998.
2. Essentials of Management, Joseph L. Massie, Prentice Hall of India, Pearson, 4th Edition, 2003
3. Management, Stoner, Freeman, Gilbert, Pearsons, 6^{TH} Edition.

Course Outcomes:

1. Understand the concepts related to Business organization.
2. Demonstrate the roles, skills and functions of manager.
3. Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.
4. Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities.
5. Recognize the role of communication in the management function.

CSH 204: Data Structures Using C	
Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	**Examination Scheme** Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Prerequisite: -

1. Familiarity with the fundamentals of C or other programming language
2. A solid background in mathematics, including probability, set theory

Course Objectives:

1. To learn the basics of abstract data types.
2. To learn the principles of linear and nonlinear data structures.
3. To build an application using sorting and searching.

Detailed Syllabus

UNIT I (10 Hours)
Introduction Data Structure: Introduction to Data Structure, Classification of data Structure, Operation on data structure, Top down and Bottom-up approaches to algorithm, Analysis of algorithm, Frequency count, Complexity measures in terms of time and space.

UNIT II (10 Hours)
Arrays: Representation of array (single & multi dimensional arrays), Traversing, insertion and deletion operations. Merging, matrix addition, subtraction, multiplication, transpose, sparse matrix

UNIT III (10 Hours)
Stacks: Introduction to stack, primitive operation on stack, Stacks application: Infix, post fix, Prefix and Recursion.
Queues: Introduction to queues, Primitive Operations on the Queues, Circular queue, Dequeue, Priority queue, Applications of queue.

UNIT IV (10 Hours)
Linked List: Introduction to the Linked List, Basic operations on linked list, Header nodes, Doubly Linked List, Circular Linked List, and Application of Linked List.

UNIT V (6 Hours)
Trees: Basic Terminology, Binary Trees, Tree Representations using Array & Linked List, Basic operation on Binary tree, Traversal of binary trees:- In order, Preorder & post order, Application of Binary tree, Threaded binary tree, Heap Tree,B-tree & Height balanced tree.

UNIT VI (10 Hours)
Searching and Sorting: Sequential search & binary search, Hashing, sorting method (Insertion sort, Selection sort, Bubble sort, Quick sort, Merge sort, Heap sort).

Text and Reference Books

1. Data Structures and Program Design in C, R.L. Kruse, B.P. Leung and C. L. Tondo, PHI, 2008.
2. Data Structures, Seymour Lipscutz, Mcgraw Hill Publication, 2009
3. Data structures using C, Aaron M.Tenanbaum, Pearson education, 2004.
4. Data structure through C, Yashvant Kanetkar, BPB Publication, 2006.

Course Outcomes:

1. Solving problems and simulate the insertion and deletion by using DS methods.
2. Understanding the concept and recognize the basic terminology used in computer programming.
3. Write, Compile and Debug programs in C language and use different data types for writing the programs.
4. Design programs connecting decision structures, loops and functions.
5. Understand the dynamic behavior of memory by the use of pointers
6. Use different data structures and create / manipulate basic data files and developing applications for real world problems.

CSH205: Operating Systems	
Teaching Scheme Lectures: 4 hrs/Week Tutorials: 2 hr/Week Credits: 6	**Examination Scheme** Class Test -20 Marks Teachers Assessment – 10 Marks Attendance – 20 Marks End Semester Exam – 100 marks

Prerequisite: - DOS, Microprocessor peripherals and interfacing

Course Objectives:

1. Define and list the functions of an operating system.
2. list resources involved in process creation and management.
3. Explain the use of paging and segmentation
4. Explain the function and structure of the I/O system.
5. Describe path names and directory structure visible to end users
6. To familiarize the students with the Operating System.
7. To demonstrate the process, memory, file and directory management issues under the UNIX operating system.
8. To introduce UNIX basic commands.
9. To make students how to make simple programs in UNIX and administrative task of UNIX.

Detailed Syllabus

UNIT I (8 Hours) **Introduction:** Operating System, Operating System Services & Functions. Simple Batch Systems, Multiprogrammed Batched Systems, Time Sharing Systems, Real-Time Systems. **Process:** Process Concept, Process Scheduling, CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms with examples.
UNIT II (8 Hours) **Process Communication and Synchronization:** Co-operating Process, Inter-process communication, Threads (Thread Concept, Single and Multiple Threads, Benefits). Introduction to process synchronization, Critical Section Problem.
UNIT III (8 Hours) **Deadlock:** Deadlocks: Deadlock Characterization, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock.
UNIT IV (16 Hours) **Introduction to UNIX**: features of UNIX, Shell Vs Kernel, types of shell, System Calls, System calls Vs Library functions, UNIX file System, The Parent-Child Relationship, Orphan, Zombie, UNIX Architecture, UNIX Commands. The first faltering step(Login), Password, Password Ageing, files related commands, Symbolic links, Listing Files & directories, Hidden files, Shell Meta characters, Masking file permission, Changing file permission(Absolute & Symbolic mode), Sticky bit, Directory related commands, Best calculator.
UNIT V (10 Hours) **The UNIX file system** INODE Table, Disk related commands, File related commands, Filters, I/O redirection & Piping, Command substitution. **Process** basic, process status, Mechanism of process creation, Job Control, background processes, Killing a process, Daemon, Changing process priorities, Scheduling a process.

