Branch: BCA	Semester-III
Subject Code: 3101	Lecture: 04 Credit: 04
Subject Title	INTRODUCTION TO MICROPROCESSOR

Modules	Sr. No.	Topic and Details	No of Lectures Assigned	Marks Weightage %
UNIT-I	1	**Introduction to Microprocessors:** History and overview, Growth of microprocessor technology from SSI, MSI, LSI to VLSI, Intel , microprocessors-8085 to Pentium-II , performance and feature comparisons, Current global trends in Microprocessors	8	16
UNIT-II	2	**8085 Microprocessor:** Internal architecture, Pin-out diagram, Memory addressing schemes, System bus structure (Data, address and control bus), Multiplexing and de-multiplexing	8	16
UNIT-III	3	Programming in 8085: Addressing modes , Data movement instructions, Arithmetic and logic instructions, Control instructions	8	16
	4	**Interrupts:** Introduction, purpose of interrupts, Interrupt vectors, **8259-Interrupt Contorller,** Internal organization, pin out, Single and cascaded operation	8	16
UNIT-IV	5	**I/O Interface:** Typical I/O interface, serial , communication, 8251 A UART : Internal organization and functioning, 8237 DMA Controller : Block diagram, organization and functioning	8	16
	6	**Memory:** Type of memory, ROM-PROM, EPROM, EEPROM, (Flash ROM Concept), RAM-SRAM, DRAM, EDO, ECC, SDRAM, Packaging-DIP, SIMM, DIMM, Addressing, memory map, address decoding, Overview of 8086/8088, Overview of 80286, 80386, 80486, Pentium, Pentium II, Pentium III	10	20
		Total	50	100

Text Books:

1) R.S. Gaonkar, "Microprocessor Architecture, programming and Applications with the 8085/8080A", Wiley Eastern Ltd. 2., 1995

References:

1) Peter Norton,"Inside the PC" (Sixth Edition), January 2005
2) Yu-Cheng Liu & Glen A. Gibson, "Microprocessor System-The 8086/8088 Family" :

3) Barry Brey"The Intel Microprocessor : 8086/8088 , 80286, 80386, Pentium, Pentium Pro. Pentium-II & III" Pearson Prentice Hall, 2009

Branch: BCA	Semester-III
Subject Code: 3102	**Lecture: 04** **Credit: 04**
Subject Title	**NUMERICAL METHODS AND ALGORITHMS**

Modules	Sr. No.	Topic and Details	No of Lectures Assigned	Marks Weightage %
UNIT-I	1	**Roots of non-linear equations:** Bisection Method, Regula-falsi Method, Newton-Raphson Method, Ramanujan's Methods	6	12
	2	**Direct solution of linear equation:** Matrix Inversion, Gauss-Elimination Method	4	8
UNIT-II	3	**Interpolation:** Finite Differences, Newton-Gregory Forward and Backward Formula, Lagrange's Interpolation Formula for In equal Intervals, Newton divided difference formula for unequal intervals	8	16
UNIT-III	4	**Numerical Integration:** Trapezoidal Rule, Simpson's 1/3 Rule, Simpson's 3/8 Rule, Error estimation for all three methods	6	12
	5	**Numerical Differentiation:** Differentiating Newton's Forward and Backward formula	6	12
UNIT-IV	6	**Numerical solution of Differential equation:** Taylor's Series, Euler's Method, Runge-Kutta Method	7	14
	7	**Numerical solution of Partial Differential equation:** Jacobi's Method, Gauss-Seidel Method, Successive Over-Relaxation	7	14
	8	**Curve Fitting, B-Splines:** Least Squares Curve Fitting Procedures, B-Splines	6	12
		Total	50	100

Text and Reference Books:

1. Numerical Methods: V. Rajaraman "Computer oriented numerical methods (third edition) 1993
2. S.S. Shastri "Introductory methods of numerical analysis" Vol-2, PHI, SECOND edition, 1994

