VIVEKANAND COLLEGE, KOLHAPUR (An EMPOWERED AUTONOMOUS Institute)

STATEMENT OF SYLLABUS COVERED

Year- 2024-25 **Term- II[nd]**

Name of teacher- Miss. Shivani Subhash Kagale **Department- BCA**

Class	Subject	Syllabus assigned	Syllabus Covered	Syllabus not to Covered	Remark
B.C.A I Sem-I (AICTE Approved)	**PROBLEM SOLVING TECHNIQUES**	**Module I** : Fundamentals of Object Oriented Programming: Basic Concepts of Object Oriented Programming (OOP), Benefits and Applications of OOP. Java Evolution: Java Features, Difference between Java, C and C++, Javaand Internet, Java Environment. Overview of Java Language: Introduction to Simple Java Program, Use ofComments and Math function, Application of two classes, Java Program Structure, Java Tokens and statements, Implementing Java programAnd JVM, Command Line Arguments.	**Module I** : Fundamentals of Object Oriented Programming: Basic Concepts of Object Oriented Programming (OOP), Benefits and Applications of OOP. Java Evolution: Java Features, Difference between Java, C and C++, Javaand Internet, Java Environment. Overview of Java Language: Introduction to Simple Java Program, Use ofComments and Math function, Application of two classes, Java Program Structure, Java Tokens and statements, Implementing Java programAnd JVM, Command Line Arguments.	.....	
		Module II: Constants, Variables and Data Types: Constants, Variables, Data Types, Declaration of Variables, Giving values to Variables, Symbolic Constants, Typecasting. Operators & Expressions: Arithmetic operators, Relational operators, Logical operators, Assignment operators, Increment & Decrement operators, conditional operators, Bitwise operators, Arithmetic Expressions, Evaluation of Expressions, Type Conversions in Expressions, Operator Precedence & Associativity. Decision Making, Branching & Looping: Decision Making with Control Statements, Looping statements, Jump in loops, Labelled loops	**Module II**: Constants, Variables and Data Types: Constants, Variables, Data Types, Declaration of Variables, Giving values to Variables, Symbolic Constants, Typecasting. Operators & Expressions: Arithmetic operators, Relational operators, Logical operators, Assignment operators, Increment & Decrement operators, conditional operators, Bitwise operators, Arithmetic Expressions, Evaluation of Expressions, Type Conversions in Expressions, Operator Precedence & Associativity. Decision Making, Branching & Looping: Decision Making with Control Statements, Looping statements, Jump in loops, Labelled loops	.....	
		Module III: Classes, Objects and Methods: Defining Class,	**Module III**: Classes, Objects and Methods: Defining Class,	.....	

		Methods Declaration, Constructors, Methods Overloading, Overriding Methods, Inheritance Arrays, Strings and Vectors: 1D arrays, Creating an Array, 2D arrays, Strings, Vectors, Wrapper Classes, Enumerated Types Inheritance: Defining, extending classes, and Implementing Interfaces. Multiple inheritance and polymorphism, overriding methods, concept of Multithreading in Java	Methods Declaration, Constructors, Methods Overloading, Overriding Methods, Inheritance Arrays, Strings and Vectors: 1D arrays, Creating an Array, 2D arrays, Strings, Vectors, Wrapper Classes, Enumerated Types Inheritance: Defining, extending classes, and Implementing Interfaces. Multiple inheritance and polymorphism, overriding methods, concept of Multithreading in Java		
		Module IV: Packages: Basics of packages, System packages, Creating and accessing packages, Creating user defined packages, Adding class to a package. Exception Handling: Using the main keywords of exception handling: try, catch,throw, throws and finally; Nested try, Multiple catch statements, Creating user defined exceptions	**Module IV:** Packages: Basics of packages, System packages, Creating and accessing packages, Creating user defined packages, Adding class to a package. Exception Handling: Using the main keywords of exception handling: try, catch,throw, throws and finally; Nested try, Multiple catch statements, Creating user defined exceptions	.....	
B.C.A II Sem-IV (NEP 1.0)	**Database Management System**	**Module I Relational Database Management System:** Concept of RDBMS, Difference between DBMS andRDBMS, Features of RDBMS, Introduction of Oracle, Role and responsibilities of DBA, RDBMS Terminology- Relation, Tuple, Cardinality,Attribute, Degree, Primary Key, Domain, Codd's Rules, Relational Model, Functional Dependencies,Normalization and its types	**Module I Relational Database Management System:** Concept of RDBMS, Difference between DBMS andRDBMS, Features of RDBMS, Introduction of Oracle, Role and responsibilities of DBA, RDBMS Terminology- Relation, Tuple, Cardinality,Attribute, Degree, Primary Key, Domain, Codd's Rules, Relational Model, Functional Dependencies,Normalization and its types	.....	
		Module II Organization of DatabaseSystem: Features of SQL, Data types, Classification of SQL Commands – DDL (create, alter,drop), DML (insert, Update, delete), DCL (grant, revoke), TCL (rollback, commit),SQL Integrity Constraints-(Primary key, Foreign key,unique key, not null, default, check), Select statement with group by and order by clause, SQL Operators-arithmetic, relational, Logical, Like,Between, IN operator, SQL Functions-Arithmetic functions, ConversionFunctions, Date function, Aggregate functions, String functions	**Module II Organization of DatabaseSystem:** Features of SQL, Data types, Classification of SQL Commands – DDL (create, alter,drop), DML (insert, Update, delete), DCL (grant, revoke), TCL (rollback, commit),SQL Integrity Constraints-(Primary key, Foreign key,unique key, not null, default, check), Select statement with group by and order by clause, SQL Operators-arithmetic, relational, Logical, Like,Between, IN operator, SQL Functions-Arithmetic functions, ConversionFunctions, Date function, Aggregate functions, String functions	.....	

		Module III JOIN AND SUB QUERIES: Join types - Inner Join, Outer Join, Cross Join and selfJoin, Sub-queries, Multiple sub queries, nesting of sub queries,sub queries in DML commands, Correlated queries, Indexes, Sequences. Views-Create View, Drop, View and its Advantages. , Denial of service (DoS), Firewall and proxy server.	**Module III JOIN AND SUB QUERIES:** Join types - Inner Join, Outer Join, Cross Join and selfJoin, Sub-queries, Multiple sub queries, nesting of sub queries,sub queries in DML commands, Correlated queries, Indexes, Sequences. Views-Create View, Drop, View and its Advantages. , Denial of service (DoS), Firewall and proxy server.	.....	
		Module IV INTRODUCTION TO PL/SQL: Introduction to PL/SQL, Block Structure,Data types in PL-SQL, Control Structures-Branching statements, Iterative Control statements,Cursors –Concept, Types- Implicit, Explicit, Procedure tocreate explicit cursors, Cursor Attributes, TRIGGERS: Concept and types.	**Module IV INTRODUCTION TO PL/SQL:** Introduction to PL/SQL, Block Structure,Data types in PL-SQL, Control Structures-Branching statements, Iterative Control statements,Cursors –Concept, Types- Implicit, Explicit, Procedure tocreate explicit cursors, Cursor Attributes, TRIGGERS: Concept and types.	.....	

(Signature of the Head of Department)

HEAD
DEPARTMENT OF B. C. A.
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous)
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JUNE
1964

(Signature of the Teacher)

VIVEKANAND COLLEGE, KOLHAPUR (An EMPOWERED AUTONOMOUS Institute)

STATEMENT OF SYLLABUS COVERED

Year- 2024-25 **Term- I[st]**

Name of teacher- Miss. Shivani Subhash Kagale **Department- BCA**

Class	Subject	Syllabus assigned	Syllabus Covered	Syllabus not to Covered	Remark
B.C.A I Sem-I (AICTE Approved)	**PROBLEM SOLVING TECHNIQUES**	**Module I :** Problems And Problem Instances, Generalization and Special Cases, Types of Computational Problems, Classification of Problems, Analysis of Problems, Solution Approaches, Algorithm Development, Analysis of Algorithm, Efficiency, Correctness, Role of Data Structures in Problem Solving, Problem-Solving Steps (Understand the Problem, Plan, Execute, And Review),Breaking the Problem into Sub problems Input / Output Specification, Input Validation, Pre and Post Conditions.	**Module I :** Problems And Problem Instances, Generalization and Special Cases, Types of Computational Problems, Classification of Problems, Analysis of Problems, Solution Approaches, Algorithm Development, Analysis of Algorithm, Efficiency, Correctness, Role of Data Structures in Problem Solving, Problem-Solving Steps (Understand the Problem, Plan, Execute, And Review),Breaking the Problem into Sub problems Input / Output Specification, Input Validation, Pre and Post Conditions.	.....	
		Module II: **Structured Programming Concepts:** Sequence (Input/Output/Assignment), Selection (If, If-Else) And Repetition (For, While, Do-While) Statements, Control Structure Stacking and Nesting. Different Kinds of Repetitions : Entry Controlled, Exit Controlled, Counter Controlled, Definite, Indefinite and Sentinel-Controlled Repetitions. Pseudocode and Flowcharts. Definition And Characteristics of Algorithms, Standard Algorithm Format. Problems Involving Iteration and Nesting: Displaying Different Patterns and Shapes Using Symbols and Numbers, Generating Arithmetic and Geometric Progression, Fibonacci and Other Sequences.. Different Kinds of Data in The Real World and How	**Module II:** **Structured Programming Concepts:** Sequence (Input/Output/Assignment), Selection (If, If-Else) And Repetition (For, While, Do-While) Statements, Control Structure Stacking and Nesting. Different Kinds of Repetitions : Entry Controlled, Exit Controlled, Counter Controlled, Definite, Indefinite and Sentinel-Controlled Repetitions. Pseudocode and Flowcharts. Definition And Characteristics of Algorithms, Standard Algorithm Format. Problems Involving Iteration and Nesting: Displaying Different Patterns and Shapes Using Symbols and Numbers, Generating Arithmetic and Geometric Progression, Fibonacci and Other Sequences.. Different Kinds of Data in The Real World and How They are Represented in The Computer	.....	

		They are Represented in The Computer Memory. Representation of Integers: Signed Magnitude Form, 1's Complement And 2's Complement. Representation of Real Numbers: IEEE 754 Floating Point Representation. Representation of Characters: ASCII, UNICODE. **C Language :** Introduction To Programming Languages, Different Generations of Programming Languages. Typed Vs Typeless Programming Languages, History of C Language ,An Empty C Program. C Language Counterparts For Input (scanf()), Output (printf()) Statements, Assignment, Arithmetic, Relational and Logical Operators. If, If-Else Statements, For, While, Do-While Statements. Data Types. Translating Pseudocode/Algorithm to C Program. Incremental Compilation and Testing of The C Program. Simple Problems Involving Input, Output, Assignment Statement, Selection and Repetition. Good Coding Practices.	Memory. Representation of Integers: Signed Magnitude Form, 1's Complement And 2's Complement. Representation of Real Numbers: IEEE 754 Floating Point Representation. Representation of Characters: ASCII, UNICODE. C **Language :** Introduction To Programming Languages, Different Generations of Programming Languages. Typed Vs Typeless Programming Languages, History of C Language ,An Empty C Program. C Language Counterparts For Input (scanf()), Output (printf()) Statements, Assignment, Arithmetic, Relational and Logical Operators. If, If-Else Statements, For, While, Do-While Statements. Data Types. Translating Pseudocode/Algorithm to C Program. Incremental Compilation and Testing of The C Program. Simple Problems Involving Input, Output, Assignment Statement, Selection and Repetition. Good Coding Practices.		
		Module III: **Problems on Numbers**: Extracting Digits of a Number (Left to Right and Right to Left), Palindrome, Prime Number, Prime Factors, Amicable Number, Perfect Number, Armstrong Number, Factorial, Converting Number from One Base to Another. Statistics (Maximum, Minimum, Sum and Average) on a Sequence of Numbers which are Read using Sentinel-Controlled Repetition using only a few Variables. C Language: else-if Ladder, switch Case, Increment/Decrement Operators, break and continue Statements	**Module III:** **Problems on Numbers:** Extracting Digits of a Number (Left to Right and Right to Left), Palindrome, Prime Number, Prime Factors, Amicable Number, Perfect Number, Armstrong Number, Factorial, Converting Number from One Base to Another. Statistics (Maximum, Minimum, Sum and Average) on a Sequence of Numbers which are Read using Sentinel- Controlled Repetition using only a few Variables. C Language: else-if Ladder, switch Case, Increment/Decrement Operators, break and continue Statements	.....	
		Module IV: Modular Programming, Top- Down and	**Module IV :** Modular Programming, Top- Down and	.....	

