Semester: I/II			
Course Title	Basics of Java Programming	**CIE Marks**	50
Course Code	BCSPLC105C/205C	**SEE Marks**	50
Course Type	Integrated	**Total Marks**	100
Course Category	PLC	**SEE Duration**	03 hrs
Hours Per Week	2L:0T:2P	**SEE Type**	Written
Total Hours	40 hrs	**Credits**	03

Course Learning Objectives
This course will enable the students to
• Learn fundamental features of object-oriented language and JAVA
• Set up a Java JDK environment to create, debug and run simple Java programs.
• Learn object-oriented concepts using programming examples.
• Study the concepts of importing of packages and exception handling mechanisms.

Module-1	**(8 hrs)**
An Overview of Java: Object-Oriented Programming, A First Simple Program, A Second Short Program, Two Control Statements, Using Blocks of Code, Lexical Issues, The Java Class Libraries, Data Types, Variables, and **Arrays:** Java Is a Strongly Typed Language, The Primitive Types, Integers, Floating-Point Types, Characters, Booleans, A Closer Look at Literals, Variables, Type Conversion and Casting, Automatic Type Promotion in Expressions, Arrays, A Few Words About Strings. **Text Book 1: Ch 2, Ch 3**	
Module-2	**(8 hrs)**
Operators: Arithmetic Operators, The Bitwise Operators, Relational Operators, Boolean Logical Operators, The Assignment Operator, The Operator, Operator Precedence, Using Parentheses, Control Statements: Java's Selection Statements, Iteration Statements, Jump Statements. **Text Book 1: Ch 4, Ch 5**	
Module-3	**(8 hrs)**
Introducing Classes: Class Fundamentals, Declaring Objects, Assigning Object Reference Variables, Introducing Methods, Constructors, This Keyword, Garbage Collection, The finalize ( ) Method, A Stack Class, A Closer Look at Methods and Classes: Overloading Methods, Using Objects as Parameters, A Closer Look at Argument Passing, Returning Objects, Recursion, Introducing Access Control, Understanding static, Introducing final. **Text Book 1: Ch 6, Ch 7: 7.1 to 7.8**	
Module-4	**(8 hrs)**
Inheritance: Inheritance, Using super, Creating a Multilevel Hierarchy, When Constructors Are Called, Method Overriding. Packages and Interfaces: Packages, Access Protection, Importing Packages, Interfaces. **Text Book 1: Ch 8.1 - 8.5, Ch 9**	
Module-5	**(8 hrs)**
Exception Handling: Exception-Handling Fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, Java's Built-in Exceptions. I/O Basics, Reading console input, writing console output, reading and writing files, Introduction to Swings. **Text Book 1: Ch 10.1,10.2,10.3,10.4, 10.10 Ch 13.1,13.2,13.3,13.5, Ch 29.1 - 29.7**	

Practical Components

Sl. No.	Programs for Implementation:
1.	Write a JAVA program that prints all possible solutions to the quadratic equation $ax^2+bx+c=0$. Take suitable values of 'a', 'b' and 'c' to get possible solutions.
2.	Write a JAVA program for multiplication of two-dimensional arrays.
3.	Write a JAVA program to sort a list of elements in ascending or descending order.
4.	Create a JAVA class called Student with the following details as variables within it. USN:NAME BRANCH: PHONE PERCENTAGE Write a JAVA program to create 'n' number of student objects and print the USN, Name, Branch, Phone no. and percentage of these objects with suitable headings.
5.	Design a class "Complex" with data members, constructor and method for overloading a binary oper '+'. Develop a JAVA program to read Two complex numbers and print the results of addition.
6.	Design a super class called Staff with details as Staffed, Name, Phone, Salary. Extend this class by writing three subclasses namely Teaching (domain, publications), Technical (skills) and Contract (period). Write a JAVA program to read and display at least 3 staff objects of all three categories.
7.	Develop a Java program to read a text file and copy the file contents to another text file.
8.	Create two packages P1 and P2. In package P1, create class A, class B inherited from A, class C. In package P2, create class D inherited from class A in package P1 and class E. Demonstrate working of access modifiers (private, public, protected, default) in all these classes using JAVA.
9.	Write a JAVA program to illustrate the working of a simple Arithmetic calculator using Swings.
10.	a) Write a JAVA program to read two integers a and b. Compute a/b and print, when b is not zero. Raise an Exception when b is equal to zero. b) Write a JAVA program to demonstrate working of Array Index Out of Bound Exception.

Text Book:	
1.	Java The Complete Reference, Herbert Schildt, Tata McGraw Hill, 7th Edition, 2007.
Reference Books:	
1.	Programming with Java, E. Balagurusamy, McGraw Hill Standard Edition, 7th Edition, 2023.
2.	Head First Java: A Brain-Friendly Guide, Paperback by Kathy Sierra (Author), Bert Bates (Author), Trisha Gee (Author), Shroff/O'Reilly, 3rd Edition, June 2022.

Course Outcome Statements: After the successful completion of the course, the student will be able to:	
CO1	Illustrate the fundamentals of Java programming using basic concepts of OOP.
CO2	Develop programs using the concepts of inheritance, polymorphism.
CO3	Practice the implementation of packages and interfaces in Java programming.
CO4	Examine the concepts of Exception handling to develop efficient and error free programs.
CO5	Design and implement java applications for real world problems.

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	-	-	2	-	-	-	1	-	-	1
CO2	2	2	2	-	2	-	-	-	1	-	-	1
CO3	2	2	2	-	2	-	-	-	1	-	-	1
CO4	2	2	2	-	2	-	-	-	1	-	-	1
CO5	2	2	2	-	2	-	-	1	1	-	-	1
Avg.	2	1.8	2	-	2	-	-	1	1	-	-	1

3: High, 2: Medium, 1: Low