**Course Information Sheet**

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| **Course Title** | Object-Oriented Programming |
| **Course Code** | CSC-103 |
| **Credit Hours** | 3+1 |
| **Program** | Computer Science/Software Engineering |
| **Semester** | 2nd |
| **Session** | Fall 2024 |
| **Prerequisites** | Programming Fundamentals |

1. **Course Objectives**

The course aims to focus on object-oriented concepts, analysis and software development. The basic concepts of OOP are covered in this course.

1. **Course Contents**

Introduction to object oriented design, history and advantages of object oriented design, introduction to object oriented programming concepts, classes, objects, data encapsulation, constructors, destructors, access modifiers, const vs non-const functions, static data members & functions, function overloading, operator overloading, identification of classes and their relationships, composition, aggregation, inheritance, multiple inheritance, polymorphism, abstract classes and interfaces, generic programming concepts, function & class templates, standard template library, object streams, data and object serialization using object streams, exception handling.

1. **Course Learning Outcomes (CLOs)**

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| **CLO No.** | **CLO Description** | **Domain and Taxonomy level** | **Mapped SO Number** | **Level of emphasis of the SO**  **(1=High; 2=Medium; 3=Low)** |
| 1. | Understand principles of object-oriented paradigm. | C2 | PLO1 | High |
| 2. | Identify the objects and their relationships to build object-oriented solution. | C3 | PLO1 | Low |
| 3. | Model a solution for a given problem using object-oriented principles. | C3 | PLO1 | Medium |
| 4. | Examine an object-oriented solution. | C4 | PLO2 | Medium |

***Note:*** *Domain =**C 🡪 Cognitive, P 🡪 Psychomotor, A 🡪 Affective*

1. **Weekly Course Plan**

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| **Week No.** | **Course Contents** | **Reading Material** |
| 1 | Introduction to computer programs, programming languages, JAVA history and characteristics, IDEs, Object oriented design, object-oriented programming concepts. | SEWBOK ver3 |
| 2 | Understanding the OOP concepts including creating JAVA classes, objects, data members and member functions, and analyzing OOP pillars in detail. | Lecture slides |
| 3 | Introducing Constructors with its types in detail with examples, Explaining Destructors and its application | Lecture slides, C. Thomas Chap 4, pg. 173 |
| 4 | Introducing Access modifiers with their implications. | Lecture slides |
| 5 | Understanding arrays, One and multi-dimensional arrays, Strings with the memory allocations in string constant pool. | Lecture slides |
| 6 | Explaining Polymorphism its types, concepts of method overloading, overriding and operator overloading | Lecture slides |
| 7 | Understanding Inheritance with different types, class relationships, association, aggregation, composition. | Lecture slides |
| 8 | **Mid Term Examination** |  |
| 9 | Understanding the concept of abstract classes and methods, Interfaces and packages. | Lecture slides |
| 10 | Understanding the concept of static keyword and analyzing its implication to data members and functions. | Lecture slides |
| 11 | Introducing and understanding file handling. | Lecture slides |
| 12 | Introducing and analyzing exception handling | Lecture slides, C. Thomas Chap 8, pg. 446 |
| 13 | Understanding object streams, data and object serialization using object streams. | Lecture slides |
| 14 | Understanding and implementing Generic programming concepts | Lecture slides |
| 15 | Understanding the GUI using Java Swing library. | Lecture slides |
| 16 | Presentation Week | Lecture slides |
| 17 | Discussing and revising topics covered | Lecture slides |
| 18 | **End Term Examination** |  |

1. **Weekly Lab Plan**

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| **Lab No.** | **Lab Title** |
| 1 | Introduce programming languages, Introduce Java programming language, Show how to set up your system environment for Java development, Introduce the basics of NetBeans IDE, Introduction to Object Oriented, Object Oriented Design & Object Oriented Programming with Java. |
| 2 | Conditional Statements and loops |
| 3 | Arrays and strings |
| 4 | To give the basic understanding of Writing Classes in JAVA ,Class Definition,& Defining Instance Variable |
| 5 | Introduction to Constructor and its types |
| 6 | Introduction to Inheritance |
| 7 | Introduction to Polymorphism & its types in JAVA |
| 8 | Introduction to Encapsulation and Access Modifiers in Java |
| 9 | To understand the concept of Abstract class and Abstract method. |
| 10 | Introduction to Nested classes, Static and Non static variables |
| 11 | Introduction to Exception Handling |
| 12 | To understand the concept of File Handling |
| 13 | To understand the concept of Interfaces and Package |
| 14 | To understand the basics of GUI based programming |
| 15 | Project Presentation Demonstration |
| 16 | Final Lab |

1. **Textbook and other Reference Material**

**Textbook:**

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| **T1:** | An Introduction to Object Oriented Programming with Java, 5th Edition by C. Thomas Wu. |

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| **R1:** | Java: How to Program, 9th Edition by Paul Deitel5. |
| **R2:** | Beginning Java 2, 7th Edition by Ivor Horton |

1. **Student assessment methods**
   1. Quiz
   2. Assignment
   3. Presentation
   4. Midterm Exam
   5. Final Exam
2. **Weighting of assessments**
   1. **Theory (100 Marks)**

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| **Assessment Tools** | **Marks** |
| Quizzes | 10 |
| Assignments | 5 |
| Project | 15 |
| Mid Exam | 20 |
| Final Exam | 50 |
| **TOTAL** | **100** |

* 1. **Lab (50 Marks)**

20 Marks (Sessional Assessment)

30 Marks (Final Assessment)

18 Marks (Viva)

12 Marks (Lab Task)

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| **Assessment Tools** | **Marks** |
| Sessional Assessment | 20 |
| Final Assessment   * 18 Marks (Viva) * 12 Marks (Lab Task) | 30 |
| **TOTAL** | **50** |