		Bottom-Up Approaches to Problem Solving. Recursion. Problems on Arrays: Reading and Writing of Array Elements, Maximum, Minimum, Sum, Average, Median and Mode. Sequential And Binary Search. Anyone Sorting Algorithm. Matrix Operations. C Language: Function Definition and Declaration (Prototype), Role of Return Statement, One Dimensional and Two-Dimensional Arrays. String Functions. Other Operators, Operator Precedence and Associativity. Debugging	Bottom-Up Approaches to Problem Solving. Recursion. Problems on Arrays: Reading and Writing of Array Elements, Maximum, Minimum, Sum, Average, Median and Mode. Sequential And Binary Search. Anyone Sorting Algorithm. Matrix Operations. C Language: Function Definition and Declaration (Prototype), Role of Return Statement, One Dimensional and Two-Dimensional Arrays. String Functions. Other Operators, Operator Precedence and Associativity. Debugging		
B.C.A II Sem-III (NEP 1.0)	**Database Management System**	**Module I Introduction of Database :** Introduction :Definition of DBMS, file processing system Vs DBMS, Limitation of file processing system, Comparison of File processing system and DBMS, Advantages and Disadvantages of DBMS, Users of DBMS, Database Designers, Application programmer, Sophisticated Users, End Users ,Capabilities of good DBMS, Types of Database System: Centralized database system, client-server system, Distributed database system.	**Module I Introduction of Database:** Introduction :Definition of DBMS, file processing system Vs DBMS, Limitation of file processing system, Comparison of File processing system and DBMS, Advantages and Disadvantages of DBMS, Users of DBMS, Database Designers, Application programmer, Sophisticated Users, End Users ,Capabilities of good DBMS, Types of Database System: Centralized database system, client-server system, Distributed database system.	.....	
		Module II Organization of Database System: Logical and Physical Files : Logical and Physical Files Definitions ,File Structure :Basic File Operations,Opening Files ,Closing Files,Reading and Writing,Seeking ,File Organization: Field and Record structure in file,Record Types,Types of file organization: Files of Unordered Records (Heap Files) ,File of Ordered Records (Sorted Files), Hash Files,Indexed file	**Module II Organization of DatabaseSystem :** Logical and Physical Files : Logical and Physical Files Definitions ,File Structure :Basic File Operations,Opening Files ,Closing Files,Reading and Writing,Seeking ,File Organization: Field and Record structure in file,Record Types,Types of file organization: Files of Unordered Records (Heap Files) ,File of Ordered Records (Sorted Files), Hash Files,Indexed file	.....	
		Module III Data Models : Introduction, Data Models, Object Based Logical Model, Record Base Logical Model a. Relational Model b. Network Model c. Hierarchical Model, Entity	**Module III Data Models :** Introduction, Data Models, Object Based Logical Model, Record Base Logical Model a. Relational Model b. Network Model c. Hierarchical Model, Entity Relationship	.....	

		Relationship Model, Entity Set, Attribute, Relationship Set, E-R Model terms Introduction a. Relation b. Tuple c. Attribute d. Cardinalitye. Degree f. Domain, Keys: Super Key, Candidate Key, Primary Key, Foreign Key,. Relational Database Design, Introduction Normalization: Normal Form 1 NF, 2 NF,3 NF	Model, Entity Set, Attribute, Relationship Set, E-R Model terms Introduction a. Relation b. Tuple c. Attribute d. Cardinality e. Degree f. Domain, Keys: Super Key, Candidate Key, Primary Key, Foreign Key,. Relational Database Design, Introduction Normalization: Normal Form 1 NF, 2 NF,3 NF		
		Module IV Relational algebra: Introduction, Operations- a. Select, b. Project, c. Union, d. Difference,e.Intersection, f. Cartesian Product, g. Natural Join,. SQL (Structured Query Language: Introduction, History of SQL, Basic Structure, DDL Commands, DML Commands, Simple Queries , Nested Queries, Aggregate Functions, Clauses	**Module IV Relational algebra:** Introduction, Operations- a. Select, b. Project, c. Union, d. Difference,e.Intersection, f. Cartesian Product, g. Natural Join,. SQL (Structured Query Language: Introduction, History of SQL, Basic Structure, DDL Commands, DML Commands, Simple Queries , Nested Queries, Aggregate Functions, Clauses	.....	
B.C.A III Sem-IV	**Python Programming**	**Module I INTRODUCTION TO PYTHON:** Installation, Spyder IDE, Python Interpreter, History Of Python, Python Features, Applications Of Python, Data Types, Types Of Operators, Operators Precedence, Expressions, Statements, Functions, Comment, Strings - Accessing Values In Strings, Updating Strings, Escape Characters, Built-In String Methods, User Input	**Module I INTRODUCTION TO PYTHON:** Installation, Spyder IDE, Python Interpreter, History Of Python, Python Features, Applications Of Python, Data Types, Types Of Operators, Operators Precedence, Expressions, Statements, Functions, Comment, Strings - Accessing Values In Strings, Updating Strings, Escape Characters, Built-In String Methods, User Input		
		Module II CONTROL FLOW AND LOOPS : Conditionals: Boolean Values And Operators, Conditional (If), Alternative (If-Else) ,Chained Conditional (If-Elif-Else) Looping-While Loop, The Infinite Loop, For Loop, Iterating BySequence Index, Using Else Statement With Loops, Nested Loops, Break, Continue & Pass Statement. Functions: Function With Arguments, Lambda Functions	**Module II** CONTROL FLOW AND LOOPS : Conditionals: Boolean Values And Operators, Conditional (If), Alternative (If-Else) ,Chained Conditional (If-Elif-Else) Looping-While Loop, The Infinite Loop, For Loop, Iterating BySequence Index, Using Else Statement With Loops, Nested Loops, Break, Continue & Pass Statement. Functions: Function With Arguments, Lambda Functions		
		Module III LISTS, TUPLES, DICTIONARIES AND SET: Lists-Create	**Module III LISTS, TUPLES, DICTIONARIES AND SET:** Lists-Create a		

		a List, Get and Set Items ,Add and Remove Items, List Slices, Different List Methods TUPLES - Creation and Accessing Values, Updating Tuples, Deleting Tuple Elements, Basic Tuples Operations, Indexing, Slicing DICTIONARYAccessing Values in Dictionary, Updating Dictionary, Delete Dictionary Elements, Properties of Dictionary Keys, BuiltInDictionary Functions and Methods. SETS -Concept of Sets, Creating, Initializing and Accessing the Elements, Sets Operation.	List, Get and Set Items ,Add and Remove Items, List Slices, Different List Methods TUPLES - Creation and Accessing Values, Updating Tuples, Deleting Tuple Elements, Basic Tuples Operations, Indexing, Slicing DICTIONARYAccessing Values in Dictionary, Updating Dictionary, Delete Dictionary Elements, Properties of Dictionary Keys, BuiltInDictionary Functions and Methods. SETS -Concept of Sets, Creating, Initializing and Accessing the Elements, Sets Operation.		
		Module IV MODULES, FILES I/O,GUI: The Import Statement, Modules (Datetime, Calendar, Math Module) Files I/O: Text Files, Reading And Writing Files Introduction To GUI In Python	**Module IV MODULES, FILES I/O,GUI:** The Import Statement, Modules (Datetime, Calendar, Math Module) Files I/O: Text Files, Reading And Writing Files Introduction To GUI In Python		

(Signature of the Head of Department)

(Signature of the Teacher)

HEAD
DEPARTMENT OF B. C. A.
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

VIVEKANAND COLLEGE, KOLHAPUR
(An Empowered Autonomous Institute)
STATEMENT OF SYLLABUS COVERED

Year- 2024-25 **Term- I & II**

Name of teacher- Miss. Prajakta Popat Misal **Department- BCA**

Class	Subject	Syllabus assigned	Syllabus Covered	Syllabus not to Covered	Remark
B.C.A-II Sem- III	Object Oriented Programming using C++ Object Oriented Programming using C++	**Module I** Principles of Objective Oriented Programming History of OOP, Introduction to Object Oriented Programming, Basic Concepts of Object Oriented Programming, Benefits of Object Oriented Programming, Object Oriented Languages, Difference between C and C++. Beginning with C++ Tokens, Keywords, Identifiers and Constants, Data Types, Type Compatibility, Variables, Operators in C++, Operator Precedence, Control Structures (Conditional, Unconditional and Looping).	**Module I** Principles of Objective Oriented Programming History of OOP, Introduction to Object Oriented Programming, Basic Concepts of Object Oriented Programming, Benefits of Object Oriented Programming, Object Oriented Languages, Difference between C and C++. Beginning with C++ Tokens, Keywords, Identifiers and Constants, Data Types, Type Compatibility, Variables, Operators in C++, Operator Precedence, Control Structures (Conditional, Unconditional and Looping).	.....	
		Module II Functions in C++, Classes & Objects Concept of Function, main() Function, Inline Functions, Function Overloading, Specifying a Class, Data members and Member Functions, Access Specifiers, Friend Function, Static data Member, Object declaration and Initialization, Arrays of ObjectsConstructors & Destructors, Inheritance Constructors-Definition, Use ofConstructors, Types of Constructors (Default, Parameterized, Copy, Dynamic),Destructors-Definition, Use, Inheritance Definition,Types of Inheritance (Single, Multiple, Multilevel, Hierarchical, Hybrid)	**Module II** Functions in C++, Classes & Objects Concept of Function, main() Function, Inline Functions, Function Overloading, Specifying a Class, Data members and Member Functions, Access Specifiers, Friend Function, Static data Member, Object declaration and Initialization, Arrays of Object Constructors & Destructors, Inheritance Constructors-Definition, Use of Constructors, Types of Constructors (Default, Parameterized, Copy, Dynamic), Destructors-Definition, Use, Inheritance-Definition, Types of Inheritance (Single, Multiple, Multilevel, Hierarchical, Hybrid)	.....	

		Module III Pointers, Virtual Functions &Polymorphism Pointer, Pointer to Object, this pointer, Pointer to Derived Classes, Polymorphism: Meaning, compile Time and Run time polymorphism, Rules for Operator Overloading, Operator Overloading (Unary & Binary)-with member function and friend function.	**Module III** Pointers, Virtual Functions &Polymorphism Pointer, Pointer to Object, this pointer, Pointer to Derived Classes, Polymorphism: Meaning, compile Time and Run time polymorphism, Rules for Operator Overloading, Operator Overloading (Unary & Binary)-with member function and friend function.	.....	
		Module IV Working with Files File-Definition, Use, Classes for File Stream Operations, Opening and Closing a File, File Opening Modes, File Pointers, Manipulation of File Pointer(using seekg,seekp,tellg,tellp), Input Output Operations-get ( )Put ( ), read ( ) Write ( ).	**Module IV** Working with Files File-Definition, Use, Classes for File Stream Operations, Opening and Closing a File, File Opening Modes, File Pointers, Manipulation of File Pointer(using-seekg,seekp,tellg,tellp), Input Output Operations-get ( )Put ( ), read ( ) Write ( ).		
B.C.A-III Sem- V	**Python**	**Module I** INTRODUCTION TO PYTHON Installation, Spyder IDE, Python Interpreter, History Of Python, Python Features, Applications Of Python, Data Types, Types Of Operators,Operators Precedence, Expressions, Statements,Functions,Comment,String-Accessing Values In Strings, Updating Strings, Escape Characters, Built-In String Methods, User Input	**Module I** INTRODUCTION TO PYTHON Installation, Spyder IDE, Python Interpreter, History Of Python, Python Features, Applications Of Python, Data Types, Types Of Operators,Operators Precedence, Expressions, Statements,Functions,Comment,String-Accessing Values In Strings, Updating Strings, Escape Characters, Built-In String Methods, User Input	.....	
		Module II CONTROL FLOW AND LOOPSConditionals: Boolean Values And Operators, Conditional (If), Alternative (If-Else) ,Chained Conditional (If-Elif-Else) Looping-While Loop, The Infinite Loop, For Loop, Iterating By Sequence Index, Using Else Statement With Loops, Nested Loops, Break, Continue & Pass Statement.Functions: Function With Arguments, Lambda Functions	**Module II** CONTROL FLOW AND LOOPS Conditionals: Boolean Values And Operators, Conditional (If), Alternative (If-Else) ,Chained Conditional (If-Elif-Else) Looping-While Loop, The Infinite Loop, For Loop, Iterating By Sequence Index, Using Else Statement With Loops, Nested Loops, Break, Continue & Pass Statement. Functions: Function With Arguments, Lambda Functions		

		Module III LISTS, TUPLES, DICTIONARIES AND SET Lists-Create a List, Get and Set Items ,Add and Remove Items, List Slices,Different List Methods TUPLES - Creation and Accessing Values, Updating Tuples, Deleting Tuple Elements, Basic Tuples Operations,Indexing, Slicing DICTIONARY- Accessing Values in Dictionary, Updating Dictionary, Delete Dictionary Elements, Properties of Dictionary Keys, Built In Dictionary Functions and Methods. SETS -Concept of Sets,Creating, Initializing and Accessing the Elements, Sets Operation.	**Module III** LISTS, TUPLES, DICTIONARIES AND SET Lists-Create a List, Get and Set Items ,Add and Remove Items, List Slices,Different List Methods TUPLES - Creation and Accessing Values, Updating Tuples, Deleting Tuple Elements, Basic Tuples Operations,Indexing, Slicing DICTIONARY- Accessing Values in Dictionary, Updating Dictionary, Delete Dictionary Elements, Properties of Dictionary Keys, Built In Dictionary Functions and Methods. SETS -Concept of Sets,Creating, Initializing and Accessing the Elements, Sets Operation.		
		Module IV MODULES, FILES I/O,GUI The Import Statement, Modules (Date time, Calendar, Math Module) Files I/O: Text Files, Reading And Writing .Files Introduction To GUI In Python	**Module IV** MODULES, FILES I/O,GUI The Import Statement, Modules (Date time, Calendar, Math Module) Files I/O: Text Files, Reading And Writing.Files Introduction To GUI In Python		
B.C.A II Sem-IV	**Data Structure Using C++**	**Module I** **Introduction to data structures** Introduction to Array, Introduction to Data Structures, Concept of Abstract Data types,Array as ADT, Data structures and its types,Data structures operations	**Module I** **Introduction to data structures** Introduction to Array, Introduction to Data Structures, Concept of Abstract Data types,Array as ADT, Data structures and its types,Data structures operations		
		Module II **Searching and Sorting and Methods** Introduction to Searching and Sorting,Searching: Linear search, Binary search and hashing, Sorting: Bubble Sort, Insertion sort, Selection sort, Merge sort,	**Module II** **Searching and Sorting and Methods** Introduction to Searching and Sorting, Searching: Linear search, Binary search and hashing,Sorting: Bubble Sort, Insertion sort, Selection sort, Merge sort,	.....	

