Course Code				**23CSMIL231**			
Title of the Course				**Object Oriented Programming Using Java**			
Offered to: (Programme/s)				**B. Sc Hons (MATHEMATICS,ELECTRONICS)**			
L	**4**	**T**	**0**	**P**	**0**	**C**	**3**
Year of Introduction:	**2024-25**			**Semester:**			**3**
Course Category:	**Minor Practical**			**Course Relates to:**			**Global / National / Regional / Local**
Year of Revision:				**Percentage:**			
Type of the Course:				**Skill Development / Employability**			
Crosscutting Issues of the Course :							
Pre-requisites, if any				Knowledge in Programming			

Course Description:

This course provides the fundamental components and libraries of the Java programming language, with a strong emphasis on object-oriented programming (OOP) principles. It constitutes as the foundation for Java development, providing the essential building blocks and features for creating robust and scalable applications.

Course Aims & Objectives:

S. No	COURSE OBJECTIVES
1	Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
2	Realize fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
3	Analyze step by step and develop programs on inheritance and interfaces,arrays and string handling functions
4	Understand the Fundamental features of multi-threaded programs, Exception handling
5	Understand packages, I/O streams in java

Course Outcomes:

At the end of the course, the student will / will be…

NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Develop a comprehensive understanding how object-oriented concepts are incorporated into the Java programming language	K2	**1,2**	
CO2	Implementing Object Oriented Programming Concepts(class, constructor, overloading) in java	K3	**1,2**	
CO3	Implementing arrays, inheritance and interfaces in a Java program.	K3	**1,2**	
CO4	Implementing Multithreading, exception handling in Java.	K3	**1,2**	
CO5	Implementing Packages and Files in java.	K3	**1,2**	

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

CO-PO-PSO MATRIX									
CO NO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**
CO1	**2**	**3**						**2**	**1**
CO2	**2**	**3**						**2**	**1**
CO3	**2**	**3**						**2**	**1**
CO4	**2**	**3**						**2**	**1**
CO5	**2**	**3**						**2**	**1**

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

Course Structure:

Unit – I: Introduction to Java Programming (12 Hrs.)

Introduction-Object Oriented paradigm-Basic Concepts of OOP-Benefits of OOP-Applications of OOP-Java features-Simple Java program structure-Java tokens-Java Statements-Implementing a Java Program-Java Virtual Machine-Command line arguments-Constants-Variables-Data Types-Declaration of Variables-Giving Value to Variables-Scope of variables-Symbolic Constants-Type casting-Getting Value of Variables - types of operators with examples-expressions

Description:

This course is tailored to understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.

Examples:

1. Operators concept in java
2. Type casting in java

Exercises:

1. Design Java program to perform Type Casting in java.

2. Develop a Java program for sorting a given list of names in ascending order.

Learning Outcomes:

By the end of the unit, students will understand the concept and underlying principles of Object-Oriented Programming and object-oriented concepts are incorporated into the Java programming language

Web Resources:

Prof.Debasis Samanta, Dept of Computer science, IIT Kharagpur."Basic Concepts of Java Programming", 2018.

https://www.youtube.com/watch?v=OjdT2l-EZJA&list=PLfn3cNtmZdPOe3R_wO_h540QNfMkCQ0ho&index=1

Unit – II: Control statements, Classes, Objects and Methods (12 Hrs.)

Introduction-Decision making with if statement-Simple if statement-If Else statement-Nesting of if else statements-The else if ladder-The switch statement-The conditional operator-The While statement-The do-while statement-The for statement- Jumps in loops-Defining a class-Adding variables-Adding methods-Creating objects-Accessing class members-Constructors-Method overloading.

Description:
This unit provides fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.

Examples:

1. Control statements in java

2. Constructors, Method overloading, Static keyword in java

Exercises:

1. Create a class Rectangle. The class has attributes length and width. It should have methods that calculate the perimeter and area of the rectangle. It should have read Attributes method to read length and width from user.

2. Construct a Java program that implements method overloading

Learning Outcomes:
By the end of this unit, students will be able to gain knowledge in Implementing Object Oriented Programming Concepts like class, constructor, overloading concepts in java

Web Resources:

Introduction to Classes and Objects in Java , Neso Academy, 7 june 2020

https://www.youtube.com/watch?v=W-D71ZeMixQ&list=PLBlnK6fEyqRiwWLbSXKFtdGV8OVqr9dZr

Unit – III: Arrays, Inheritance and Interfaces (12 Hrs.)

Arrays- One dimensional arrays- Creating an array – Two dimensional arrays -Extending a class -Overriding methods-Final variables and methods-Final classes-Abstract methods and classes

MULTIPLE INHERITANCE: Introduction- Defining interfaces- Extending interfaces-Implementing interfaces-Accessing interface variables

Description:

This unit helps in understanding the principles of inheritance and interfaces, array creation in java

Examples:

1. Types of inheritances.
2. array creation in java

Exercises:

1. Design a Java program to calculate multiplication of 2 matrices.

2. Construct a program for extending and implementing interfaces.

Learning Outcomes:
By the end of this unit, students will be able to understand and implement inheritance and interfaces, array creation and string handling functions in a Java program.

Web Resources:

1.Prof.Debasis Samanta, Dept of Computer science, IIT Kharagpur."Inheritance in Java", 2018.

https://www.youtube.com/watch?v=rxsl1TzcEgg

2. Arrays in Java by Neso Academy,2019
https://www.youtube.com/watch?v=kWJHzambtNo&list=PLBlnK6fEyqRiraym3T703apTvEZLaSVtJ

3.What is string in Java **by Lab Mug** ,2023

https://www.youtube.com/watch?v=Vv8ijzbz22s

Unit – IV: Multi-Threading, Exception Handling (12 Hrs.)