Branch: BCA	Semester-III
Subject Code: 3103	Lecture: 04 Credit: 04
Subject Title	COMPUTER ORGANIZATION AND ARCHITECTURE

Modules	Sr. No.	Topic and Details	No of Lectures Assigned	Marks Weightage %
UNIT-I	1	**Computer Structures:** Computer components, Computer functions, Basic instruction cycle(Fetch & Execute), Interrupts, Instruction Cycle with interrupts, Multiple Interrupts, I/o functions, Interconnection structure, Bus Interconnection structures, Bus structure, Multiple bus hierarchy, Elements of Bus design	8	16
UNIT-II	2	**Internal memory:** Characteristics of memory system Memory hierarchy Semiconductor main memory, Basic concepts, RAM (Static and Dynamic), ROM (PROM, EPROM, EEPROM, FLASH MEMORY), Memory Module organization, Cache Memory, Principle, Elements of cache design (Size, Mapping, Replacement, Write policies, Block size), Error detecting & correcting code	12	24
UNIT-III	3	**External Memory:** Magnetic disk, Data organization and Format, Characteristics, Disk access time, Optical Memory, CD-ROMs, WORM, Erasable optical disk, DVD, Magnetic tape , Difference between disk & tape & DVD	10	20
	4	Input/Output • Introduction • Access to I/O devices • I/O Modules (Functions and structures) • Programmed I/O o Overview o I/O Commands o I/O Instruction o Flowcharts • Interrupt driven I/O o Interrupt processing o Design Issues • Drawbacks of Programmed & interrupt I/O • Direct Memory Access	10	20

		○ DMA Functions • I/O channels & Processes Evolution of I/O Function Characteristics of I/O channels		
UNIT-IV	5	Advanced Architecture • Parallel Processing (SISD, SIMD, MISD and MIMD) • RISC and CISC ○ Characteristics ○ RISC Pipelining	10	20
		Total	50	100

Text Books:

1. William Stallings,"Computer Organisation and Architecture",Prentice Hall PTR, 07-Aug-2003

References:

1. Jain, "Modern Digital Electronic",McGraw Hill, 2008
2. Morris Mano."Computer System Architecture",Pearson Custom Publishing, 2001
3. Hwang,"Advanced Computer Architecture",Tata McGraw Hill Education,2003
4. Michael J. Flynn, "Computer Architecture", Narosa Publishing,1995
5. Devale,"Computer Organisation and Architecture", 2004

Branch: BCA	**Semester-III**
Subject Code: 3104	**Lecture: 04** **Credit: 04**
Subject Title	**FILE STRUCTURE AND DATABASE MANAGEMENT SYSTEM**

Modules	**Sr. No.**	**Topic and Details**	**No of Lectures Assigned**	**Marks Weightage %**
UNIT-I	1	**Introduction to file system and Indexing and Hashing** • Meaning of file, types of file, organization of records in file • Concepts of Index, Types of indexes • Ordered (SAM), HASHED • Types of ISAM • Primary, Cluster, Secondary • Concept of Multilevel indexes	10	20

		• B+ tree & B tree • Concept of HASHING • Types of Hashing (Static, Dynamic)		
UNIT-II	2	**Query Processing and query optimization** • Meaning of Query, • Steps in Processing Query, • Translating SQL query into Relational Algebra, • Query tree and its notations, Initial tree, • Query equivalence, • Query expression –Materialization and Pipelining • Cost estimation / Measures of Query cost. • Query optimization, • Heuristics Algebraic optimization	12	24
UNIT-III	3	**Transaction Processing** • Definition of Transaction, • Transaction states – Diagram and explanation • Partially committed, • Committed, Failed, Aborted • Properties of transaction (ACID) • Atomicity, Consistency, Isolation, Durability • Basic transaction operations - Read, Write • Why Concurrency Control is needed? • Schedule, types of schedule (Serial, Non-Serial, concurrent, recoverable, cascadeless, strict) • Serializability and conflict serializability • System log, Lost update problem, • Temporary update problem, • Incorrect summary problem, Unrepeatable read Active	12	24
UNIT-IV	4	**Concurrency control** **Introduction** • Locks and types of locks • Compatibility matrix • Conversion of locks – upgrading and downgrading • Starvation of lock • Deadlock handling- Deadlock detection methods, problems of deadlock, wait-die and wound-wait protocols, methods used for prevent deadlock , recovery of deadlock • Multiple granularity locking protocol • 2-phase locking protocol (2PL) • Timestamps- W-timestamp and R-timestamps, • Thomas's Write rule	16	32
Total			50	100