		Module III **Stacks and Queues** Introduction to stack, Primitive Stack operations: Push & Pop, Array and Linked Implementation of Stack in C++, Application of stack: Prefix and Postfix Expressions Evaluation, Definition of queue, Operations on queue, Types of queue-Linear, Circular, Applications of queue	**Module III** **Stacks and Queues** Introduction to stack, Primitive Stack operations: Push & Pop, Array and Linked Implementation of Stack in C++, Application of stack: Prefix and Postfix Expressions Evaluation, Definition of queue, Operations on queue, Types of queue-Linear, Circular, Applications of queue	.....	
		Module IV **Linked Lists and Trees** Introduction to Pointer, Introduction to linked lists, Implementation of Linked list, Types of Linked List: Singly, Doubly and Circular, Operations on linear linked list: Traversal, Insertion, Deletion, Searching Trees: definition, terminologies, representation, types, Tree Traversal- (Preorder, Inorder, Postorder)	**Module IV** **Linked Lists and Trees** Introduction to Pointer, Introduction to linked lists, Implementation of Linked list, Types of Linked List: Singly, Doubly and Circular, Operations on linear linked list: Traversal, Insertion, Deletion, Searching Trees: definition, terminologies, representation, types, Tree Traversal- (Preorder, Inorder, Postorder)	.....	
B.C.A-III Sem- VI	**Java Programming**	**Module I** **JavaFundamentals** Introduction to Java, History and Features of Java, C++ vs Java, Simple Java Program, Internal path seting, JDK, JRE, and JVM (Java Virtual Machine),JVM Memory Management, data types, Unicode System, Operators, Keywords, and Control Statements, methods, constructor, class,objects,methods,Accessmodifiers,statickeyword,finalkeyword,STRING Manipulation,Array	**Module I** **JavaFundamentals** Introduction to Java, History and Features of Java, C++ vs Java, Simple Java Program, Internal path seting, JDK, JRE, and JVM (Java Virtual Machine),JVM Memory Management, data types, Unicode System, Operators, Keywords, and Control Statements, methods, constructor, class,objects,methods,Accessmodifiers,statickeyword,finalkeyword,STRING Manipulation,Array		

		Module II **Inheritance, Polymorphism and Encapsulation** Inheritance in Java, Is-A Relationship, Aggregation and Composition(HAS-A),Types of inheritance, this & super keyword Polymorphism in Java, Types of polymorphism, Static and Dynamic Binding, Abstract class and method	**Module II** **Inheritance, Polymorphism and Encapsulation** Inheritance in Java, Is-A Relationship, Aggregation and Composition(HAS-A),Types of inheritance, this & super keyword Polymorphism in Java, Types of polymorphism, Static and Dynamic Binding, Abstract class and method		
		Module III **Package, Multithreading and Exception handling** Defining & create packages, system packages,Introduction of Exception, Pre - Defined Exceptions, Try-Catch-Finally, Throws, throw,User Defined Exception examples, Multithreading- introduction, Thread Creations, Thread Life Cycle, Life Cycle Methods, Synchronization, Wait() notify() notify all() methods	**Module III** **Package, Multithreading and Exception handling** Defining & create packages, system packages, Introduction of Exception, Pre -Defined Exceptions, Try-Catch-Finally, Throws, throw,User Defined Exception examples, Multithreading-introduction, Thread Creations, Thread Life Cycle, Life Cycle Methods, Synchronization, Wait() notify() notify all() methods		
		Module IV **AWT,SWING (JFC)** Introduction and Components of AWT, Event-Delegation Model, Listeners, Layouts, Individual Components Label, Button, Check Box, Radio Button, Introduction Diff B/W AWT and SWING, Components hierarchy, Panes, Individual Swings components J Label, JButton, JText Field, JTextArea	**Module IV** **AWT,SWING (JFC)** Introduction and Components of AWT, Event-Delegation Model, Listeners, Layouts, Individual Components Label, Button, Check Box, Radio Button, Introduction Diff B/W AWT and SWING, Components hierarchy, Panes, Individual Swings components J Label, JButton, JText Field, JTextArea		

HEAD
DEPARTMENT OF B. C. A.
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

(Signature of the Head of Department)

(Signature of the Teacher)

VIVEKANAND COLLEGE, KOLHAPUR
(Empowered Autonomous Institution)
STATEMENT OF SYLLABUS COVERED

Year- 2024-25 **Term- I &II**

Name of teacher- Miss Pratiksha Prakash Deshmukh **Department-BCA**

Class	Subject	Syllabus assigned	Syllabus Covered	Syllabus not to Covered	Rem
B.C.A-III Sem-V	**Cloud Computing**	**Module I** Introduction to Cloud Computing Introduction 1.2 Roots of Cloud Computing 1.3 Layers and Types of Cloud 1.4 Desired Features of a Cloud Platform as a Service Providers 1.6Architecture of cloud computing 1.7Challenges in the cloud Types of Cloud : Private, Public, Hybrid	**Module I** Introduction to Cloud Computing 1.1Introduction 1.2 Roots of Cloud Computing 1.3 Layers and Types of Cloud 1.4 Desired Features of a Cloud 1.5 Platform as a Service Providers 1.6Architecture of cloud computing 1.7Challenges in the cloud Types of Cloud : Private, Public, Hybrid	.....	
		Module II Virtualization 2.1 Introducing virtualization and its benefits 2.2 Implementation Levels of Virtualization 2.3 Virtualization at the OS Model 2.4 Virtualization Structure: Hosted Structure, Bare-Metal 2.5 Structure Virtualization of CPU, Memory, and I/O Devices 2.6 Virtualization in Multicore Processors 2.7 Virtual Clusters and Resource management	**Module II** Virtualization 2.1 Introducing virtualization and its benefits 2.2 Implementation Levels of Virtualization 2.3 Virtualization at the OS Model 2.4 Virtualization Structure: Hosted Structure, Bare-Metal 2.5 Structure Virtualization of CPU, Memory, and I/O Devices 2.6 Virtualization in Multicore Processors 2.7 Virtual Clusters and Resource management		

		Module III Cloud Computing Services 3.1 Infrastructure as a Service 3.2 Platform as a service 3.3 Leveraging PaaS for productivity 3.4 Guidelines for selecting PaasPovider 3.5 Concern with PaaS 3.6 Language and PaaS 3.7 Software as a Service 3.8 Database as a Service 3.9 Specialized Cloud Services	**Module III** Cloud Computing Services 3.1 Infrastructure as a Service 3.2 Platform as a service 3.3 Leveraging PaaS for productivity 3.4 Guidelines for selecting PaasPovider 3.5 Concern with PaaS 3.6 Language and PaaS 3.7 Software as a Service 3.8 Database as a Service 3.9 Specialized Cloud Services	.....	
		Module IV Cloud Computing Applications 4.1 Business Applications: MailChimp, Salesforce, Chatter, Paypal 4.2 Education Applications: Google Apps for Education, Chrome books for Education, Tablets with Google Play for Education 4.4 Entertainment Applications: Online games, Video Conferencing Apps, 4.5 Social Applications: Facebook, Twitter, LinkedIn	**Module IV** Cloud Computing Applications 4.1 Business Applications: Mail Chimp, Salesforce, Chatter, Paypal 4.2 Education Applications: Google Apps for Education, Chrome books for Education, Tablets with Google Play for Education 4.4 Entertainment Applications: Online games, Video Conferencing Apps, 4.5 **Social Applications: Facebook, Twitter, LinkedIn**	.....	

		Module III Pointers, Virtual Functions &Polymorphism Pointer, Pointer to Object, this pointer, Pointer to Derived Classes, Polymorphism: Meaning, compile Time and Run time polymorphism,Rules for Operator Overloading, Operator Overloading (Unary & Binary)-with member function and friend function.	**Module III** Pointers, Virtual Functions &Polymorphism Pointer, Pointer to Object, this pointer, Pointer to Derived Classes, Polymorphism: Meaning, compile Time and Run time polymorphism, Rules for Operator Overloading, Operator Overloading (Unary & Binary)-with member function and friend function.		
		Module IV Working with Files File- Definition, Use, Classes for File Stream Operations, Opening and Closing a File, File Opening Modes, File Pointers, Manipulation of File Pointer(using-seekg,seekp,tellg,tellp), Input Output Operations-get ( )Put ( ), read ( ) Write ( )	**Module IV** Working with Files File- Definition, Use, Classes for File Stream Operations, Opening and Closing a File, File Opening Modes, File Pointers, Manipulation of File Pointer(using- seekg,seekp,tellg,tellp), Input Output Operations- get ( )Put ( ), read ( ) Write ( )	.....	

B.C.A-I Sem-I	**Computer Architecture**	**Module I** DigitalPrinciples: Definition for Digital signals, Digital logic, Digital computers, Von Neumann Architecture, Boolean Laws and Theorems, K-Map: Truth Tables to K-Map, 2, 3 and 4 variable K Map, K-Map Simplifications, Don't Care Conditions, SOP and POS. Number Systems: Decimal, Binary, Octal, Hexadecimal, Number System Conversions, Binary Arithmetic, Addition and subtraction of BCD, Octal Arithmetic, Hexadecimal Arithmetic, Binary Codes, Decimal Codes, Error detecting and correcting codes, ASCII, EBCDIC, Excess- 3 Code, The Gray Code.	**Module I** DigitalPrinciples Definition for Digital signals, Digital logic, Digital computers, Von Neumann Architecture, Boolean Laws and Theorems, K-Map: Truth Tables to K-Map, 2, 3 and 4 variable K Map, K-Map Simplifications, Don't Care Conditions, SOP and POS. NumberSystems Decimal, Binary,Octal, Hexadecimal, Number System Conversions, Binary Arithmetic, Addition and subtraction of BCD, Octal Arithmetic, Hexadecimal Arithmetic, Binary Codes, Decimal Codes, Error detecting and correcting codes, ASCII, EBCDIC, Excess- 3 Code, The Gray Code.	.....
		Module II Combinational Circuits: Half Adder and Full Adder, Subtractor, Decoders, Encoder, Multiplexer, Demultiplexer Sequential Circuits: Flip-Flops- SR Flip- Flop, D Flip-Flop, J-K Flip-Flop, T Flip-Flop. Register: 4 bit register with parallel load, Shift Registers- Bidirectional shift register with parallel load Binary Counters-4 bit synchronous and Asynchronous binary counter.	**Module II** Combinational Circuits: Half Adder andFullAdder, Subtractor, Decoders, Encoder, Multiplexer, Demultiplexer Sequential Circuits: Flip-Flops- SR Flip- Flop, D Flip-Flop, J-K Flip-Flop, T Flip-Flop. Register: 4 bit register with parallel load, Shift Registers- Bidirectional shift register with parallel load Binary Counters-4 bit synchronous and Asynchronous binary counter.	

		Module III Basic Computer Organization and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-Output Interrupt, Complete Computer Description, Design of Basic Computer, Design of Accumulator logic. Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer(RISC), RISC Vs CISC.	**Module III** Basic Computer Organization and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input- Output Interrupt, Complete Computer Description, Design of Basic Computer, Design of Accumulator logic. Central Processing Unit: Introduction, General Register Organization, Stack Organization,InstructionFo rmats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer(RISC), RISC Vs CISC.	.....
		Module IV Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline. Input-Output Organization: Peripheral Devices, Input- Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct memory Access, Input- Output Processor(IOP). Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory, Virtual Memory, Memory Management Hardware.	**Module IV** Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline. Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct memory Access, Input-Output Processor(IOP). Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory, Virtual Memory, Memory Management Hardware.	

