Course Title: Object Oriented Programming

Course Code: CSE 1115

Course Type: Core Course (Programming) **Credits: 03**

Status: Theory **Pre-requisite: Programming Fundamentals**

Course Rationale:

The course focuses on the core concepts of object-oriented programming and design including understanding of the concepts such as classes, objects, data abstraction, methods, method overloading, inheritance, polymorphism and exception handling.

Course Objectives:

The objectives of this course are-

1. To facilitate necessary knowledge about the basic concepts and techniques which form the object-oriented programming paradigm.
2. To build an understanding of the object-oriented approach in programming.
3. To familiarize the student with the writing and analyzing of computer programs to solve real world problems in Java.

Course Outcomes (COs):

Upon successful completion of this course, students will be able to

CO1 **Explain (C2)** the fundamental OOP concepts (Classes, Operators, Variables, Keywords, Objects, Methods, Constructors, and Packages).

CO2 **Illustrate (C3)** different object-oriented principles (Encapsulation, Polymorphism, Abstraction, Interfaces and Inheritance) to solve engineering problems.

CO3 **Demonstrate (C3)** object-oriented features: GUI, Exception Handling and .java collection framework.

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓											
CO2	✓											
CO3	✓											

Course Description:

SL No.	Course Contents	COs
1.	Introduction to Object Orientation, Elements of Object Orientation, An Overview of Java. Comparison with C programming language and discussing on the syntax of Java to handle different elements in C Programming Language.	CO1
2.	Introducing Classes, Objects and Constructor (Class Fundamentals, Declaring Objects, Assigning Object Reference Variables)	CO1
3.	Introducing Methods, This Keyword, Garbage Collection, the finalize () Method	CO1

4.	Overloading Methods, Using Objects as Parameters, Returning Objects	CO1
5.	Recursion in Java, Understanding Static, Introducing Final Keyword	CO1
6.	Nested and Inner class	CO1
7.	Exploring the String Class, Using Command -Line Argument	CO1
8.	Varargs: Variable-Length Arguments	CO1
9.	Inheritance Basics, Using Super, Creating a multilevel hierarchy	CO2
10.	Method overriding, dynamic method dispatch	CO2
11.	Using Abstract Classes, Using Final with Inheritance	CO2
12.	The Object Class, Package (defining package, importing package, access protection)	CO1
13.	Interfaces (Defining interface, implementing interfaces, accessing through interface reference, nested interface, interface variable, extending interface)	CO2
14.	Exception Handling (Fundamental mechanism, Exception Types, Try and Catch, displaying a description of an Exception, multiple catch clauses, nested try statements, use of throw, throws and finally keywords)	CO3
15.	Java Graphics: Enumerate the basic concepts of the Swing package.	CO3
16.	**Java Collections Framework:** Java Map methods e.g., tree map, hash map. relevant programs. Java collections framework and iterator. relevant programs. List, set, and relevant programs.	CO3

Textbooks, Reference Books and Other Resources:

1. Programming with Java A Primer--- (E. Balagurusamy)
2. Java the Complete Reference --- (Herbert Schildt)
3. Java How to Program--- (Deitel and Deitel)

Mapping Course Outcomes with the Teaching-Learning and Assessment Strategy:

COs	**POs**	**Bloom's Taxonomy Domain/Level *(C: Cognitive, P: Psychomotor A: Affective)***	**Delivery Methods and Activities**	**Assessment Tools**
CO1	PO1	C2	Lecture notes, PPT slides, problem solving, web content	Class Test, Midterm, Assignment, Final Exam
CO2	PO1, PO2	C3	Lecture notes, PPT slides, problem solving, web content	Class Test, Midterm, Assignment, Final Exam
CO3	PO1, PO2	C3	Lecture notes, PPT slides, problem solving, web content	Class Test, Midterm, Assignment, Final Exam

Department of Computer Science and Engineering
Lesson Plan:

Course Title: Object Oriented Programming **Course Code: CSE-1115**
Level/Term: Level-2 Term-1 **Section: A, B**
Credit: 03 **Conduct Hours: 39**
Prerequisite: Programming Fundamentals
Type: Core/Major: Core
Session: Spring 2024

Instructor: Syed Md. Minhaz Hossain
Class schedule:
Section-A:
Monday: 11.30 AM-1.00 PM
Wednesday: 11.30 AM-1.00 PM
Section-B:
Monday: 1 PM-2.30 PM
Wednesday: 1 PM-2.30 PM

Counseling Time:
Sunday: 2.30 PM-4 PM
Tuesday: 2.30 PM-4 PM

Room No: 607
Email address: minhazpuccse@gmail.com **Phone No: 01815811328**

Course Rationale:
This course provides appropriate machine learning techniques, and learning algorithm to best suit the current need and enhance the learning parameters for maximum performance.