Text Books:

1) Korth, Siberschatz,"Database System Concepts", McGraw-Hill, 27-Jan-2010

References:

1) Elmarsi and Navathe.,"Fundamentals of Database Systems", McGraw-Hill, 2010
2) Bayross ,"Oracle – the complete reference", Ivan: BPB Publications
3) "Upgrade to oracle 8", DataproInfoworld Ltd.
4) GioWiderhold."Database Design", McGraw-Hill 1995

Branch: BCA	**Semester-III**
Subject Code: 3201	**Practical: 02** **Credit: 02**
Subject Title	**MICROPROCESSORS LAB***

Modules	**Sr. No.**	**Topic and Details**	**No of Lectures/Practicals Assigned**	**Marks Weightage %**
UNIT-I	1	Program to find addition of two 8-bit numbers	1	2
	2	Program to find subtraction of two 8-bit numbers	1	2
	3	Program to find addition of two 16-bit numbers	1	2
	4	Program to find subtraction of two 16-bit numbers	1	2
UNIT-II	5	Program to find addition of two 16-bit BCD numbers	1	2
	6	Program to find subtraction of two 8-bit BCD numbers	1	2
	7	Program to find multiplication of two 8-bit numbers using successive addition method.	1	2
	8	Program to find multiplication of two 8-bit numbers using shift and add method.	1	2
	9	Program to divide 16-bit number by an 8-bit number	1	2
UNIT-III	10	Program to Transfer a block of N bytes from source to destination	1	2
	11	Program to find maximum number in the array	1	2
	12	Program to find minimum number in the array	1	2
	12	Program to sort the numbers in ascending order	1	2
	14	Program to sort the numbers in descending order	1	2
	15	Program to convert two BCD numbers to their HEX equivalent	1	2
UNIT-IV	16	Program to convert HEX number to BCD	1	2

	17	Write a sub routine for 8085 to generate delay of 100 ms	1	2
	18	Write a sub routine for 8085 to generate delay of 10 ms	2	4
	19	Write a program to generate Fibonacci series	2	4
	20	Study of Hardware Interrupts	2	4
	21	Study of Software Interrupts	2	4
Total			25	50

Text Books:

1. R.S. Gaonkar, "Microprocessor Architecture, programming and Applications with the 8085/8080A", Wiley Eastern Ltd. 2., 1995

References:

1. Peter Norton (Sixth Edition) "Inside the PC":, January 2005
2. Yu-Cheng Liu & Glen A. Gibson, "Microprocessor System-The 8086/8088 Family"
3. "The Intel Microprocessor : 8086/8088 , 80286, 80386, Pentium, Pentium Pro. Pentium-II & III" : Barry Brey (Fourth Edition)

Branch: BCA	**Semester-III**
Subject Code: 3202	**Practical: 02** **Credit: 02**
Subject Title	**DATABASE MANAGEMENT SYSTEM LAB**

Module	**Sr.. No.**	**Topic and Details**	**No of Lectures/Practicals Assigned**	**Marks Weightage %**
UNIT-I	1	Data Base Creation, Table Creation	3	6
UNIT-II	2	Operation on Databases like insertion, deletion, updation, searching, etc	2	4
	3	Using Joining and Relational Operation in commands	5	10
UNIT-III	4	Implementation of Nested Queries	5	10
	5	Altering Table, and Fields	3	6
UNIT-IV	6	Writing and defining Constraints	2	4
	7	Normalization and Multi table query execution	5	10
Total			25	50