B.C.A-III Sem-VI	**Java Programming**	**Module I** Java Fundamentals Introduction to Java, History and Features of Java, C++ vs Java, Simple Java Program, Internal path setting, JDK, JRE, and JVM (Java Virtual Machine),JVM Memory Management, data types, Unicode System, Operators, Keywords, and Control Statements, methods, constructor, class,objects,methods,Access modifiers,static keyword,final key word,STRING Manipulation,Array	**Module I** Java Fundamentals Introduction to Java, History and Features of Java, C++ vs Java, Simple Java Program, Internal path setting, JDK, JRE, and JVM (Java Virtual Machine),JVM Memory Management, data types, Unicode System, Operators, Keywords, and Control Statements, methods, constructor, class,objects,methods,Access modifiers,static keyword,final keyword, String Manipulation,Array	.....	
		Module II Inheritance, Polymorphism and Encapsulation Inheritance in Java, Is-A Relationship, Aggregation and Composition(HAS-A),Types of inheritance, this & super keyword Polymorphism in Java, Types of polymorphism, Static and Dynamic Binding, Abstract class and method	**Module II** Inheritance, Polymorphism and Encapsulation Inheritance in Java, Is-A Relationship, Aggregation and Composition(HAS-A), Types of inheritance, this & super keyword Polymorphism in Java, Types of polymorphism, Static and Dynamic Binding, Abstract class and method	.....	
		Module III Package, Multithreading and Exception handling Defining & create packages, system packages,Introduction of Exception, Pre - Defined Exceptions, Try-Catch-Finally, Throws, throw,User Defined Exception examples, Multithreading- introduction, Thread Creations, Thread Life Cycle, Life Cycle Methods, Synchronization, Wait() notify() notify all() methods	**Module III** Package, Multithreading and Exception handling Defining & create packages, system packages, Introduction of Exception, Pre -Defined Exceptions, Try-Catch- Finally, Throws, throw,User Defined Exception examples, Multithreading- introduction, Thread Creations, Thread Life Cycle, Life Cycle Methods, Synchronization, Wait() notify() notify all() methods		

		Module IV AWT,SWING (JFC) Introduction and Components of AWT, Event-Delegation Model, Listeners, Layouts, Individual Components Label, Button, Check Box, Radio Button, Introduction Diff B/W AWT and SWING, Components hierarchy, Panes, Individual Swings components J Label, JButton, JText Field, JTextArea	**Module IV** AWT,SWING (JFC) Introduction and Components of AWT, Event-Delegation Model, Listeners, Layouts, Individual Components Label, Button, Check Box, Radio Button, Introduction Diff B/W AWT and SWING, Components hierarchy, Panes, Individual Swings components J Label, JButton, JText Field, JTextArea		
B.C.A-I Sem-II	**Object Oriented Programming using Java**	**Module I** Fundamentals of Object Oriented Programming: Basic Concepts of Object Oriented Programming (OOP), Benefits and Applications of OOP. Java Evolution: Java Features, Overview of Java Language: Introduction to Simple Java Program, Use ofComments and Math function, Application of two classes, Java Program Structure, Java Tokens and statements, Implementing Java programAnd JVM, Command Line Arguments.	**Module I** Fundamentals of Object Oriented Programming: Basic Concepts of Object Oriented Programming (OOP), Benefits and Applications of OOP. Java Evolution: Java Features, Difference between Java, C and C++, Java and Internet, Java Environment. Overview of Java Language: Introduction to Simple Java Program, Use ofComments and Math function, Application of two classes, Java Program Structure, Java Tokens and statements, Implementing Java programAnd JVM, Command Line Arguments.	.....	
		Module II Constants, Variables and Data Types: Constants, Variables, Data Types, Declaration of Variables, Giving values to Variables, Symbolic Constants, Typecasting. Operators & Expressions: Arithmetic operators, Relational operators, Logical operators, Assignment operators, Increment & Decrement operators, conditional operators, Bitwise operators, Arithmetic Expressions, Evaluation of Expressions, Type Conversions in Expressions, Operator Precedence	**Module II** Constants, Variables and Data Types: Constants, Variables, Data Types, Declaration of Variables, Giving values to Variables, Symbolic Constants, Typecasting. Operators & Expressions: Arithmetic operators, Relational operators, Logical operators, Assignment operators, Increment & Decrement operators conditional operators, Bitwise operators, Arithmetic Expressions, Evaluation of Expressions, Type Conversions in Expressions, Operator Precedence		

		& Associativity. Decision Making, Branching & Looping: Decision Making with ControlStatements,Looping statements, Jump in loops, Labelled loops.	& Associativity. Decision Making, Branching & Looping: Decision Making with ControlStatements, Looping statements, Jump in loops, Labelled loops.		
		Module III Classes, Objects and Methods: Defining Class, Methods Declaration,Constructors, Methods Overloading, Overriding Methods, Inheritance Arrays, Strings and Vectors: 1D arrays, Creating an Array, 2D arrays, Strings,Vectors, Wrapper Classes, Enumerated Types Inheritance: Defining, extending classes, and Implementing Interfaces. Multipleinheritance and polymorphism.	**Module III** Classes, Objects and Methods: Defining Class, Methods Declaration,Constructors, Methods Overloading, Overriding ,Methods, Inheritance Arrays, Strings and Vectors: 1D arrays, Creating an Array, 2D arrays, Strings,Vectors, Wrapper Classes, Enumerated Types Inheritance: Defining,extending classes, and Implementing Interfaces. Multipleinheritance and polymorphism.		
		Module IV Packages: Basics of packages, System packages, Creating and accessing packages, Creating user defined packages, Adding class to a package. Exception Handling: Using the main keywords of exception handling: try, catch,throw, throws and finally; Nested try, Multiple catch statements, Creating user defined exceptions	**Module IV** Packages: Basics of packages, System packages, Creating and accessingpackages, Creating user defined packages, Adding class to a package. Exception Handling: Using the main keywords of exception handling: try, catch,throw, throws and finally; Nested try, Multiple catch statements, Creating user defined exceptions		

(Signature of H.O.D)

(Signature of Teacher)

VIVEKANAND COLLEGE, KOLHAPUR
(An Empowered Autonomous Institute)
STATEMENT OF SYLLABUS COVERED

Year- 2024-25 **Term- I &II**

Name of teacher- Miss. Vaishnavi Arun Kotamire **Department- BCA**

Class	Subject	Syllabus assigned	Syllabus Covered	Syllabus not to Covered	Remark
B.C.A- I Sem- I **(AIECT Approved)**	**Computer Architecture**	**Module I** DigitalPrinciples: Definition for Digital signals, Digital logic, Digital computers, Von Neumann Architecture, Boolean Laws and Theorems, K-Map: Truth Tables to K-Map, 2, 3 and 4 variable K Map, K-Map Simplifications, Don't Care Conditions, SOP and POS. Number Systems: Decimal, Binary, Octal, Hexadecimal, Number System Conversions, Binary Arithmetic, Addition and subtraction of BCD, Octal Arithmetic, Hexadecimal Arithmetic, Binary Codes, Decimal Codes, Error detecting and correcting codes, ASCII, EBCDIC, Excess- 3 Code, The Gray Code.	**Module I** DigitalPrinciples Definition for Digital signals, Digital logic, Digital computers, Von Neumann Architecture, Boolean Laws and Theorems, K-Map: Truth Tables to K-Map, 2, 3 and 4 variable K Map, K-Map Simplifications, Don't Care Conditions, SOP and POS. NumberSystems Decimal, Binary,Octal, Hexadecimal, Number System Conversions, Binary Arithmetic, Addition and subtraction of BCD, Octal Arithmetic, Hexadecimal Arithmetic, Binary Codes, Decimal Codes, Error detecting and correcting codes, ASCII, EBCDIC, Excess- 3 Code, The Gray Code.	.....	
		Module II Combinational Circuits: Half Adder and Full Adder, Subtractor, Decoders, Encoder, Multiplexer, Demultiplexer Sequential Circuits: Flip-Flops- SR Flip- Flop, D Flip-Flop, J-K Flip-Flop, T Flip-Flop. Register: 4 bit register with parallel load. Shift Registers- Bidirectional shift register with parallel load Binary Counters-4 bit synchronous and Asynchronous binary counter.	**Module II** Combinational Circuits: Half Adder andFullAdder, Subtractor, Decoders, Encoder, Multiplexer, Demultiplexer Sequential Circuits: Flip-Flops- SR Flip-Flop, D Flip-Flop, J-K Flip-Flop, T Flip-Flop. Register: 4 bit register with parallel load, Shift Registers- Bidirectional shift register with parallel load Binary Counters-4 bit synchronous and Asynchronous binary counter.	.....	

		Module III Basic Computer Organization and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input- Output Interrupt, Complete Computer Description, Design of Basic Computer, Design of Accumulator logic. Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer(RISC), RISC Vs CISC.	**Module III** Basic Computer Organization and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input- Output Interrupt, Complete Computer Description, Design of Basic Computer, Design of Accumulator logic. Central Processing Unit: Introduction, General Register Organization, Stack Organization,InstructionFormats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer(RISC), RISC Vs CISC.		
		Module IV Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline. Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct memory Access, Input-Output Processor(IOP). Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory, Virtual Memory, Memory Management Hardware.	**Module IV** Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline. Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct memory Access, Input-Output Processor(IOP). Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory, Virtual Memory, Memory Management Hardware.	.....	
B.C.A- II Sem- IV (NEP 1.0)	**Data Structure Using C++**	**Module I** **Introduction to data structures** Introduction to Array, Introduction to Data Structures, Concept of Abstract Data types,Array as ADT, Data structures and its types,Data structures operations	**Module I** **Introduction to data structures** Introduction to Array, Introduction to Data Structures, Concept of Abstract Data types,Array as ADT, Data structures and its types,Data structures operations	.....	
				.....	

		Module II **Searching and Sorting and Methods** Introduction to Searching and Sorting, Searching: Linear search, Binary search and hashing, Sorting: Bubble Sort, Insertion sort, Selection sort, Merge sort.	**Module II** **Searching and Sorting and Methods** Introduction to Searching and Sorting ,Searching: Linear search, Binary search and hashing, Sorting: Bubble Sort, Insertion sort, Selection sort, Merge sort.		
		Module III **Stacks and Queues** Introduction to stack, Primitive Stack operations: Push & Pop, Array and Linked Implementation of Stack in C++, Application of stack:Prefix and Postfix Expressions Evaluation,Definition of queue, Operations on queue,Types of queue-Linear, Circular, Applications of queue.	**Module III** **Stacks and Queues** Introduction to stack, Primitive Stack operations: Push & Pop, Array and Linked Implementation of Stack in C++, Application of stack: Prefix and Postfix Expressions Evaluation, Definition of queue, Operations on queue, Types of queue-Linear, Circular, Applications of queue.	.....	
		Module IV **Linked Lists and Trees** Introduction to Pointer,Introduction to linked lists,Implementation of Linked list,Types of Linked List:Singly, Doubly and Circular, Operations on linear linked list: Traversal, Insertion, Deletion, SearchingTrees: definition, terminologies, representation, types, Tree Traversal- (Preorder, Inorder, Postorder)	**Module IV** **Linked Lists and Trees** Introduction to Pointer,Introduction to linked lists,Implementation of Linked list,Types of Linked List:Singly, Doubly and Circular, Operations on linear linked list: Traversal, Insertion, Deletion, SearchingTrees: definition, terminologies, representation, types, Tree Traversal- (Preorder, Inorder, Postorder)	.....	
B.C.A- I Sem-II (AIECT Approved)	**Data Structure Using C**	**Module I** IntroductionandOverview:Definition,Classification and Operations of Data Structures. Algorithms: Complexity, Time-Space Tradeoff.	**Module I** IntroductionandOverview:Definition,Classification and Operations of Data Structures. Algorithms: Complexity, Time-Space Tradeoff.	.....	

		Arrays: Definition and Classification of Arrays, Representation of Linear Arrays in Memory, Operations on Linear Arrays: Traversing, Inserting, Deleting, Searching, Sorting and Merging. Searching: Linear Search and Binary Search, Comparison of Methods. Sorting: Bubble Sort, SelectionSort, and Insertion Sort. Two-DimensionalArrays, Representation of Two DimensionalArrays in Memory, Matrices and Sparse Matrices,Multi-Dimensional Arrays.	Arrays: Definition and Classification of Arrays, Representation of Linear Arrays in Memory, Operations on Linear Arrays: Traversing, Inserting, Deleting, Searching, Sorting and Merging. Searching: Linear Search and Binary Search, Comparison of Methods. Sorting: Bubble Sort, SelectionSort, and Insertion Sort. Two-DimensionalArrays, Representation of Two DimensionalArrays in Memory, Matrices and Sparse Matrices,Multi-Dimensional Arrays.		
		Module II Linked Lists: Definition, Comparison with Arrays, Representation, Types of Linked lists, Traversing, Inserting, Deleting and Searching in Singly Linked List, Doubly Linked List and Circular Linked List. Applications of Linked Lists: Addition of Polynomials. Hashing and Collision: Hashing, Hash Tables, Types of Hash Functions, Collision, Collision Resolution with Open Addressing and Chaining.	**Module II** Linked Lists: Definition, Comparison with Arrays, Representation, Types of Linked lists, Traversing, Inserting, Deleting and Searching in Singly Linked List, Doubly Linked List and Circular Linked List. Applications of Linked Lists: Addition of Polynomials. Hashing and Collision: Hashing, Hash Tables, Types of Hash Functions, Collision, Collision Resolution with Open Addressing and Chaining.	.....	
		Module III Stacks: Definition, Representation of Stacks using Arrays and Linked List, Operations on Stacks using Arrays and Linked List, Application of Stacks: Arithmetic Expressions, Polish Notation, Conversion of Infix Expression to Postfix Expression, Evaluation of Postfix Expression. Recursion: Definition, Recursive Notation, Runtime Stack, Applications of Recursion: Factorial of Number, GCD, Fibonacci Series and Towers of Hanoi. Queues: Definition, Representation of Queues using Array and Linked List, Types of Queue: Simple Queue, Circular Queue, Double-Ended queue, Priority Queue, Operations on Simple Queues and Circular Queues using Array and Linked List, Applications of Queues.	**Module III** Stacks: Definition, Representation of Stacks using Arrays and Linked List, Operations on Stacks using Arrays and Linked List, Application of Stacks: Arithmetic Expressions, Polish Notation, Conversion of Infix Expression to Postfix Expression, Evaluation of Postfix Expression. Recursion: Definition, Recursive Notation, Runtime Stack, Applications of Recursion: Factorial of Number, GCD, Fibonacci Series and Towers of Hanoi. Queues: Definition, Representation of Queues using Array and Linked List, Types of Queue: Simple Queue, Circular Queue, Double-Ended queue, Priority Queue, Operations on Simple Queues and Circular Queues using Array and Linked List, Applications of Queues.	.....	

