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

Course Code				**23CGMAL233**			
Title of the Course				**Object Oriented Programming Using Java**			
Offered to: (Programme/s)				**B.Sc Hons (CSCS)**			
L	**4**	**T**	**0**	**P**	**0**	**C**	**3**
Year of Introduction:	**2024-25**			**Semester:**			**3**
Course Category:	**Major Theory**			**Course Relates to:**	**Global / National / Regional / Local**		
Year of Revision:				**Percentage:**			
Type of the Course:				**Major Theory**			
Crosscutting Issues of the Course :							
Pre-requisites, if any				Knowledge in computer basics and programming concepts			

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	Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
3	Understand the principles of inheritance and interfaces,arrays and string handling functions
4	Understand the Fundamental features of multi-threaded programs, Exception handling and packages.
5	Understand the principles of applets, I/O streams in java and java database connectivity

Course Outcomes:

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

NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Understand the concept and underlying principles of Object-Oriented Programming ,Understand how object-oriented concepts are incorporated into the Java programming language	K2	**1,2**	**1**
CO2	Implement Object Oriented Programming Concepts(class, constructor, overloading) in java	K3	**1,2**	**1**
CO3	Use and create inheritance and interfaces in a Java program.	K3	**1,2**	**1**
CO4	Implement Multithreading, exception handling in Java.	K3	**1,2**	**1**
CO5	Use and create packages and interfaces in a Java program,Use graphical user interface in Java programs,Use of Input/output Streams in java	K3	**1,2**	**1**

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**						**3**	
CO2	**3**	**3**						**2**	
CO3	**2**	**3**						**3**	
CO4	**3**	**3**						**3**	
CO5	**3**	**3**						**2**	

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.Develop a java program to display Fibonacci series.

2.Create a java program to find out the given number is palindrome or not \

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-Static members-Nesting of methods

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.Develop a java program to implement main method inside and outside of a class.
2.Construct a java program on Decision making.

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: Inheritance, Arrays, Strings and Interfaces (12 Hrs.)

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

Multiple Inheritance: Introduction- Defining interfaces- Extending interfaces-Implementing interfaces-Assessing interface variables

Description:

This unit helps in understanding the principles of inheritance and interfaces, array creation and string handling functions

Examples:

1. Types of inheritances.
2. String handling functions and array creation in java

Exercises:

1. Construct a java program on single and Multi-dimensional array.
2. Develop java programs on various types of Inheritance.

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 and Packages (12 Hrs.)

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

Description:

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

Examples:

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

Exercises:
1.Design java programs on Packages.
2.Construct a java program on Multi-Threading

Learning Outcomes:
By the end of this unit, students will be able to Implement Multithreading, exception handling and packages 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.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
3. 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: Applets and I/O Files (12 Hrs.)

Local and remote applets-Applets and Applications-Building Applet code- Applet Life cycle: Initialization state, Running state, Idle or stopped state, Dead state, Display state-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 the principles of applets, I/O streams in java

Examples:

1. Applet creation
2. Writing and Reading Files.

Exercises:

1. Construct an Applet program to draw a Line, Rectangle, Circle, Ellipse, Arcs and a Polygon.
2. Develop a java program to perform writing Data in a file and reading data from a file.

Learning Outcomes:
By the end of this unit, students will be able to implement graphical user interface in Java programs, Input/output Streams in java and java database connectivity with oracle

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

https://www.youtube.com/watch?v=cC_Ij7WmP_k&list=PLfn3cNtmZdPOe3R_wO_h540QNfMkCQ0ho&index=34
2.Prof.Debasis Samanta, Dept of Computer science, IIT Kharagpur." JDBC", 2018.

https://www.youtube.com/watch?v=ajhWv31oN1k&list=PLfn3cNtmZdPOe3R_wO_h540QNfMkCQ0ho&index=50
3. "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

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Object Oriented Programming Using Java
SEMESTER -END QUESTION PAPER STRUCTURE

Course Code & Title of the Course:	**23CGMAL233 : Object Oriented Programming using Java**
Offered to:	**B. Sc Hons (CSCS)**

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 class creation with methods, variables and create objects for it. K2

OR

(b)Explain constructors in java with example. K2

3. (a) Illustrate any five string handling methods in java.K3

(b)Illustrate implementing interfaces in java with example. K3

4. (a) Describe creating threads in java with an example.K2

OR

(b)Describe package creation and accessing with example.K2

5. (a) Explain byte stream classes in java. K2

OR

(b) Explain with program applet creation.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

3. (a) Describe Method Overloading with an example program.K2

(OR)

(b)Describe the concept of static members in java with example.K2

4. (a) Explain the concept of final keyword with examples.K2

(OR)

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

5. (a) Explain life cycle of a thread with neat diagram. K2

(OR)

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

6. (a) Explain life cycle of applet with neat diagram. K2

(OR)

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