

<b>BASICS OF JAVA PROGRAMMING</b>	
<b>Course Code:</b> 22PLC15C/22PLC25C	<b>Credits:</b> 2:0:1
<b>Pre – requisites:</b> none	<b>Contact Hours:</b> 28L+14T
<b>Course Coordinator:</b>	

## **Course Content**

### **Unit I**

An Overview of Java: Introduction to Object-Oriented Programming, Simple Java Programs, identifiers, literals, Data Types, Variables, and Arrays: Java Is a Strongly Typed Language, The Primitive Types, Integers, Floating-Point Types, Characters, Booleans, Variables, Arrays, and Strings.

- Pedagogy/Course delivery tools: Chalk and talk, PowerPoint Presentation
- Links: <https://pythontutor.com/visualize.html#mode=edit>

### **Unit II**

Operators: Arithmetic Operators, The Bitwise Operators, Relational Operators, Boolean Logical Operators, The Assignment Operator, The ?: Operator, Operator Precedence, Control Statements: Java's Selection Statements - if, if-else, nested if else, if else ladder, Iteration Statements – while, do-while, for, for-each, nested loops, Jump Statements – break, continue, return.

- **Pedagogy/Course delivery tools: Chalk and talk, PowerPoint Presentation**
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### **Unit III**

Introducing Classes: Class Fundamentals, Declaring Objects, Assigning Object Reference Variables, Introducing Methods, Constructors, The this Keyword, Garbage Collection, The finalize() Method, A Closer Look at Methods and Classes: Overloading Methods, Using Objects as Parameters, A Closer Look at Argument Passing, Returning Objects, Introducing Access Control, Understanding static, Introducing final

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### **Unit IV**

Inheritance: Inheritance, using super, creating a Multilevel Hierarchy, When Constructors Are Called, Method Overriding, Dynamic Method Dispatch, Using Abstract Classes, Using final with Inheritance.

- **Pedagogy/Course delivery tools:** Chalk and talk, PowerPoint Presentation
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### **Unit V**

Packages and Interfaces: Packages, Access Protection, Importing Packages, Interfaces, Exception Handling: Exception-Handling Fundamentals, Exception Types, Uncaught Exceptions, using try and catch, Multiple catch Clauses, Nested try Statements, throw, throws, finally, Java's Built-in Exceptions.

- Pedagogy/Course delivery tools: Chalk and talk, PowerPoint Presentation
- Links: <https://pythontutor.com/visualize.html#mode=edit>

**Lab Component:**

1. Java Program to demonstrate arithmetic operators, relational operators and bitwise operators.
2. Java Program to find the largest and smallest of three numbers using a ternary operator.
3. Write a Java program to find Fibonacci series, using while and for loop.
4. Write a Java program to calculate a Factorial of a number
5. Write a java program to check if a given number is palindrome.
6. ATM program Java- representing ATM transactions such as withdraw the money, deposit the money, check the balance, and exit using switch statement.
7. Java Program to print the largest element in an array.
8. Java Program to Add Two Matrices
9. Write a Java program to implement a linear Search Algorithm.
10. Write a JAVA program to add two complex numbers using Class.
11. 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 Student objects and print the USN, Name, Branch, Phone, and percentage of these objects with suitable headings.
12. Write a JAVA program demonstrating Method overloading and Constructor overloading.
13. Find the area of the rectangle using constructors and method area().
14. Write a Java program to demonstrate the finalize() method that helps in garbage collection.
15. Design a super class called Staff with details as StaffId, 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.
16. Java Program to demonstrate the uses of super.
17. Describe the abstract class called shape, which has three subclasses say triangle, rectangle and circle. Define one method area() in abstract class and override this area() in these three subclasses to calculate areas of triangle, rectangle and circle.
18. 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. Also demonstrate working of ArrayIndexOutOfBoundsException.
19. Write a JAVA program demonstrating finally block for handling exceptions.
20. Java program to implement multiple inheritance.

**Text Books:**

Herbert Schildt, Java The Complete Reference, 7th Edition, Tata McGraw Hill, 2007

**Reference Books:**

Bruce Eckel, Thinking in Java, 4th Edition, Tata McGraw Hill

**Course Outcomes (COs):**

At the end of the course, students will be able to

CO1: Understand Object Oriented Programming Concepts (PO 1)

CO2: Apply Java programming constructs to solve the given problems (PO 1,2, 3)

CO3: Apply the concept of Classes and Objects to solve the given problems. (PO 1,2, 3)

CO4: Use the concepts of polymorphism and inheritance to solve the given problems. (PO 1,2, 3)

CO5: Design the solutions for the given real world problems using concepts of packages, interfaces and Exception Handling. (PO 1,2, 3)

**Course Assessment and Evaluation:**

<b>Continuous Internal Evaluation (CIE): 50 Marks</b>		
<b>Assessment Tool</b>	<b>Marks</b>	<b>Course outcomes addressed</b>
Internal test-I	30	CO1, CO4
Internal test-II	30	CO2, CO3, CO5
Average of the two internal tests shall be taken for 30 marks.		
<b>Other components</b>		
Lab Component Evaluation	20	CO1, CO2, CO3, CO5, CO5
<b>Semester-End Examination (SEE)</b>	100	CO1, CO2, CO3, CO4, CO5