Text and Reference Books:

1. Oracle 8i The Complete Reference : Loney, Koch

Branch: BCA	**Semester-IV**
Subject Code: 4101	**Lecture: 04** **Credit: 04**
Subject Title	**DATA STRUCTURES AND FILE ORGANIZATION**

Modules	**Sr. No.**	**Topic and Details**	**No of Lectures Assigned**	**Marks Weightage %**
UNIT-I	1	**Introduction:** Definition, Classification of data structure (Primitive and non Primitive), Description of various data structure, Arrays, Lists, Stacks, Queues, Trees and Graphs	4	8
	2	**Arrays:** One dimensional array, its Initialization, Implementation of One dimensional array in memory, Insertion, deletion of an element from One dimensional array, Traversing of an array	4	8
UNIT-II	5	**Linked lists:** Introduction, Keyterms, Advantages& disadvantages Linear linked lists (,) ○ Types(Singly, Doubly, Circular) Operations (Inserting, Deleting nodes)	5	10
	3	**Stack :** Introduction , Stack implementation, Operations on stack (Push Pop), Implementation of stack using pointer, Applications of stack, Infix prefix, postfix notations Algorithms for converting from one form to another	6	12
	4	**Queue :** Introduction and Queue implementation, Operations on queue (Insertion & deletion), Limitations of simple queue Circular queue, Double ended queue(dequeue), Application queue& it's types	6	12
UNIT-III	6	**Trees** – Introduction, terminology, Binary tree , Creation, Operations, Strictly Binary tree, Complete Binary tree Binary tree representation, As Array and Linked lists	6	12

		Traversal (Inorder , preorder, postorder)		
	7	**Graphs** - Introduction, terminology Graph representation, Applications of graph, Graph traversal (BFS, DFS, Shortest path), Spannig tree, Minimum spanning tree	6	12
	8	**Searching & Sorting:** Searching (Sequential, Binary search) Sorting (Bubble sort, Selection sort, Quick sort, Heap sort, Insertion sort)	5	10
UNIT-IV	9	**Introduction to Files & Concept of Record:** Definition, Forming Records, Modes of Accessing Files, File Organisation (Sequential, Relative, Direct Access, Indexed Sequential Files), Multi key Files, File Systems, Primitive Operations on Files (Open/ Close, Read/ Write Next, Read_Direct, Write_Direct, Update , Append, Allocate, Deallocate	4	8
	10	**Direct File Organisation:** Introduction, Hashing Function, Properties of good Hashing Function, Different types of Hashing Functions, Primitive Operations on Direct Files, File Functions	4	8
		Total	50	100

Text Books:

1. S. Sawhney& E. Horowitz,"Fundamentals Of Data Structure", , Computer Science Press, 1987

References:

1. Trembley&Sorrenson "Data Structure",2005
2. Lipschuists ,"Data Structure", (Schaum's Outline Series Mcgraw Hill Publication)
3. Ellis Horowitz And SartajSawhney "Fundamentals Of Computer Algorithm"
4. Aho, Hopcroft And Lulman," Data Structures And Algorithms"
5. AbhayAbhyankar,"Data Structures And Files"
6. G.S. Baluja "Data Structures Through C"
7. Mary Loomis ,"Data Management And File Structures", Prentice Hall; 2 Sub edition (January 1989)

Branch: BCA	**Semester-IV**
Subject Code: 4102	**Lecture: 04** **Credit: 04**
Subject Title	**INFORMATION SYSTEMS ANALYSIS AND DESIGN**

