PKM EDUCATIONAL TRUST®

R R Institute of Technology

RAJA REDDY LAYOUT, NEAR CHIKKABANAVARA RAILWAY STATION, CHIKKABANAVARA,

An Autonomous Institution under VTU
Approved by AICTE, New Delhi & Government of Karnataka

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Course Title:	**Basics of Java Programming**		
Course Code:	**BPLCK105C /205C**	CIE Marks	50
Course Type (Theory/Practical /Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:2	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03

Course objectives
- Learn fundamental features of object oriented language and JAVA
- Set up 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 mechanism.

Teaching-Learning Process
These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching –Learning more effective
1. Use https://pythontutor.com/visualize.html#mode=edit in order to visualize the Java programs
2. Chalk and talk
3. Onine demonstration
4. Hands on problem solving

Module-1 (8 hours)
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 hours)
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 hours)
Introducing Classes: Class Fundamentals, Declaring Objects, Assigning Object Reference Variables, Introducing Methods, Constructors, The 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, Arrays Revisited
Text book 1: Ch 6, Ch 7 (7.1-7.9)

Module-4 (8 hours)

Inheritance: Inheritance, Using super, Creating a Multilevel Hierarchy, When Constructors Are Called, Method Overriding, Dynamic Method Dispatch, Using Abstract Classes, Using final with Inheritance, The Object Class.

Text book 1: Ch 8

Module-5 (8 hours)

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, Creating Your Own Exception Subclasses, Chained Exceptions, Using Exceptions.

Text book 1: Ch 9, Ch 10

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

CO1	To explain the features and object oriented concepts in JAVA programming
CO2	To analyse working of bitwise operators in JAVA
CO3	To develop simple programs based on polymorphism and inheritance
CO4	To describe the concepts of importing packages and exception handling mechanism

Programming Assignments

1. Write a JAVA program that prints all real solutions to the quadratic equation $ax2+bx+c=0$. Read in a, b, c and use the quadratic formula.

2. Write a JAVAprogram for multiplication of two arrays.

3. Demonstrate the following operations and sign extension with Java programs
   (i) $<<$ (ii) $>>$ (iii) $>>>$

4. Write aJAVA program to sort list of elements in ascending and descending order

5. 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.

6. Write a JAVA program demonstrating Method overloading and Constructor overloading.

7. 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.

8. Demonstrate dynamic dispatch using abstract class in JAVA.

9. 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.

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10. 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 Array Index Out Of Bound Exception.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50). The minimum passing mark for the SEE is 35% of the maximum marks (18 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination(SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation (CIE):

The CIE marks for the theory component of the IC shall be **30 marks** and for the laboratory component **20 Marks**.

CIE for the theory component of the IC

- Three Tests each of 20 Marks**;** after the completion of the syllabus of 35-40%, 65-70%, and 90-100% respectively.

- Two Assignments/two quizzes/ seminars/one field survey and report presentation/one- course project totaling20 marks.

Total Marks scored (test + assignments) out of 80 shall be scaled down to **30 marks CIE for**

the practical component of the IC

- On completion of every experiment/program in the laboratory, the students shall be evaluated and marks shall be awarded on the same day. The **15 marks** are for conducting the experiment and preparation of the laboratory record, the other **05 marks shall be for the test** conducted at the end of the semester.

- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 10 marks. Marks of all experiments' write-ups are added and scaled down to 15 marks.

- The laboratory test **(duration 03 hours)** at the end of the 15th week of the semester /after completion of all the experiments (whichever is early) shall be conducted for 50 marks and scaled down to **05 marks.**

Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IC for **20 marks**.

However, in SEE, the questions from the laboratory component shall be included**.** The maximum of 05 questions is to be set from the practical component of IC/IPCC, the total marks of all questions should not be more than 25 marks.

The theory component of the IC shall be for both CIE and SEE.

Semester End Examination (SEE):

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

- The question paper shall be set for 100 marks. The medium of the question paper shall be English). The duration of SEE is 03 hours.

The question paper will have 10 questions. Two questions per module. Each question is set for 20 marks. The students have to answer 5 full questions, selecting one full question from each module. The student has to answer for 100 marks and marks scored out of 100 shall be proportionally reduced to 30 marks. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module.

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

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

Web links and Video Lectures (e-Resources):

- https://onlinecourses.nptel.ac.in/noc22_cs47/preview

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Conduct on spot problem solving based on JAVA
- Develop simple GUI interfaces for a computer program to interact with users The minimum marks to be secured in CIE to appear for SEE shall be 12 (40% of maximum marks) in the theory component and 08 (40% of maximum marks) in the practical component.

  The laboratory component of the IC/IPCC shall be for CIE only.

COs	POs						
	1	2	3	4	5	6	7
CO1							
CO2							
CO3							
CO4							

COs and POs Mapping (Individual teacher has to fill up)

Level 3- Highly Mapped,   **Level 2-Moderately Mapped,**   **Level 1-Low Mapped,**   **Level 0- Not Mapped**

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