**Banasthali Vidyapith - Faculty of Mathematics and Computing**
**Course Handout: B.Tech. (CS/IT) IV Semester Jan – May 2022**

Date: 1-Jan-2022

**Course Code: CS 214** **Course Name:** Object Oriented Programming
**Credit Points: 4** **Max. Marks : 100 (CA: 40+ ESA: 60)**
**Course Instructors:**
Dr.Manjeet Kumar, Assistant Professor, Computer Science-B.Tech IV Sem (CS-'A' & 'B' Batch )
Dr**.** Vaibhav Vyas, Associate Professor, Computer Science-B.Tech IV Sem (CS – 'C' + IT Batch)
Ms. Sneha Asopa, Assistant Professor, Computer Science- B.Tech IV Sem( IT –'B' Batch)

**Learning Outcomes:**

- After successful completion of the course students will be able to describe the features of C++ supporting object oriented programming.
- Explain the relative merits of C++ as an object oriented programming language.
- Describe how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism.
- Apply advanced features of C++ specifically stream I/O, templates and operator overloading
- Apply other features of the C++ language including templates, forms of casting, conversions, and file handling.

**Syllabus**

**Section A**

Basic Concept of Object Oriented Programming: Need of OOP, advantage over other programming paradigms, Tokens, Keywords, Identifiers and Constants, Basic Data Types, Control Structures. Functions: Call by Value, Call by Reference, Function Overloading.
Class & Objects: Concepts of Objects & Classes, declaring multiple objects, array of objects, Friend Functions.

**Section B**

Constructors and Destructors: Introduction, Default, Parameterized and Copy Constructor, Concept and use of destructors. Operator Overloading: Overloading Unary Operators, Overloading Binary Operators. Inheritance: Derived and Base Class, Public, Private, Protected, Multiple and Multilevel Inheritance, Function Overriding. Pointers: Pointers to Objects, this Pointer, Virtual Functions, Polymorphism.

**Section C**

Console I/O: Concept of Streams, Hierarchy of Console stream Classes, Unformatted and formatted I/O Operations, Managing Output with Manipulators Templates: Class and function templates, overloading of function templates File Handling: Classes for file stream operations, open and close a file, EOF, file modes, file pointers and their manipulators, sequential I/O operations, updating a file-Random access, Error Handling During File Operation.

**Suggested Readings:**

R1. Balagurusamy, E. (2001). Object Oriented Programming with C++, 6e. Tata McGraw-Hill Education.
R2. Schildt, H. (2003). C++: The complete reference. McGraw-Hill.
R3. Lafore, R. (1997). Object-oriented programming in C++. Pearson Education.
R4. Stroustrup, B. (2000). The C++ programming language. Pearson Education India.
R5. Venugopal, K. R. (2013). Mastering C++. Tata McGraw-Hill Education.

**Suggested E- Resources:**

1. Stroustrup, B. (2000). The C++ programming language. Pearson Education India. http://www.stroustrup.com/C++.html
2. Programming in C++ https://nptel.ac.in/courses/106105151/

**Continuous Assessment: 40 marks**

| S. No. | Component | Max. Marks | Submission/ Examination date | Allotment/Syllabus |
|---|---|---|---|---|
| 1. | Home assignment I** | 10 | Submission by 31 January, 2022 | Topics shall be allotted in the class by 13 January, 2022 |
| 2. | Periodical test I | 10 | 9-14 February, 2022* | Based on Section –A & B |
| 3. | Home assignment II** | 10 | Submission by 10 March, 2022 | Topics shall be allotted in the class by 22 February, 2022 |
| 4. | Periodical test II | 10 | 22-27 March, 2022* | Section B & C |
| 5. | Semester Examination | 60 | As per schedule | Whole Syllabus |

***** subject to change

******Assignment marks will be based on written documents, viva voice and any other components decided by the instructor on the regular basis.

**Lecture-Wise Schedule:**

| Sr. No | Lecture No. | Topics to be Covered | Suggested Readings |
|---|---|---|---|
| | **SECTION – A** | | |
| 1. | 1-3 | Basic Concept of OOP | R1, R3, R4 |
| 2. | 4-8 | Programming paradigm, data types, | R1, R5 |
| 3. | 9-10 | Loops, and basic programming in C++ | R1,R5 |
| 4. | 11-14 | Functions: Call by Value, Call by Reference, Function Overloading | R1, R2,R5 |
| 5. | 15-19 | Class and Objects: Basic concepts, multiple objects, array of objects, friend functions | R1,R3 |
| | **SECTION- B** | | |
| 6. | 20-22 | Constructors and Destructors | R1, R2 |
| 7. | 23-26 | Operator overloading | R1, R2 |
| 8. | 27-32 | Inheritance: Derived and Base class, Public, Private, Protected, Multiple and Multilevel Inheritance, Function | R1, R2, R3 |

| | | | |
|---|---|---|---|
| | | Overriding, Virtual Function and Polymorphism | |
| | **SECTION C** | | |
| 9. | 33-34 | Pointers | R1, R3,R5 |
| 10. | 35-37 | Console I/O | R1, R2 |
| 11. | 38-40 | Templates | R1, R2 ,R3 |
| 12. | 40-45 | File Handling | R1, R2, R3 |

**(Signature)**

**Dr. Manjeet Kumar**

**Dr. Vaibhav Vyas**

**Ms. Sneha Asopa**