		Module IV Graphs: Definition, Terminology, Representation, Traversal. Trees: Definition, Terminology, Binary Trees, Traversal of Binary Tree, Binary Search Tree, Inserting, Deleting and Searching in Binary Search Tree, Height Balanced Trees: AVL Trees, Insertion and Deletion in AVL Tree.	**Module IV** Graphs: Definition, Terminology, Representation, Traversal. Trees: Definition, Terminology, Binary Trees, Traversal of Binary Tree, Binary Search Tree, Inserting, Deleting and Searching in Binary Search Tree, Height Balanced Trees: AVL Trees, Insertion and Deletion in AVL Tree.	.....	

VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous) ESTD JUNE 1964

(Signature of the Head of Department)

HEAD
DEPARTMENT OF B. C. A.
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

(Signature of the Teacher)

VIVEKANAND COLLEGE, KOLHAPUR
(An Empowered Autonomous Institute)
STATEMENT OF SYLLABUS COVERED

Year- 2024-25 **Term- I & II**

Name of teacher- Miss. Aradhana S.Dalavi **Department- BCA**

Class	Subject	Syllabus assigned	Syllabus Covered	Syllabus not to Covered	Remark
B.C.AI Sem- I	Problem Solving Techniques	**Module I** Problems And Problem Instances, Generalization and Special Cases, Types of Computational Problems, Classification of Problems, Analysis of Problems, Solution Approaches, Algorithm Development, Analysis of Algorithm, Efficiency, Correctness, Role of Data Structures in Problem Solving, Problem-Solving Steps (Understand the Problem, Plan, Execute, And Review), Breaking the Problem into Subproblems, Input/Output Specification, Input Validation,Pre and Post Conditions.	**Module I** Problems And Problem Instances, Generalization and Special Cases, Types of Computational Problems, Classification of Problems, Analysis of Problems, Solution Approaches, Algorithm Development, Analysis of Algorithm, Efficiency, Correctness, Role of Data Structures in Problem Solving, Problem-Solving Steps (Understand the Problem, Plan, Execute, And Review), Breaking the Problem into Subproblems, Input/Output Specification, Input Validation,Pre and Post Conditions.	.....	
		Module II Structured Programming Concepts: Sequence (Input/Output/Assignment), Selection (If, If-Else) And Repetition (For, While, Do-While) Statements, Control Structure Stacking and Nesting.Different Kinds of Repetitions: Entry Controlled, Exit Controlled, Counter Controlled, Definite,Indefinite and Sentinel-Controlled Repetitions. Pseudocode and Flowcharts. Definition And Characteristics of Algorithms, Standard Algorithm Format. Problems Involving Iteration and Nesting: Displaying Different Patterns and Shapes Using Symbols and	**Module II** Structured Programming Concepts: Sequence (Input/Output/Assignment), Selection (If, If-Else) And Repetition (For, While, Do-While) Statements, Control Structure Stacking and Nesting.Different Kinds of Repetitions: Entry Controlled, Exit Controlled, Counter Controlled, Definite,Indefinite and Sentinel-Controlled Repetitions. Pseudocode and Flowcharts. Definition And Characteristics of Algorithms, Standard Algorithm Format. Problems Involving Iteration and Nesting: Displaying Different Patterns and Shapes Using Symbols and Numbers, Generating Arithmetic and Geometric	.....	

		Numbers, Generating Arithmetic and Geometric Progression, Fibonacci and Other Sequences, Approximate Values For π, Sin(x), Cos(x), Etc. Using Taylor Series. Different Kinds of Data in The Real World and How They are Represented in The Computer Memory. Representation of Integers: Signed Magnitude Form, 1's Complement And 2's Complement. Representation of Real Numbers: IEEE 754 Floating Point Representation. Representation of Characters: ASCII, UNICODE. C Language: Introduction To Programming Languages, Different Generations of Programming Languages. Typed Vs Typeless Programming Languages, History of C Language, An Empty C Program. C Language Counterparts For Input (scanf()), Output (printf()) Statements, Assignment, Arithmetic, Relational and Logical Operators. If, If-Else Statements, For, While, Do-While Statements. Data Types. Translating Pseudocode/Algorithm to C Program. Incremental Compilation and Testing of The C Program. Simple Problems Involving Input, Output, Assignment Statement, Selection and Repetition. Good Coding Practices.	Progression Fibonacci and Other Sequences, Approximate Values For π, Sin(x), Cos(x), Etc. Using Taylor Series. Different Kinds of Data in The Real World and How They are Represented in The Computer Memory. Representation of Integers: Signed Magnitude Form, 1's Complement And 2's Complement. Representation of Real Numbers: IEEE 754 Floating Point Representation. Representation of Characters: ASCII, UNICODE. C Language: Introduction To Programming Languages, Different Generations of Programming Languages. Typed Vs Typeless Programming Languages, History of C Language, An Empty C Program. C Language Counterparts For Input (scanf()), Output (printf()) Statements, Assignment, Arithmetic, Relational and Logical Operators. If, If-Else Statements, For, While, Do-While Statements. Data Types. Translating Pseudocode/Algorithm to C Program. Incremental Compilation and Testing of The C Program. Simple Problems Involving Input, Output, Assignment Statement, Selection and Repetition. Good Coding Practices.		
		Module III Problems on Numbers: Extracting Digits of a Number (Left to Right and Right to Left), Palindrome, Prime Number, Prime Factors, Amicable Number, Perfect Number, Armstrong Number, Factorial, Converting Number from One Base to Another. Statistics (Maximum, Minimum, Sum and Average) on a Sequence of Numbers which are Read using Sentinel-	**Module III** Problems on Numbers: Extracting Digits of a Number (Left to Right and Right to Left), Palindrome, Prime Number, Prime Factors, Amicable Number, Perfect Number, Armstrong Number, Factorial, Converting Number from One Base to Another. Statistics (Maximum, Minimum, Sum and Average) on a Sequence of Numbers which are Read using Sentinel-Controlled Repetition using only a few Variables. C Language: else-if Ladder, switch Case, Increment/Decrement Operators, break and	.....	

		Controlled Repetition using only a few Variables. C Language: else-if Ladder, switch Case, Increment/Decrement Operators, break and continue Statement	continue Statements.		
		Module IV Modular Programming, Top-Down and Bottom-Up Approaches to Problem Solving. Recursion. Problems on Arrays: Reading and Writing of Array Elements, Maximum, Minimum, Sum, Average, Median and Mode. Sequential And Binary Search. Any one Sorting Algorithm. Matrix Operations. C Language: Function Definition and Declaration (Prototype), Role of Return Statement, One Dimensional and Two-Dimensional Arrays. String Functions. Other Operators, Operator Precedence and Associativity. Debugging.	**Module IV** Modular Programming, Top-Down and Bottom-Up Approaches to Problem Solving. Recursion. Problems on Arrays: Reading and Writing of Array Elements, Maximum, Minimum, Sum, Average, Median and Mode. Sequential And Binary Search. Any one Sorting Algorithm. Matrix Operations. C Language: Function Definition and Declaration (Prototype), Role of Return Statement, One Dimensional and Two-Dimensional Arrays. String Functions. Other Operators, Operator Precedence and Associativity. Debugging.		
B.C.A-III Sem- VI	**Data Warehousing and Data Mining**	**Module I** Data Warehousing: Introduction to data warehousing, Data warehousing components, Building a data warehouse, Difference between database system and data warehouse, Data warehouse architecture	**Module I** Data Warehousing: Introduction to data warehousing, Data warehousing components, Building a data warehouse, Difference between database system and data warehouse, Data warehouse architecture	.....	
		Module II Data Mining: Introduction of data mining - Definition and functionalities Issues in DM, Applications of data mining, KDD process. Data Pre-processing: Data Pre-processing, Data cleaning, Data integration and transformation, Data reduction, Discretization and concept hierarchy generation, Data mining Tasks	**Module II** Data Mining: Introduction of data mining - Definition and functionalities Issues in DM, Applications of data mining, KDD process. Data Pre-processing: Data Pre-processing, Data cleaning, Data integration and transformation, Data reduction, Discretization and concept hierarchy generation, Data mining Tasks		
		Module III Data Mining techniques: Frequent item - set and association rule mining: apriori algorithm, use of sampling for frequent item- set tree algorithm, Graph	**Module III** Data Mining techniques: Frequent item - set and association rule mining: apriori algorithm, use of sampling for frequent item- set tree algorithm, Graph		

		sampling : frequent sub graph mining , tree mining ,sequence mining Classification and Prediction - Issues Regarding Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification –Prediction – Accuracy and Error Measures ..	sampling : frequent sub graph mining , tree mining ,sequence mining Classification and Prediction - Issues Regarding Classification and Prediction – Based Classification –Prediction - Accuracy and Error Measures . Classification by Decision Tree Introduction – Bayesian Classification – Rule		
		Module IV Cluster Analysis: Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods – K-Means and K-Medoid	**Module IV** Cluster Analysis: Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods – K-Means and K-Medoids		
B.C.A III Sem-VI	**Android Programming**	**Module I** Introduction to Mobile Operating System: Mobile operating system, Operating system structure, Constraints and Restrictions, Features: Multitasking Scheduling, Memory Allocation, File System Interface, Keypad Interface, I/O Interface, Protection and Security, Multimedia features. Brief history of Android, Different types of mobile applications	**Module I** Introduction to Mobile Operating System: Mobile operating system, Operating system structure, Constraints and Restrictions, Features: Multitasking Scheduling, Memory Allocation, File System Interface, Keypad Interface, I/O Interface, Protection and Security, Multimedia features. Brief history of Android, Different types of mobile applications		
		Module II Android Development Environment : Introduction to Mobile development IDE's, Setting up development environment, Android Software Development, Working with the AndroidManifest.xml, Dalvik Virtual Machine & .apk file extension, Android Architecture, Building a sample Android application using Android Studio. Android Project Structure, Working with emulator	**Module II** Android Development Environment : Introduction to Mobile development IDE's, Setting up development environment, Android Software Development, Working with the AndroidManifest.xml, Dalvik Virtual Machine & .apk file extension, Android Architecture, Building a sample Android application using Android Studio. Android Project Structure,Working with emulator.	.....	

		Module III Android Application Framework : Layouts & Drawable Resources, Basic Building blocks - Activities and Activity lifecycle, UI Components - Views & Notifications, Components for communication -Intents & type of Intents, Android API levels(versions & version names), Developing sample Application	**Module III** Android Application Framework : Layouts & Drawable Resources, Basic Building blocks - Activities and Activity lifecycle, UI Components - Views & Notifications, Components for communication -Intents & type of Intents, Android API levels(versions & version names), Developing sample Application	.....	
		Module IV Basic UI design: Form widgets, Text Fields, Layouts, Option menu, Context menu, Sub menu, Time and Date, Images and media,Composite, Alert Dialogs & Toast, Popup, Introduction to SQLite Programming, SQLite Database.	**Module IV** Basic UI design: Form widgets, Text Fields, Layouts, Option menu, Context menu, Sub menu, Time and Date, Images and media,Composite, Alert Dialogs & Toast, Popup, Introduction to SQLite Programming, SQLite Database.	.....	
B.C.A- I Sem-II	**Data Structures using C**	**Module I** Introduction and Overview: Definition, Classification and Operations of Data Structures. Algorithms: Complexity, Time-Space Trade off.Arrays: Definition and Classification of Arrays, Representation of Linear Arrays in Memory, Operations on Linear Arrays: Traversing, Inserting, Deleting, Searching, Sorting and Merging. Searching: Linear Search and Binary Search, Comparison of Methods. Sorting: Bubble Sort, Selection Sort, and Insertion Sort. Two-Dimensional Arrays, Representation of Two-Dimensional Arrays in Memory, Matrices and Sparse Matrices, Multi-Dimensional Arrays.	**Module I** Introduction and Overview: Definition, Classification and Operations of Data Structures. Algorithms: Complexity, Time-Space Trade off.Arrays: Definition and Classification of Arrays, Representation of Linear Arrays in Memory, Operations on Linear Arrays: Traversing, Inserting, Deleting, Searching, Sorting and Merging. Searching: Linear Search and Binary Search, Comparison of Methods. Sorting: Bubble Sort, Selection Sort, and Insertion Sort. Two-Dimensional Arrays, Representation of Two-Dimensional Arrays in Memory, Matrices and Sparse Matrices, Multi-Dimensional Arrays.	.....	