Course Objectives:
The objectives of this course are-

1. To facilitate necessary knowledge about the basic concepts and techniques which form the object-oriented programming paradigm.
2. To build an understanding of the object-oriented approach in programming.
3. To familiarize the student with the writing and analyzing of computer programs to solve real world problems in Java.

Course Outcomes (COs):
Upon successful completion of this course, students will be able to

CO1 **Explain (C2)** the fundamental OOP concepts (Classes, Operators, Variables, Keywords, Objects, Methods, Constructors, and Packages).
CO2 **Illustrate (C3)** different object-oriented principles (Encapsulation, Polymorphism, Abstraction, Interfaces and Inheritance) to solve engineering problems.
CO3 **Demonstrate (C3)** object-oriented features: GUI, Exception Handling and .java collection framework.

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓											
CO2	✓											
CO3	✓											

Assessment:
Class attendance (10%), quiz/assignments/home works (10%), Class tests (20%), midterm exam (20%) and final exam (40%).

Textbooks, References & Other Resources:
1. Herbert Schildt, Java the Complete Reference, McGraw Hill, 2018.
2. Paul Deitel and Harvey Deitel, Java How to Program, Pearson, 2017. 3. E. Balagurusamy, Programming with Java A Primer, Tata Mcgraw-Hill Publishing, 2007

Class-wise schedule:

Day	Topic	Teaching strategy	Course outcome	Assessment Strategy
1.	Introduction to Object Oriented Programming, OO System, Introduction to Java, History of Java, Philosophy of Java, Java Innovations, Class definition, Adding Attributes to class, Adding constructor to class, Class versus objects, Creating objects	Lecture, Problem solution, Video, Web Link	CO1	Final
2.	Viable, Primitive data type, Other data types, Declaring variables,	Lecture, Problem solution, Video, Web Link	CO1	Final Examination
3.	USING JAVA LIBRARIES – THE JAVA API, Round to 2 decimal places, User Input, Scanner input, Control Structures, Compound Statements, Relational Operators, bolean type, logical expressions	Lecture, Problem solution, Video, Web Link	CO1	CT-1
4.	Method call, More on arguments, void and Non void methods, Method overloading, Method invocation, Method reuse	Lecture, Problem solution, Video, Web Link	CO1	CT-1

5.	Class attributes, Constant data field, Access Modifier, Visibility, Accessor & Mutator Methods, toString(), Passing objects as parameters	Lecture, Problem solution, Video, Web Link	CO1	CT-1, Final Examination
6.	Multiple Classes, Increment, decrement, for loops, while, do while, Nested for loops	Lecture, Problem solution, Video, Web Link	CO1	Midterm Examination
7.	Array, CT-1	Lecture, Problem solution, Video, Web Link	CO1	Midterm Examination
8.	Casting, break, switch, 2D array	Lecture, Problem solution, Video, Web Link	CO1	Midterm Examination, Final Examination
9.	Static attribute, static method, Efficient array search	Lecture, Problem solution, Video, Web Link	CO1	Midterm Examination
10.	OO design concepts, Design principles in code	Lecture, Problem solution, Video, Web Link	CO2	Final Examination
11.	Introduction to inheritance, Implementing inheritance	Lecture, Problem solution, Video, Web Link	CO2	CT-2, Final Examination
12.	Abstract and concrete class, abstract class inheritance	Lecture, Problem solution, Video, Web Link	CO2	CT-2, Final Examination
13.	Interface inheritance	Lecture, Problem solution, Video, Web Link	CO2	Final Examination
14.	Midterm Examination			

15.	Enumerated Types, Intro to Polymorphism	Lecture, Problem solution, Video, Web Link	CO2	Final Examination
16.	Dynamic Dispatch, Approaches to Testing	Lecture, Problem solution, Video, Web Link	CO2	Final Examination
17.	Casting Objects and Using Typed Lists, Iterating Through a List	Lecture, Problem solution, Video, Web Link	CO3	Final Examination
18.	Good OOP Practices, List Lookup and Group Classes	Lecture, Problem solution, Video, Web Link	CO3	Final Examination
19.	Exception Handling (Fundamental mechanism, Exception Types, Try and Catch, displaying a description of an Exception)	Lecture, Problem solution, Video, Web Link	CO3	Final Examination
20.	Multiple catch clauses, nested try statements, use of throw, throws and finally keywords	Lecture, Problem solution, Video, Web Link	CO3	Final Examination
21.	Introduction to Java GUI and Swing, GUI Layouts and Event Processing	Lecture, Problem solution, Video, Web Link	CO2	Final Examination
22.	Advanced Swing Components, Intro to MVC	Lecture, Problem solution, Video, Web Link	CO3	CT-3
23.	Implementing MVC, Observer Pattern and Implementation	Lecture, Problem solution, Video, Web Link	CO3	CT-3
24.	Java collection	Lecture, Problem solution, Video, Web Link	CO3	Final Examination

25.	Java collection (cont.)	Lecture, Problem solution, Video, Web Link	CO3	Final Examination
26.	CT-3 Review class			