UNIT VI (6 Hours)

System Administration in UNIX- the System administrator's login, the administrator's privileges, Adding & Removing groups, user's management, Booting & Shutdown, Making a file system, Mounting & Unmounting File system.

Text and Reference Books

1. Operating System concepts, A. Silberschatz, Peter B. Galvin, Addison Wesley publishing Company, 6th Edition
2.UNIX shell programming By Yashvant Kanetkar ---BPB Publications
3.UNIX Concepts and Application By Sumitabha Das--- Tata McGraw-Hill publication
4.The C Odyssey UNIX the open boundless C By Meeta Gandhi--- BPB Publications

Course Outcomes:

1. Differentiate between multiprocessing, multiprogramming, and multitasking.
2. Differentiate between programs, processes and threads.
3. Knowledge about working environment in UNIX.
4. Knowledge about the UNIX commands to perform different tasks.
5. Difference between DOS and UNIX environment.
6. Create or design different scripts using shell programming.
7. Implement process, thread, semaphore concept of operating system
8. Responsibilities and duties of a system administrator along with the knowledge how to grant permission to users, create user account etc.

CSH206: Programming in C++

Teaching Scheme	Examination Scheme
Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Unit Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Prerequisite: - Basics of c language

Course Objectives:

1. Understand fundamentals of object-oriented programming in C++.
2. Have the ability to write a computer program to solve specified problems.
3. Be able to explain the difference between object-oriented programming and procedural programming.
4. Be able to program using more advanced C++ features
5. Be able to build C++ classes using appropriate encapsulation and design principles.
6. Improve problem solving skills

Detailed Syllabus

UNIT I

Introduction to OOP: Basic concepts of OOPs, Advantages of OOP, Need of object-oriented programming, characteristics of object-oriented languages, Object oriented approach vs procedure oriented approach, Object, Classes, Encapsulation, Data Abstraction, Inheritance, Polymorphism, Dynamic binding, Message Passing, Application of OOPs.

UNIT II

C++ Programming Basics: Language Fundamentals-Character set, Keywords, Identifiers, Variables, Constant, Data Types, and Comments. Operators in C++, Operator Precedence - Types of operators, Precedence and Associativity. Type Conversion, Statement and types of statements. Difference between C++ and C. Basic program construction, input/output using cin/count; manipulators

UNIT III

Control Statements: Conditional expressions, loop statements, breaking and control statements. Arrays-Notation, Declaration, Initialization, Processing.

UNIT IV

Functions: Simple functions, Function Prototyping, Call by reference, Return by Reference, Default Arguments, Constant Arguments, Inline Function, functions overloading, static function.

UNIT V

Classes and Objects: Introduction, structure and classes, declaration of class, defining the object of a class, accessing a member of class, arrays of class objects, Constructors, Destructors, friend function, Dynamic memory allocation. Constructors and Destructors, objects as function arguments, static class member.

UNIT VI

Inheritance: Introduction, defining derived classes, overriding member functions, Single Inheritance, multilevel Inheritance, multiple Inheritance, Hierarchical Inheritance, Virtual Base Class. Operator Overloading: Overloading Unary & Binary operators, Data conversion.

Text and Reference Books

1. Object Oriented Programming with C++, E. Balaguruswamy, 4th Edition.
2. Object Oriented Programming in C++, Robert Lafore, Sams, Dec., 2001.
3. C++ Programming, D. Ravichandran, TMH, 2nd Edition, Dec. 2002.
4. Mastering C++, Venugopal, TMH, September, 1997.
5. Object Oriented Programming using C++ , Joyce Farrell, Cengage Learning India Pvt. Ltd., 6th Edition.

Course Outcomes:

After completing the course, students will be able to:

1. Describe the procedural and object-oriented paradigm with concepts of streams, classes, functions, data and objects.
2. Understand dynamic memory management techniques using pointers, constructors, destructors, etc.
3. Describe the concept of function overloading, operator overloading, virtual functions and polymorphism.
4. Implement abstraction level programming using inheritance
5. Design modular programs.
6. Apply good programming style and understand the impact of style on developing and maintaining programs.
7. Design object-oriented solutions for small systems involving multiple objects.