		Module II Linked Lists: Definition, Comparison with Arrays, Representation, Types of Linked lists, Traversing, Inserting, Deleting and Searching in Singly Linked List, Doubly Linked List and Circular Linked List. Applications of Linked Lists: Addition of Polynomials.Hashing and Collision: Hashing, Hash Tables, Types of Hash Functions, Collision, Collision Resolution with Open Addressing and Chaining.	**Module II** Linked Lists: Definition, Comparison with Arrays, Representation, Types of Linked lists, Traversing, Inserting, Deleting and Searching in Singly Linked List, Doubly Linked List and Circular Linked List. Applications of Linked Lists: Addition of Polynomials.Hashing and Collision: Hashing, Hash Tables, Types of Hash Functions, Collision, Collision Resolution with Open Addressing and Chaining.	.....	
		Module III Stacks: Definition, Representation of Stacks using Arrays and Linked List, Operations on Stacks using Arrays and Linked List, Application of Stacks: Arithmetic Expressions, Polish Notation, Conversion of Infix Expression to Postfix Expression, Evaluation of Postfix Expression.Recursion: Definition, Recursive Notation, Runtime Stack, Applications of Recursion:Factorial of Number, GCD, Fibonacci Series and Towers of Hanoi.Queues: Definition, Representation of Queues using Array and Linked List, Types of Queue:Simple Queue,Circular Queue, Double-Ended queue, Priority Queue, Operations on Simple Queues and Circular Queues using Array and Linked List, Applications of Queues.	**Module III** Stacks: Definition, Representation of Stacks using Arrays and Linked List, Operations on Stacks using Arrays and Linked List, Application of Stacks: Arithmetic Expressions, Polish Notation, Conversion of Infix Expression to Postfix Expression, Evaluation of Postfix Expression.Recursion: Definition, Recursive Notation, Runtime Stack, Applications of Recursion:Factorial of Number, GCD, Fibonacci Series and Towers of Hanoi.Queues: Definition, Representation of Queues using Array and Linked List, Types of Queue:Simple Queue,Circular Queue, Double-Ended queue, Priority Queue, Operations on Simple Queues and Circular Queues using Array and Linked List, Applications of Queues.		

		Module IV Graphs: Definition, Terminology, Representation, Traversal.Trees: Definition, Terminology, Binary Trees, Traversal of Binary Tree, Binary Search Tree,Inserting, Deleting and Searching in Binary Search Tree, Height Balanced Trees: AVL Trees, Insertion and Deletion in AVL Tree.	**Module IV** Graphs: Definition, Terminology, Representation, Traversal.Trees: Definition, Terminology, Binary Trees, Traversal of Binary Tree, Binary Search Tree,Inserting, Deleting and Searching in Binary Search Tree, Height Balanced Trees: AVL Trees, Insertion and Deletion in AVL Tree.		
BCA-I Sem-II	**Operating Systems**	**Module I** Operating Systems Overview: Definition, Evaluation of O.S, Components & Services of OS,Structure, Architecture, types of Operating Systems, Batch Systems, Concepts of Multiprogramming and Time Sharing, Parallel, Distributed and real time Systems.Operating Systems Structures: Operating system services and systems calls, system programs, operating system structure, operating systems generations.	**Module I** Operating Systems Overview: Definition, Evaluation of O.S, Components & Services of OS,Structure, Architecture, types of Operating Systems, Batch Systems, Concepts of Multiprogramming and Time Sharing, Parallel, Distributed and real time Systems.Operating Systems Structures: Operating system services and systems calls, system programs, operating system structure, operating systems generations.		
		Module II Process Management: Process Definition, Process states, Process State transitions, Process Scheduling, Process Control Block, Threads, Concept of multithreads, Benefits of threads,Types of threads. Process Scheduling: Definition, Scheduling objectives, Scheduling algorithms, CPU scheduling Preemptive and Non-preemptive Scheduling algorithms (FCFS, SJF and RR), Performance evaluation of the scheduling Algorithms	**Module II** Process Management: Process Definition, Process states, Process State transitions, Process Scheduling, Process Control Block, Threads, Concept of multithreads, Benefits of threads,Types of threads. Process Scheduling: Definition, Scheduling objectives, Scheduling algorithms, CPU scheduling Preemptive and Non-preemptive Scheduling algorithms (FCFS, SJF and RR), Performance evaluation of the scheduling Algorithms		

		Module III Process Synchronization: Introduction, Inter-process Communication, Race Conditions, Critical Section Problem, Mutual Exclusion, Semaphores,Monitors. Deadlocks: System model, deadlock characterization, deadlock prevention, avoidance,Banker's algorithm, Deadlock detection, and recovery from deadlocks.	**Module III** Process Synchronization: Introduction, Inter-process Communication, Race Conditions, Critical Section Problem, Mutual Exclusion, Semaphores,Monitors. Deadlocks: System model, deadlock characterization, deadlock prevention, avoidance,Banker's algorithm, Deadlock detection, and recovery from deadlocks		
		Module IV Memory Management: Logical and Physical address map, Swapping, Memory allocation,MFT, MVT, Internal and External fragmentation and Compaction, Paging, Segmentation. Virtual Memory: Demand paging, Page Replacement algorithms, Allocation of frames,thrashing.I/O Management: Principles of I/O Hardware: Disk structure, Disk scheduling algorithms.	**Module IV** Memory Management: Logical and Physical address map, Swapping, Memory allocation,MFT, MVT, Internal and External fragmentation and Compaction, Paging, Segmentation.Virtual Memory: Demand paging, Page Replacement algorithms, Allocation of frames,thrashing.I/O Management: Principles of I/O Hardware: Disk structure, Disk scheduling algorithms.		

VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous) ESTD JUNE 1964

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VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

(Signature of the Head of Department)

(Signature of the Teacher)

VIVEKANAND COLLEGE (AN EMPOWERED AUTONOMOUS INSTITUTE), KOLHAPUR
STATEMENT OF SYLLABUS COVERED

Year: 2024-2025 **Term-I**

Name of Teacher: Mrs. Megha Bipin Alman **Department : BCA**

Class	Subject	Syllabus Assigned	Syllabus Covered	Syllabus not to Covered	Remark
BCA-III	**Computer Network**	**Module 1:Basics of Data communication** Data Communication concept , Components- sender, receiver, message, transmission media- Data Flow- simplex, half-duplex, or full-duplex , Networks ,Definition, Advantages and disadvantages, Categories of Networks- LAN, WAN,MAN Network Architecture-Client-Server and Peer to peer , Multiplexing and switchin, Frequency-Division Multiplexing, Wavelength-Division Multiplexing, Time-Division Multiplexing , Circuit switching, Packet Switching, Message Switching	**Module 1:Basics of Data communication** Data Communication concept , Components- sender, receiver, message, transmission media- Data Flow- simplex, half-duplex, or full-duplex , Networks ,Definition, Advantages and disadvantages, Categories of Networks- LAN, WAN,MAN Network Architecture-Client-Server and Peer to peer , Multiplexing and switchin, Frequency-Division Multiplexing, Wavelength-Division Multiplexing, Time-Division Multiplexing , Circuit switching, Packet Switching, Message Switching	---------	----------
		Module 2:Transmission media and Reference Models Transmission Media, Guided Media - Twisted-Pair Cable, Coaxial Cable, Fiber-Optic Cable Unguided Media: Radio Waves, Microwaves, Infrared, satellite communication,Transmission Modes- Parallel and Serial -(Asynchronous, Synchronous),Reference Models-OSI reference model,TCP/IP reference model ·Comparison of OSI and TCP/IP reference model Protocol Standards, IP address scheme and characteristics of IP address	**Module 2:Transmission media and Reference Models** Transmission Media, Guided Media - Twisted-Pair Cable, Coaxial Cable, Fiber-Optic Cable Unguided Media: Radio Waves, Microwaves, Infrared, satellite communication,Transmission Modes- Parallel and Serial -(Asynchronous, Synchronous),Reference Models-OSI reference model,TCP/IP reference model Comparison of OSI and TCP/IP reference model,Protocol Standards, IP address scheme and characteristics of IP address	--------	------

		Module 3:Data link, Network and Transport layer Data link Layer-Design issues,Framing, error detection and correction, Network layer,design issues of network layer, Routing algorithm (shortest path, Flooding, distance vector,) Congestion control,Transport laye, Transport Layer Primitives: listen, connect, send, receive, disconnect, Protocols: TCP, UDP	**Module 3:Data link, Network and Transport layer** Data link Layer-Design issues,Framing, error detection and correction, Network layer,design issues of network layer,Routing algorithm (shortest path, Flooding, distance vector,) Congestion control,Transport laye, Transport Layer Primitives: listen, connect, send, receive, disconnect, Protocols: TCP, UDP	------	------
		Module 4: Session, Presentation and Application layer Session layer-Services: dialog management, synchronization, activity management, exception handling , Remote procedure calls 4.2 Presentation layer: Services: Translation, compression, encryption , Cryptography: concept, symmetric key & asymmetric key cryptography,Application layer- Function, Domain name system (DNS),Hypertext Transfer Protocol (HTTP),Simple Mail Transfer Protocol (SMTP) ,Telnet, File Transfer Protocol (FTP)	**Module 4: Session, Presentation and Application layer** Session layer-Services: dialog management, synchronization, activity management, exception handling , Remote procedure calls 4.2 Presentation layer: Services: Translation, compression, encryption , Cryptography: concept, symmetric key & asymmetric key cryptography,Application layer- Function, Domain name system (DNS),Hypertext Transfer Protocol (HTTP),Simple Mail Transfer Protocol (SMTP) ,Telnet, File Transfer Protocol (FTP)	-------	-------

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B.C.A-II Sem-III	**Object Oriented Programming using C++**	**Module I** Principles of Objective Oriented Programming History of OOP, Introduction to Object Oriented Programming, Basic Concepts of Object Oriented Programming, Benefits of Object Oriented Programming, Object Oriented Languages, Difference between C and C++.Beginning with C++Tokens, Keywords, Identifiers and Constants, Data Types, Type Compatibility, Variables, Operators in C++, Operator Precedence, Control Structures (Conditional, Unconditional and Looping).	**Module I** Principles of Objective Oriented Programming History of OOP, Introduction to Object Oriented Programming, Basic Concepts of Object Oriented Programming, Benefits of Object Oriented Programming, Object Oriented Languages, Difference between C and C++.Beginning with C++ Tokens, Keywords, Identifiers and Constants, Data Types, Type Compatibility, Variables, Operators in C++, Operator Precedence, Control Structures (Conditional, Unconditional and Looping).	.....	
		Module II Functions in C++, Classes & Objects Concept of Function, main() Function, Inline Functions, Function Overloading, Specifying a Class, Data members and Member Functions, Access Specifiers, Friend Function, Static data Member, Object declaration and Initialization, Arrays of Objects Constructors & Destructors, Inheritance Constructors-Definition, Use of Constructors, Types of Constructors (Default, Parameterized, Copy, Dynamic), Destructors-Definition, Use, Inheritance Definition, Types of Inheritance (Single, Multiple, Multilevel, Hierarchical, Hybrid)	**Module II** Functions in C++, Classes & Objects Concept of Function, main() Function, Inline Functions, Function Overloading, Specifying a Class, Data members and Member Functions, Access Specifiers, Friend Function, Static data Member, Object declaration and Initialization, Arrays of Objects Constructors & Destructors, Inheritance Constructors-Definition, Use of Constructors, Types of Constructors (Default, Parameterized, Copy, Dynamic), Destructors-Definition, Use, Inheritance- Definition, Types of Inheritance (Single, Multiple, Multilevel, Hierarchical, Hybrid)		