Modules	Sr. No.	Topic and Details	No of Lectures Assigned	Marks Weightage %
UNIT-I	1	Definition of a system Characteristics. elements, types of a system , Business Information system, Categories of a system, Introduction to structured methods of analysis, Overview of System analysis and design: Development life cycle (Waterfall, Spiral, incremental models),	5	10
	2	Role of a systems Analyst, Skills required to be , systems analyst, Requirement analysis, Role of user in requirement analysis	4	8
UNIT-II	3	Feasibility Studies, Requirements determination, Logical design, Physical design, Program design, Risk and feasibility analysis, prototyping	4	8
	4	Feasibility Analysis: Definition, Types of feasibility, steps of feasibility analysis, Feasibility Report Fact finding Techniques (Interview, Questionnaire, Record review and On site observation)	4	8
	5	Information requirement analysis: Process modelling with physical and logical data flow diagrams, Data modelling with entity relationship diagrams, Normalization up to 3NF	6	12
UNIT-II	6	Tools of SSAD Structure Chart, DFD, DD, Structured English, Decision table, Decision Tree (with examples) Input/output form/screen design	5	10
	7	System design: Process descriptions, Input/output controls, object modelling, Database design, User Interface design, Documentation, Data Dictionary,.	5	10
UNIT-IV	8	Development methodologies: Top down, bottom up, structured chart, decision table, decision tree, CASE productivity tools	6	12
	9	Testing – Unit, integration, system, Acceptance, regression, Test Case generation, Methods of testing (WBT, BBT, Alpha, Beta testing) Implementation of a system, User training	6	12
	10	Case Studies	5	10
		Total	50	100

Text Books:

1. SENN "Analysis and Design of information system" , McGraw-Hill, 1989

References:

Awad "System Analysis and Design", R.D. Irwin, 1985
Khalkar, "System Analysis and Design"
GARG "Workbook for System Analysis and Design"PHI Learning Pvt.Ltd,2004
Gane and Sarson,"System Analysis and Design ",Advanced Systems Incorporated, 1979

Branch: BCA	Semester-IV
Subject Code: 4103	Lecture: 04 Credit: 04
Subject Title	INTRODUCTION TO SOFTWARE ENGINEERING

Modules	Sr. No.	Topic and Details	No of Lectures Assigned	Marks Weightage %
UNIT-I	1	Introduction: Definition, need, software engineering methods, Tools, and procedures, Software Process: Software Engineering layers, SEI-CMM, process framework, Development Lifecycle models: Waterfall, spiral, iterative, enhancement and phased development, RAD model, Component based development model, Prototyping model. Overview, various phases, analysis, design, development and implementation.	5	10
	2	Software project planning :Overview, objectives, scope, resources	3	6
UNIT-II	3	Cost Estimation Techniques : Metrics for software productivity and quality Productivity metrics: direct and indirect methods, size and function oriented metrics, Decomposition techniques: LOC and FP estimation, Effort Estimation: Overview, COCOMO, putnam, esterling models, automated Estimation tools. Configuration and Administration; virtual hosting	5	10
	4	Software Project Scheduling: Task definition and parallelism, effort distribution, scheduling , Methods: PERT and CPM, Software project plan outline Software prototyping : Overview, steps, methods, tools, specification, guidelines	5	10
UNIT-III	5	Requirement analysis methods: introduction, methods Object oriented, data flow and data structure oriented, comparisons, application results, automated tools , Software design Methods: iterative, top-down, bottom-up	5	10
	6	Design representations: flow charts, pseudo code, HIPO and techniques , Modular design: Overview, module coupling and cohesion, various types of coupling, merits and demerits, other approaches to programming.	6	12
	7	Software implementation: Issues, concept of	6	12

		programming support environment,Risk Management Software testing Overview Various tests and methods: top-down, bottom-up, Debugging: definition, techniques and strategies, exhaustive testing, classification, cyclomatic complexity, Overview, integration of hardware and software components		
UNIT-IV	8	Strategies software configuration management, Management activity, planning, monitoring , Controlling, resource management,	5	10
	9	Product assurance: overview, quality assurance, Software quality assurance: definitions for software quality, various types, trade-offs, verification and validation	5	10
	10	Configuration management: identification, control, auditing, status accounting, , overview, definition, V and V life cycle.	5	10
		Total	50	100