Introduction-Creating Threads-Extending the Threads-Stopping and Blocking a Thread-Lifecycle of a Thread-Using Thread Methods-Implementing the 'Runnable' Interface-Types of errors-Compile time errors-Run-time errors-Exceptions-Exception handling-Multiple Catch Statements-Using finally statement

Description:

This unit helps in understanding and implementing multi-threaded programs, Exception handling

Examples:
1. Multi-threading in java
2. Types of exception handling mechanisms

Exercises:
1. Develop a Java program to create three threads and that displays "good morning", for every one second, "hello" for every 2 seconds and "welcome" for every 3 seconds by using extending Thread class.

2. Construct Java program to implement various types of Exception Handling Mechanisms

Learning Outcomes:

By the end of this unit, students will be able to Implement Multithreading, exception handling

Resources:

1.Prof.Debasis Samanta, Dept of Computer science, IIT Kharagpur."Exception Handling in Java", 2018.

https://www.youtube.com/watch?v=vUov8EkjZjU&list=PLfn3cNtmZdPOe3R_wO_h540QNfMkCQ0ho&index=23

2. Prof.Debasis Samanta, Dept of Computer science, IIT Kharagpur."Multi Threading in Java", 2018.

https://www.youtube.com/watch?v=6rYOyIGfy3w&list=PLfn3cNtmZdPOe3R_wO_h540QNfMkCQ0ho&index=27

Unit – V: Packages and I/O Files (12 Hrs.)

Java API Packages-Creating Packages-Accessing a Package- Using a Package-Concept of Streams-Stream classes-Byte Stream Classes-Character Stream classes: Reader stream classes, Writer Stream classes-Reading and writing files.

Description:
This unit focuses Understanding packages, I/O streams in java

Examples:

1. Package creation
2. Writing and Reading Files.

Exercises:
1. **Write a program to create and Import Packages**

2. Create a program for writing and reading Files

Learning Outcomes:
By the end of this unit, students will be able to implement packages in Java programs, Input/output Streams in java

Resources:
1.Prof.Debasis Samanta, Dept of Computer science, IIT Kharagpur."Packages in Java", 2018.

https://www.youtube.com/watch?v=TwU3cv1FFis&list=PLfn3cNtmZdPOe3R_wO_h540QNfMkCQ0ho&index=17

2. "File Handling in Java", Learn Coding, 2021.

https://www.youtube.com/watch?v=VJgCjLuU4e8&list=PLqleLpAMfxGDVu5tUmUg9jSQUUB8_5DB0

Specific Resources:

Text Books:

1. E.Balaguruswamy, Programming with JAVA, A primer, 3e, TATA McGraw-Hill Company.

Reference Books:

1. Programming in Java by Sachin Malhotra, OXFORD University Press
2. John R. Hubbard, Programming with Java, Second Edition, Schaum's outline Series, TATA McGraw-Hill Company.
3. Deitel &Deitel. Java TM: How to Program, PHI (2007)
4. Java Programming: From Problem Analysis to Program Design- D.S Mallik
5. Object Oriented Programming Through Java by P. Radha Krishna, Universities Press (2008)

Web Resources:

Prof.Debasis Samanta, Dept of Computer science, IIT Kharagpur."Basic Concepts of Java Programming", 2018.

https://www.youtube.com/watch?v=OjdT2l-EZJA&list=PLfn3cNtmZdPOe3R_wO_h540QNfMkCQ0ho&index=1

PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS & SCIENCE
Autonomous
Siddhartha Nagar, Vijayawada–520010
Re-accredited at 'A+' by the NAAC

Object Oriented Programming Using Java
SEMESTER -END QUESTION PAPER STRUCTURE

Course Code & Title of the Course:	**23CSMIL231**
Offered to:	**B.Sc HONS (Mathematics,Electronics)**
Category:	**SEMESTER: 3**
Max. Marks	**70**
Max.Time	**3 Hrs**

Section A: Short Answer Questions (20 Marks)
Answer All questions. Each question carries 4 Marks.

1. A) Discuss about structure of java program.(K2)
   OR
   B)Discuss about data types in java.(K2)
2. A) Explain accessing class members with an example. (k2)
   OR
   B)Explain constructors in java with example. (K2)
3. A) Discuss about 2-D Array in java with example.(k2)
   OR
   B)Illustrate implementing interfaces in java with example. (K3)
4. A) Describe Thread Creation in java with an example.(k2)
   OR
   B)Explain finally block with an example. (K2)
5. A) Explain byte stream classes in java. (k2)
   OR
   B) Explain File creation in java with example. (K2)

Section B: Long Answer Questions (50 Marks)
Answer All questions. Each question carries 10 Marks.

6. (A) Discuss Object Oriented Programming Principles. (k2)
   (OR)
   (B) Discuss Java Buzz words. (K2)
7. (A) Describe Method Overloading with an example program. (k2)
   (OR)
   (B)Describe the concept of static members in java with example. (K2)

8. (A) Explain the concept of final keyword with example. (k2)

(OR)

(B)List of different types of inheritance in java and explain with examples. (K2)

9. (A) Explain life cycle of a thread with neat diagram. (k2)

(OR)

(B)Define Exception. Explain Exception handling mechanism in java with examples (K2)

10. (A) Describe package creation and accessing with example. (k2)

(OR)

(B) Explain writing and reading files in java. (K2)

***