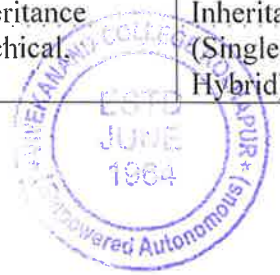
VIVEKANAND COLLEGE (AN EMPOWERED AUTONOMOUS INSTITUTE), KOLHAPUR

STATEMENT OF SYLLABUS COVERED

Year: 2024-2025 **Term-I**

Name of Teacher: Mrs. Megha Bipin Alman **Department : BCA**

Class	Subject	Syllabus Assigned	Syllabus Covered	Syllabus not to Covered	Remark
BCA-II	Object Oriented Programming with C++	**Module 1:** **Principles of Objective Oriented Programming** History of OOP, Introduction to Object Oriented Programming, Basic Concepts of Object Oriented Programming, Benefits of Object Oriented Programming, Object Oriented Languages, Difference between C and C++. **Beginning with C++** Tokens, Keywords, Identifiers and Constants, Data Types, Type Compatibility, Variables, Operators in C++, Operator Precedence, Control Structures (Conditional, Unconditional and Looping).	**Module 1:** **Principles of Objective Oriented Programming** History of OOP, Introduction to Object Oriented Programming, Basic Concepts of Object Oriented Programming, Benefits of Object Oriented Programming, Object Oriented Languages, Difference between C and C++. **Beginning with C++** Tokens, Keywords, Identifiers and Constants, Data Types, Type Compatibility, Variables, Operators in C++, Operator Precedence, Control Structures (Conditional, Unconditional and Looping).	---	---
		Module 2: **Functions in C++, Classes & Objects** Concept of Function, main() Function, Inline Functions, Function Overloading, Specifying a Class, Data members and Member Functions, Access Specifiers, Friend Function, Static data Member, Object declaration and Initialization, Arrays of Objects **Constructors & Destructors, Inheritance** Constructors-Definition, Use of Constructors, Types of Constructors (Default, Parameterized, Copy, Dynamic), Destructors-Definition, Use, Inheritance-Definition, Types of Inheritance (Single, Multiple, Multilevel, Hierarchical, Hybrid)	**Module 2:** **Functions in C++, Classes & Objects** Concept of Function, main() Function, Inline Functions, Function Overloading, Specifying a Class, Data members and Member Functions, Access Specifiers, Friend Function, Static data Member, Object declaration and Initialization, Arrays of Objects **Constructors & Destructors, Inheritance** Constructors-Definition, Use of Constructors, Types of Constructors (Default, Parameterized, Copy, Dynamic), Destructors-Definition, Use, Inheritance-Definition, Types of Inheritance (Single, Multiple, Multilevel, Hierarchical, Hybrid)	---	---



		Module 3: **Pointers, Virtual Functions &Polymorphism** Pointer, Pointer to Object, this pointer, Pointer to Derived Classes, Polymorphism: Meaning, compile Time and Run time polymorphism, Rules for Operator Overloading, Operator Overloading (Unary & Binary)-with member function and friend function.	**Module 3:** **Pointers, Virtual Functions &Polymorphism** Pointer, Pointer to Object, this pointer, Pointer to Derived Classes, Polymorphism: Meaning, compile Time and Run time polymorphism, Rules for Operator Overloading, Operator Overloading (Unary & Binary)-with member function and friend function.	------	------
		Module 4: **Working with Files** File-Definition, Use, Classes for File Stream Operations, Opening and Closing a File, File Opening Modes, File Pointers, Manipulation of File Pointer(using-seekg,seekp,tellg,tellp), Input Output Operations-get ( ) Put ( ), read ( ) Write ().	**Module 4:** **Working with Files** File-Definition, Use, Classes for File Stream Operations, Opening and Closing a File, File Opening Modes, File Pointers, Manipulation of File Pointer(using-seekg,seekp,tellg,tellp), Input Output Operations-get ( ) Put ( ), read ( ) Write ( )	-------	-------

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VIVEKANAND COLLEGE (AN EMPOWERED AUTONOMOUS INSTITUTE), KOLHAPUR
STATEMENT OF SYLLABUS COVERED

Year: 2024-2025 **Term-II**

Name of Teacher: Mrs. Megha Bipin Alman **Department : BCA**

Class	Subject	Syllabus Assigned	Syllabus Covered	Syllabus not to Covered	Remark
BCA-I	Object Oriented Programming using Java	**Module 1: Fundamentals of Object Oriented Programming:** Basic Concepts of Object Oriented Programming (OOP), Benefits and Applications of OOP. **Java Evolution:** Java Features, Difference between Java, C and C++, Java and Internet, Java Environment. **Overview of Java Language:** Introduction to Simple Java Program, Use of Comments and Math function, Application of two classes, Java Program Structure, Java Tokens and statements,Implementing Java program And JVM, Command Line Arguments.	**Module 1: Fundamentals of Object Oriented Programming:** Basic Concepts of Object Oriented Programming (OOP), Benefits and Applications of OOP. **Java Evolution:** Java Features, Difference between Java, C and C++, Java and Internet, Java Environment. **Overview of Java Language:** Introduction to Simple Java Program, Use of Comments and Math function, Application of two classes, Java Program Structure, Java Tokens and statements,Implementing Java program And JVM, Command Line Arguments.	---------	----------
		Module 2: Constants, Variables and Data Types: Constants, Variables, Data Types, Declaration of Variables, Giving values to Variables, Symbolic Constants, Type casting. **Operators & Expressions:** Arithmetic operators, Relational operators, Logical operators,Assignment operators, Increment & Decrement operators, conditional operators, Bitwise operators, Arithmetic Expressions, Evaluation of Expressions, Type Conversions in Expressions, Operator Precedence & Associativity. **Decision Making, Branching & Looping:** Decision Making with Control Statements, Loopingstatements, Jump in loops, Labelled loops.	**Module 2: Constants, Variables and Data Types:** Constants, Variables, Data Types, Declaration of Variables, Giving values to Variables, Symbolic Constants, Type casting. **Operators & Expressions:** Arithmetic operators, Relational operators, Logical operators,Assignment operators, Increment & Decrement operators, conditional operators, Bitwise operators, Arithmetic Expressions, Evaluation of Expressions, Type Conversions in Expressions, Operator Precedence & Associativity. **Decision Making, Branching & Looping:** Decision Making with Control Statements, Loopingstatements, Jump in loops, Labelled loops.	--------	------

		Module 3: Classes, Objects and Methods: Defining Class, Methods Declaration, Constructors, Methods Overloading, Overriding Methods, Inheritance **Arrays, Strings and Vectors:** 1D arrays, Creating an Array, 2D arrays, Strings, Vectors, Wrapper Classes, Enumerated Types **Inheritance:** Defining, extending classes, and Implementing Interfaces. Multiple inheritance and polymorphism.	**Module 3: Classes, Objects and Methods:** Defining Class, Methods Declaration, Constructors, Methods Overloading, Overriding Methods, Inheritance **Arrays, Strings and Vectors:** 1D arrays, Creating an Array, 2D arrays, Strings, Vectors, Wrapper Classes, Enumerated Types **Inheritance:** Defining, extending classes, and Implementing Interfaces. Multiple inheritance and polymorphism.	------	------
		Module 4: Packages: Basics of packages, System packages, Creating and accessing packages, Creating user defined packages, Adding class to a package. **Exception Handling:** Using the main keywords of exception handling: try, catch, throw, throws and finally; Nested try, Multiple catch statements, Creating user defined exceptions	**Module 4:Packages:** Basics of packages, System packages, Creating and accessing packages, Creating user defined packages, Adding class to a package. **Exception Handling:** Using the main keywords of exception handling: try, catch, throw, throws and finally; Nested try, Multiple catch statements, Creating user defined exceptions	-------	-------

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VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous) ESTD JUNE 1964

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VIVEKANAND COLLEGE (AN EMPOWERED AUTONOMOUS INSTITUTE), KOLHAPUR

STATEMENT OF SYLLABUS COVERED

Year: 2024-2025 **Term-II**

Name of Teacher: Mrs. Megha Bipin Alman **Department : BCA**

Class	Subject	Syllabus Assigned	Syllabus Covered	Syllabus not to Covered	Remark
BCA-III	Android Programming	**Module 1:Introduction to Mobile Operating System** Mobile operating system, Operating system structure, Constraints and Restrictions, Features: Multitasking Scheduling, Memory Allocation, File System Interface, Keypad Interface, I/O Interface, Protection and Security, Multimedia features. Brief history of Android, Different types of mobile applications).	**Module 1:Introduction to Mobile Operating System** Mobile operating system, Operating system structure, Constraints and Restrictions, Features: Multitasking Scheduling, Memory Allocation, File System Interface, Keypad Interface, I/O Interface, Protection and Security, Multimedia features. Brief history of Android, Different types of mobile applications).	---	---
		Module 2:Android Development Environment Introduction to Mobile development IDE's, Setting up development environment, Android Software Development, Working with the AndroidManifest.xml, Dalvik Virtual Machine & .apk file extension, Android Architecture, Building a sample Android application using Android Studio. Android Project Structure, Working with emulator	**Module 2:Android Development Environment** Introduction to Mobile development IDE's, Setting up development environment, Android Software Development, Working with the AndroidManifest.xml, Dalvik Virtual Machine & .apk file extension, Android Architecture, Building a sample Android application using Android Studio. Android Project Structure, Working with emulator	---	---
		Module 3: **Android Application Framework** Layouts &Drawable Resources, Basic Building blocks - Activities and Activity lifecycle, UI Components - Views & Notifications, Components for communication -Intents & type of Intents, Android API levels (versions & version names), Developing sample Application	**Module 3:** **Android Application Framework** Layouts &Drawable Resources, Basic Building blocks - Activities and Activity lifecycle, UI Components - Views & Notifications, Components for communication -Intents & type of Intents, Android API levels (versions & version names), Developing sample Application	---	---

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		Module 4: Basic UI design Form widgets, Text Fields, Layouts, Option menu, Context menu, Sub menu, Time and Date, Images and media, Composite, Alert Dialogs & Toast, Popup, Introduction to SQLite Programming, SQLite Database.	**Module 4: Basic UI design** Form widgets, Text Fields, Layouts, Option menu, Context menu, Sub menu, Time and Date, Images and media, Composite, Alert Dialogs & Toast, Popup, Introduction to SQLite Programming, SQLite Database.	-------	-------

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VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous)
ESTD
JUNE
1964

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VIVEKANAND COLLEGE, KOLHAPUR (An Empowered Autonomous Institute)

STATEMENT OF SYLLABUS COVERED

Year- 2024 - 025 Term - Ist

Name of teacher- Mr.K.D.Morabale Department- BCA

Class	Subject	Syllabus assigned	Syllabus Covered	Syllabus not to Covered	Remark
B.C.A I Sem-I (AICTE)	Mathematics Foundation to Computer Science - I (DSC39MAT 11)	**Unit- 1 Set, Relation And Function** Set, Set Operations, Properties of Set operations, Subset, Venn Diagrams, Cartesian Products. Relations on a Set, Properties of Relations, Representing Relations using matrices and digraphs, Types of Relations, Equivalence Relation, Equivalence relation and partition on set, Closures of Relations. Functions, properties of functions (domain, range), composition of functions, surjective (onto), injective (one-to-one) and bijective functions, inverse of functions.	**Unit 1 Set, Relation And Function** Set, Set Operations, Properties of Set operations, Subset, Venn Diagrams, Cartesian Products. Relations on a Set, Properties of Relations, Representing Relations using matrices and digraphs, Types of Relations, Equivalence Relation, Equivalence relation and partition on set, Closures of Relations. Functions, properties of functions (domain, range), composition of functions, surjective (onto), injective (one-to-one) and bijective functions, inverse of functions.	.....	
		Unit- 2 Counting and Recurrence Relation Basics of counting, Pigeonhole principle, permutation, combination, Binomial coefficients, Binomial theorem.	**Unit- 2 Counting and Recurrence Relation** Basics of counting, Pigeonhole principle, permutation, combination, Binomial coefficients, Binomial theorem.	.....	
		Unit-3 Elementary Graph Theory Basic terminologies of graphs, connected and disconnected graphs, subgraph, paths and cycles, complete graphs, digraphs, weighted graphs, Euler and Hamiltonian graphs. Trees, properties of trees,	**Unit-3 Elementary Graph Theory** Basic terminologies of graphs, connected and disconnected graphs, subgraph, paths and cycles, complete graphs, digraphs, weighted graphs, Euler and Hamiltonian graphs. Trees, properties of trees,	.....	

		concept of spanning tree. Planar graphs. Definitions and basic results on the topics mentioned	concept of spanning tree. Planar graphs. Definitions and basic results on the topics mentioned		
		Unit-4 Graph Theory Types of matrices, algebra of matrices–addition, subtraction, and multiplication of matrices, determinant of a matrix, symmetric and skew-symmetric matrices, inverse of a matrix, applications of matrices to solve system of linear equations, Eigen values and Eigen vectors, Caley-Hamilton theorem.	**Unit-4 Graph Theory** Types of matrices, algebra of matrices–addition, subtraction, and multiplication of matrices, determinant of a matrix, symmetric and skew-symmetric matrices, inverse of a matrix, applications of matrices to solve system of linear equations, Eigen values and Eigen vectors, Caley-Hamilton theorem.	.....	