Text Books:

1. Pressman "Software Engineering A Practitioner's Approach" McGraw-Hill, 5th Edition, 2005

Reference Books:

1. Shooman "Software Engineering Design, Reliability and Management" McGraw Hill 1983
   Fairley "Software Engineering Concepts" " McGraw--Hill Series, New York, 1985

Branch: BCA	**Semester-IV**
Subject Code: 4104	**Lecture: 04** **Credit: 04**
Subject Title	**OBJECT ORIENTED PROGRAMMING USING C++**

Modules	**Sr. No.**	**Topic and Details**	**No of Lectures Assigned**	**Marks Weightage %**
UNIT-I	1	**Introduction:** Introduction of POP, Principals of Object oriented programming, Differentiate POP and OOP, Object oriented programming paradigm, Basic Concepts of Object oriented programming, Benefits of OOP, Beginning with c++, Applications of c++, Program features, Comments, Output operator, Input operator, Iostream File, Cascading of I/O operators, Structure of c++ program, Client server model, Tokens	4	8

		Expressions and Control Structures, Basic data types, User define data types, Derived data types, Symbolic constants, Declaration of variables, Dynamic initialization of variables, Reference variables		
	2	**Operators in c++:** Scope resolution operator, Memory managements operators, Manipulators, Type cast operator, Expressions and their types, Implicit conversions, Control structures: If statements, Switch statements, Loop statements, Functions in c++: Main function, function proto type, Call by reference, return by reference, Inline functions, Default arguments, Const Arguments, Function overloading,	4	8
UNIT-II	3	**Classes and Object**, Memory Allocation for objects • Arrays of objects • Objects as function Arguments • Friend functions • Returning objects • Const Member functions • Pointers to members	4	8
	4	**Constructors and Destructors:** Constructors(Parameterized Constructors, Multiple constructors in a class, Constructors with default arguments, Copy constructors, Dynamic constructors) Destructors.	6	12
UNIT-III	5	Operator Overloading (Unary, Binary, Using friend functions , Manipulation of strings using operators, Rules	6	12
	6	**Inheritance ,Pointers virtual functions and polymorphism:** Inheritance (Defining derived classes, Single Inheritance, Making a private member inheritable, Visibility of inherited members, Multilevel inheritance, Multiple inheritance, Hierarchical inheritance, Hybrid inheritance, Virtual base class, Abstract class, Constructors in derived classes, Nesting of classes Pointers	6	12
UNIT-IV	7	Managing Console I/O OPERATIONS and Working with files: C++ Stream and Classes, Unformatted I/O operations, Put(),get(), getline(),write(), Formatted console I/O operations, Ios class functions and flags, Manipulators, User defined output functions	4	8
	8	**File Handling:** Classes for file stream operations, Opening and closing files, Detecting End of file, File modes, File pointers and their manipulations, Sequential input and output operations, Reading and writing class object, Command line arguments	6	12
	9	**Templates**: Class template, Class template with multiple parameters, Function template, Function template with multiple parameters, Overloading of	5	10

		Function template, Member function template, Non – type template arguments		
	10	**Exception Handling:** Basic of exception handling, Exception handling mechanism, Throwing mechanism, Catching mechanism, Multiple catch statements, Catch all exceptions, Rethrowing Exceptions,Specifying exceptions	5	10
		Total	50	100

Text Books:

1. E.Balgurusam ,"Object Oriented Programming using c++", Tata McGraw-Hill Education, 01-Jan-2006

References:

1. K.R. Venugopal"Mastering C++",Tata McGraw-hill
2. B. Stroustroup Addison Wesley "C++ Programming Language", 1997
3. B. Chandra "A Treatise on Object Oriented Programming using C++"
4. Herbert Schildt, "The complete Reference C++", Tata McGraw-Hill, 2001

Branch: BCA	**Semester-IV**
Subject Code: 4201	**Practical: 02** **Credit: 02**
Subject Title	**DATA STRUCTURES LAB**