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VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous)
ESTD JUNE 1964

VIVEKANAND COLLEGE, KOLHAPUR (An Empowered Autonomous Institute)

STATEMENT OF SYLLABUS COVERED

Year- 2024 - 025 **Term - IInd**

Name of teacher- Mr.K.D.Morabale **Department- BCA**

Class	Subject	Syllabus assigned	Syllabus Covered	Syllabus not to Covered	Remark
B.C.A I Sem-II (AICTE)	**Mathematics Foundation to Computer Science - II (DSC39MAT 21)**	**Unit 1 Logic and Methods of Proofs** Propositions, logical operations (basic connectives), compound statements, construction of truth table, quantifiers, conditional statements, tautology, contradiction, contingency, logical equivalence. Methods of proofs	**Unit 1 Logic and Methods of Proofs** Propositions, logical operations (basic connectives), compound statements, construction of truth table, quantifiers, conditional statements, tautology, contradiction, contingency, logical equivalence. Methods of proofs	.....	
		Unit- 2 Algebraic Structures Semi-group, Monoid, Group, Subgroup, Cyclic group.	**Unit- 2 Algebraic Structures** Semi-group, Monoid, Group, Subgroup, Cyclic group.	.....	
		Unit-3 Numerical Methods Concept and importance of errors in numerical methods. Solution of algebraic and transcendental equations: Bisection method and Newton-Raphson methods. Numerical Interpolation: Newton's Forward and Newton's Backward interpolation formula and Lagrange's formula. Numerical Integration: Trapezoidal rule and Simpson's 1/3 rule	**Unit-3 Numerical Methods** Concept and importance of errors in numerical methods. Solution of algebraic and transcendental equations: Bisection method and Newton-Raphson methods. Numerical Interpolation: Newton's Forward and Newton's Backward interpolation formula and Lagrange's formula. Numerical Integration: Trapezoidal rule and Simpson's 1/3 rule	.....	
		Unit- 4 Optimization Techniques Linear programming: Introduction, LP formulation, Graphical method for solving LPs	**Unit- 4 Optimization Techniques** Linear programming: Introduction, LP formulation, Graphical method for solving LPs	.....	

		with two variables, Special cases in graphical methods Transportation problem: Definition, Linear form, North-west corner method, Least cost method, Vogel's approximation method for finding feasible solution.	with two variables, Special cases in graphical methods Transportation problem: Definition, Linear form, North-west corner method, Least cost method, Vogel's approximation method for finding feasible solution.		

(Signature of the Head of Department)

HEAD
DEPARTMENT OF B. C. A.
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous)
ESTD JUNE 1964

(Signature of the Teacher)

VIVEKANAND COLLEGE, KOLHAPUR (An EMPOWERED AUTONOMOUS Institute)

STATEMENT OF SYLLABUS COVERED

Year- 2024-25 **Term- II[nd]**

Name of teacher- Miss. Vaishnavi Rajendra Swami **Department- BCA**

Class	Subject	Syllabus assigned	Syllabus Covered	Syllabus not to Covered	Remark
B.C.A I Sem-II (AICTE Approved)	Data Structures using C	**Module I** : **Introduction and Overview:** Definition, Classification and Operations of Data Structures. Algorithms: Complexity, Time-Space Tradeoff. **Arrays:** Definition and Classification of Arrays, Representation of Linear Arrays in Memory, Operations on Linear Arrays: Traversing, Inserting, Deleting, Searching, Sorting and Merging. Searching: Linear Search and Binary Search, Comparison of Methods. Sorting: Bubble Sort, Selection Sort, and Insertion Sort. Two-Dimensional Arrays, Representation of Two-Dimensional Arrays in Memory, Matrices and Sparse Matrices, Multi-Dimensional Arrays..	**Module I** : **Introduction and Overview:** Definition, Classification and Operations of Data Structures. Algorithms: Complexity, Time-Space Tradeoff. **Arrays:** Definition and Classification of Arrays, Representation of Linear Arrays in Memory, Operations on Linear Arrays: Traversing, Inserting, Deleting, Searching, Sorting and Merging. Searching: Linear Search and Binary Search, Comparison of Methods. Sorting: Bubble Sort, Selection Sort, and Insertion Sort. Two-Dimensional Arrays, Representation of Two-Dimensional Arrays in Memory, Matrices and Sparse Matrices, Multi-Dimensional Arrays..	.....	
		Module II: **Linked Lists:** Definition, Comparison with Arrays, Representation, Types of Linked lists, Traversing, Inserting, Deleting and Searching in Singly Linked List, Doubly Linked List and Circular Linked List. Applications of Linked Lists: Addition of Polynomials. **Hashing and Collision:** Hashing, Hash Tables, Types of Hash Functions, Collision, Collision Resolution with Open Addressing and Chaining.	**Module II**: **Linked Lists:** Definition, Comparison with Arrays, Representation, Types of Linked lists, Traversing, Inserting, Deleting and Searching in Singly Linked List, Doubly Linked List and Circular Linked List. Applications of Linked Lists: Addition of Polynomials. **Hashing and Collision:** Hashing, Hash Tables, Types of Hash Functions, Collision, Collision Resolution with Open Addressing and Chaining. loops, Labelled loops	.....	
		Module III: **Stacks:** Definition, Representation of Stacks using Arrays and Linked List, Operations on Stacks using Arrays and Linked List,	**Module III**: **Stacks:** Definition, Representation of Stacks using Arrays and Linked List, Operations on Stacks using Arrays and Linked List,	.....	

		Application of Stacks: Arithmetic Expressions, Polish Notation, Conversion of Infix Expression to Postfix Expression, Evaluation of Postfix Expression. **Recursion:** Definition, Recursive Notation, Runtime Stack, Applications of Recursion: Factorial of Number, GCD, Fibonacci Series and Towers of Hanoi. **Queues:** Definition, Representation of Queues using Array and Linked List, Types of Queue: Simple Queue, Circular Queue, Double-Ended queue, Priority Queue, Operations on Simple Queues and Circular Queues using Array and Linked List, Applications of Queues.	Application of Stacks: Arithmetic Expressions, Polish Notation, Conversion of Infix Expression to Postfix Expression, Evaluation of Postfix Expression. **Recursion:** Definition, Recursive Notation, Runtime Stack, Applications of Recursion: Factorial of Number, GCD, Fibonacci Series and Towers of Hanoi. **Queues:** Definition, Representation of Queues using Array and Linked List, Types of Queue: Simple Queue, Circular Queue, Double-Ended queue, Priority Queue, Operations on Simple Queues and Circular Queues using Array and Linked List, Applications of Queues.		
		Module IV: **Graphs:** Definition, Terminology, Representation, Traversal. **Trees:** Definition, Terminology, Binary Trees, Traversal of Binary Tree, Binary Search Tree, Inserting, Deleting and Searching in Binary Search Tree, Height Balanced Trees: AVL Trees, Insertion and Deletion in AVL Tree.	**Module IV:** **Graphs:** Definition, Terminology, Representation, Traversal. **Trees:** Definition, Terminology, Binary Trees, Traversal of Binary Tree, Binary Search Tree, Inserting, Deleting and Searching in Binary Search Tree, Height Balanced Trees: AVL Trees, Insertion and Deletion in AVL Tree.	.....	
B.C.A I Sem-II (AICTE Approved)	**Operating Systems**	**Module I:** **Operating Systems Overview:** Definition, Evaluation of O.S, Components & Services of OS, Structure, Architecture, types of Operating Systems, Batch Systems, Concepts of Multiprogramming and Time Sharing, Parallel, Distributed and real time Systems. **Operating Systems Structures:** Operating system services and systems calls, system programs, operating system structure, operating systems generations.	**Module I:** **Operating Systems Overview:** Definition, Evaluation of O.S, Components & Services of OS, Structure, Architecture, types of Operating Systems, Batch Systems, Concepts of Multiprogramming and Time Sharing, Parallel, Distributed and real time Systems. **Operating Systems Structures:** Operating system services and systems calls, system programs, operating system structure, operating systems generations.	.....	
		Module II: **Process Management:** Process Definition, Process states, Process State transitions, Process Scheduling, Process Control Block, Threads, Concept of multithreads, Benefits of threads,	**Module II:** **Process Management:** Process Definition, Process states, Process State transitions, Process Scheduling, Process Control Block, Threads, Concept of multithreads, Benefits of threads,	.....	

		Types of threads. **Process Scheduling:** Definition, Scheduling objectives, Scheduling algorithms, CPU scheduling Preemptive and Non-preemptive Scheduling algorithms (FCFS, SJF and RR), Performance evaluation of the scheduling Algorithms	Types of threads. **Process Scheduling:** Definition, Scheduling objectives, Scheduling algorithms, CPU scheduling Preemptive and Non-preemptive Scheduling algorithms (FCFS, SJF and RR), Performance evaluation of the scheduling Algorithms		
		Module III: **Process Synchronization:** Introduction, Inter-process Communication, Race Conditions, Critical Section Problem, Mutual Exclusion, Semaphores, Monitors. **Deadlocks:** System model, deadlock characterization, deadlock prevention, avoidance, Banker's algorithm, Deadlock detection, and recovery from deadlocks..	**Module III:** **Process Synchronization:** Introduction, Inter-process Communication, Race Conditions, Critical Section Problem, Mutual Exclusion, Semaphores, Monitors. **Deadlocks:** System model, deadlock characterization, deadlock prevention, avoidance, Banker's algorithm, Deadlock detection, and recovery from deadlocks.	.....	
		Module IV: **Memory Management:** Logical and Physical address map, Swapping, Memory allocation, MFT, MVT, Internal and External fragmentation and Compaction, Paging, Segmentation. **Virtual Memory:** Demand paging, Page Replacement algorithms, Allocation of frames, thrashing. **I/O Management:** Principles of I/O Hardware: Disk structure, Disk scheduling algorithms.	**Module IV:** **Memory Management:** Logical and Physical address map, Swapping, Memory allocation, MFT, MVT, Internal and External fragmentation and Compaction, Paging, Segmentation. **Virtual Memory:** Demand paging, Page Replacement algorithms, Allocation of frames, thrashing. **I/O Management:** Principles of I/O Hardware: Disk structure, Disk scheduling algorithms.	.....	

B.C.A I Sem-IV (NEP 1.0)	**Data Structure Using C++**	**Module I** : **Introduction to data structures** Introduction to Array, Introduction to Data Structures, Concept of Abstract Data types, Array as ADT,Data structures and its types,Data structures operations	**Module I** : **Introduction to data structures** Introduction to Array, Introduction to Data Structures, Concept of Abstract Data types, Array as ADT,Data structures and its types,Data structures operations	.....	
		Module II: **Searching and Sorting and Methods** Introduction to Searching and Sorting, Searching: Linear search, Binary search and hashing, Sorting: Bubble Sort,Insertion sort, Selection sort, Merge sort, .	**Module II**: **Searching and Sorting and Methods** Introduction to Searching and Sorting, Searching: Linear search, Binary search and hashing, Sorting: Bubble Sort,Insertion sort, Selection sort, Merge sort, .	.....	

		Module III: **Stacks and Queues** Introduction to stack, Primitive Stack operations: Push & Pop, Array and Linked Implementation of Stack in C++, Application of stack: Prefix and Postfix Expressions Evaluation, Definition of queue, Operations on queue, Types of queue-Linear, Circular, Applications of queue	**Module III:** **Stacks and Queues** Introduction to stack, Primitive Stack operations: Push & Pop, Array and Linked Implementation of Stack in C++, Application of stack: Prefix and Postfix Expressions Evaluation, Definition of queue, Operations on queue, Types of queue-Linear, Circular, Applications of queue	.....	
		Module IV: **Linked Lists and Trees** Introduction to Pointer,Introduction to linked lists, Implementation of Linked list, Types of Linked List: Singly, Doubly and Circular, Operations on linear linked list: Traversal, Insertion, Deletion, Searching Trees : definition, terminologies, representation, types, Tree Traversal- (Preorder, Inorder, Postorder)	**Module IV:** **Linked Lists and Trees** Introduction to Pointer,Introduction to linked lists, Implementation of Linked list, Types of Linked List: Singly, Doubly and Circular, Operations on linear linked list: Traversal, Insertion, Deletion, Searching Trees : definition, terminologies, representation, types, Tree Traversal- (Preorder, Inorder, Postorder)	.....	
B.C.A III Sem-VI (NEP 1.0)	**Data Warehousing and Data Mining**	**Module I:** **Data Warehousing:** Introduction to data warehousing, Data warehousing components, Building a data warehouse, Difference between database system and data warehouse, Data warehouse architecture	**Module I:** **Data Warehousing:** Introduction to data warehousing, Data warehousing components, Building a data warehouse, Difference between database system and data warehouse, Data warehouse architecture	.....	
		Module II: **Data Mining:** Introduction of data mining - Definition and functionalities Issues in DM, Applications of data mining, KDD process. Data Pre-processing: Data Pre-processing, Data cleaning, Data integration and transformation, Data reduction, Discretization and concept hierarchy generation, Data mining Tasks	**Module II:** **Data Mining:** Introduction of data mining - Definition and functionalities Issues in DM, Applications of data mining, KDD process. Data Pre-processing: Data Pre-processing, Data cleaning, Data integration and transformation, Data reduction, Discretization and concept hierarchy generation, Data mining Tasks	.....	
		Module III: **Data Mining techniques**: Frequent item - set and association rule mining: apriori algorithm, use of sampling for frequent item- set tree algorithm, Graph sampling : frequent sub graph	**Module III:** **Data Mining techniques**: Frequent item - set and association rule mining: apriori algorithm, use of sampling for frequent item- set tree algorithm, Graph sampling : frequent sub graph	.....	

		mining , tree mining ,sequence mining Classification and Prediction - Issues Regarding Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Prediction – Accuracy and Error Measures .	mining , tree mining ,sequence mining Classification and Prediction - Issues Regarding Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Prediction – Accuracy and Error Measures .		
		Module IV: **Cluster Analysis:** Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods – K-Means and K-Medoids	**Module IV:** **Cluster Analysis:** Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods – K-Means and K-Medoids	.....	

(Signature of the Head of Department)

(Signature of the Teacher)

VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous) ESTD JUNE 1964