Modules	**Sr. No.**	**Topic and Details**	**No of Lectures/Practicals Assigned**	**Marks Weightage %**
UNIT-I	1	**Arrays:** Implementations of Array and Operations-Insertion, deletion of an element from One dimensional array, Traversing of an array	2	4
	2	**Linked lists: Singular** Implementation of List and Linked List And Operations -Inserting, Deleting nodes etc	2	4
UNIT-II	3	**Linked lists:** Implementation of Two way Doubly and Circular Linked List And Operations -Inserting, Deleting nodes etc	3	6
	4	**Stack :** Stack implementation, Operations on stack (Push Pop), Implementation of stack using	4	8

		pointer, Applications of stack, Infix prefix, postfix , converting from one form to another		
UNIT-III	5	**Queue :** Implementation of Queue implementation, Operations on queue (Insertion & deletion)	3	6
	6	**Trees** – Implementation of tree as Array and Linked lists and Traversal (Inorder , preorder, postorder)	4	8
	7	**Graphs** - I Implementation of Graph traversal (BFS, DFS, Shortest path	3	6
UNIT-IV	8	**Searching & Sorting:** Implementation of Searching (Sequential, Binary search) Sorting (Bubble sort, Selection sort, Quick sort etc)	4	8
		Total	25	50

Branch: BCA	**Semester-IV**
Subject Code: 4202	**Practical: 02** **Credit: 02**
Subject Title	**OBJECT ORIENTED PROGRAMMING C++ LAB**

Modules	**Sr. No.**	**Topic and Details**	**No of Lectures/Practicals Assigned**	**Marks Weightage %**
UNIT-I	1	**Introduction:** Simple Programs on fundamental Data Types and I/O operators, Derived data types, Symbolic constants, variables and Reference variables	2	4
	2	**Operators and decision control structures:** Programs to implement If statements, Switch statements, Loop statements, Functions in c++: Main function, function proto type, Call by reference, return by reference, Inline functions, Default arguments, Const Arguments, Function overloading,	2	4
UNIT-II	3	**Classes and Object**, Programs for memory allocation for objects, Arrays of objects, Objects as function Arguments, Friend functions, Returning objects, Const Member functions, Pointers to members	2	4
	4	**Constructors and Destructors:**	2	4

		Implementations of Constructors(Parameterized Constructors, Multiple constructors in a class, Constructors with default arguments, Copy constructors, Dynamic constructors)Destructors.		
UNIT-III	5	Programs for Operator Overloading (Unary, Binary, Using friend functions etc.)	3	6
	6	**Inheritance ,Pointers virtual functions and polymorphism:** Programs for Inheritance Single, Multiple, Multilevel, Hierarchical inheritance, Hybrid inheritance, Virtual base class, Abstract class, Constructors in derived classes, Nesting of classes	3	6
UNIT-IV	7	Programs for Managing Console I/O OPERATIONS and Working with files: C++ Stream and Classes, Unformatted I/O operations, Put(),get(), getline(),write(), Formatted console I/O operations, Ios class functions and flags, Manipulators, User defined output functions	3	6
	8	**File Handling:** Implementation of Opening and closing files, Detecting End of file, File modes, File pointers and their manipulations, Sequential input and output operations, Reading and writing class object, Command line arguments	2	4
	9	**Templates**: Implementations of Class template, Class template with multiple parameters, Function template.	4	8
	10	**Exception Handling:** implementations of try, catch and throw statement for handling the exceptions.	2	4
		Total	25	50

Text Book:

1. K.R Venugopal 'Mastering C++', Tata Mcgrawlhill, 1997

References:

1. B.Stroustroup 'C++ Programming Language' (3rd Edition). Addison Wesley, 1997
2. B.chandra Narosa 'A Treatise On Object Oriented programming using C++'- Publications, 1998
3. Herbert Schildt, "The Complete Reference CN", Tata McGraw-Hili, 2001