Government Holkar (Model, Autonomous) Science College, Indore (M.P.)

Computer Science Department

Part A - Introduction			
Programme - B.Sc. (Computer Science - Major)	**Class** – B.Sc. IV Semester	**Year- 2025**	**Session- 2024-25**
Course Type (Computer Science) – Major			

1	**Course Code**	S4-CSC1T
2	**Course Title**	Object Oriented Programming with Java
3	**Pre – requisite (if any)**	To study this course, a student must have successfully completed the course on Programming Methodology at Certificate Level.
4	**Course Learning Outcomes (CLO)**	**After the completion of this course, a student shall be able to do the following:** 1. Achieve foundational understanding of Java fundamentals and Object-Oriented Programming (OOP) concepts. 2. Apply Java programming techniques for solving real-world problems, including data manipulation and I/O operations. 3. Analyze complex Java topics such as applet development, graphics creation, and error handling to enhance problem-solving abilities. 4. Synthesize knowledge and skills to create advanced Java applications, debug programs effectively, and prepare for further Java specialization. 5. Assess Java proficiency by evaluating problem-solving techniques and establishing a strong foundation for future Java exploration.
5	**Credit Value**	4 Credits
6	**Total Marks**	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks **Total 40+60= 100 Marks** **Minimum Pass Marks – 35**

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Part A - Introduction			
Programme - B.Sc. (Computer Science - Major)	**Class** – B.Sc. IV Semester	**Year- 2025**	**Session- 2024-25**
Course Type (Computer Science) – Major			
Course Code	S4-CSCIT		
Course Title	Object Oriented Programming with Java		

Part – B Content of the Course		
Total no. of lectures – As per UGC rules (1 Credit = 15 Lectures)		
S. No.	**Topics**	**No. of Lectures**
I	OOPS - Object Oriented Paradigm, Benefits of OOP, Applications of OOP. Java - History, Java Features, How Java Differs from C and C++, Java and internet, Java and World Wide Web, Web Browsers, Hardware and Software Requirements, Java Supports Systems, Java Environment. Java Program Structure - Java Tokens, Java Statements, Implementing a Java Program, Java Virtual Machine, Command Line Arguments, and Programming Style.	12
II	Java Basics - Constants, Variables, Data Types, Declaration of Variables, Giving Values to Variables, Scope of Variable, Symbolic Constants, Type Casting, Getting Values of Variables, Standard Default Values. Operators - Arithmetic Operator, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special Operators. Arithmetic Expressions - Evaluation of Expressions, Precedence of Arithmetic Operators, Type Conversions in Expressions, Operator Precedence and Associativity, Mathematical Functions. Decision Making: with if Statement, Simple if Statement, if- else Statement, Nesting of if ...else Statement, if-else Ladder, The Switch Statement, The + Operator. Loops - While Statement, Do Statement, For Statement, Jump in Loops, Labeled Loops.	12

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Course Code	S4-CSCIT		
Course Title	Object Oriented Programming with Java		

III	Class - Defining a Class, Adding Variables, Adding Methods, Creating Objects, Accessing Class Members, Constructors — definition and types, Methods Overloading, Static Members, Nesting of Methods. Inheritance - Extending a Class, Overloading Methods, Final Variables and Methods, Final Classes, Finalize Methods, Abstract Methods and Classes, Visibility Control Arrays, One Dimensional Array, Strings, Vectors, Wrapper Classes. Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables.	12
IV	Java API Packages - Using System Packages, Naming Conventions, Creating Packages, Accessing a Package, Using a Package, Adding a Class to a Package, and Hiding Classes. Creating Threads, Extending the Thread Class, Stopping and Blocking a Threads, Life Cycle of a Thread, Using Threads Methods, Threads Exceptions, Threads Priority, Synchronization, Implementing the 'Runnable' interface. Types of Errors - Exceptions, Syntax of Exception Handling Code, Multiple Catch Statements, Using Finally Statements, Throwing Our Own Exceptions, Using Exceptions for Debugging. Preparing to Write Applets - Building Applet Code, Applet Life Cycle, Creating an Executable Applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, Running the Applet.	12
V	More About the Applet tag - Passing Parameters to Applets, Aligning the Display, More About HTML Tags, Displaying Numbering Values, Getting Input from the user. The Graphics Class - Lines and Rectangles, Circles and Ellipses, Drawing Arcs, Drawing Polygons, Line Graphs, Using Control Loops in Applets, Drawing Bar Charts. Concept of Stream - Stream Classes, Byte Stream Classes, Character Stream Classes, Using Streams. Other Useful I/O Classes - Using the File Class, Input / Output Exceptions, Creation of Files, Reading / Writing Characters, Reading / Writing Bytes, Handing Primitive Data Types, Concatenating and Buffering Files, Random Access, Files, Interactive Input and Output, other Stream Classes.	12

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Part A - Introduction			
Programme - B.Sc. (Computer Science - Major)	**Class** – B.Sc. IV Semester	**Year- 2025**	**Session- 2024-25**
Course Type (Computer Science) – Major			
Course Code	S4-CSC1T		
Course Title	Object Oriented Programming with Java		

Part – C Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

Textbooks:

1. E Balguruswami, Programming with Java, Tata McGraw-Hill Publication.

Reference Books:

1. Bruce Eckel, Thinking in Java.
2. Herbert Schildt, Java: The Complete Reference.
3. Y. Daniel Liang, Introduction to Java Programming.
4. Paul Deitel, Harvey Deitel, Java: How to Program.
5. Cay S. Horsttnann, Core Java Volume I —Fundamentals.
6. Java Projects, BPB Publication.
7. Dr. S.S. Kandare, Programming in Java, S Chand Publication.
8. Books published by M.P. Hindi Granth Academy, Bhopal

Suggestive digital platform web links :

1. https://www.cs.emu.ediJafs/cs.cniu.edu/user/qc1ien/www/doum1oad/java/LeainJava.pdf
2. https://www.tutoria1spoint.confjava/java tutorial.pdf
3. https://www.yoiitube.com/watc1i?v=7soxDfdqfDw
4. https://www.mphindigranthacademy.org/

Suggested equivalent online courses:

1. https://www.nptel.ac.in/courses/106/105/106105191

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Part A - Introduction			
Programme - B.Sc. (Computer Science - Major)	**Class** – B.Sc. IV Semester	**Year- 2025**	**Session- 2024-25**
Course Type (Computer Science) – Major			
Course Code	S4-CSC1T		
Course Title	Object Oriented Programming with Java		

Part – D Assessment and Evaluation				
Internal Assessment: Continuous Comprehensive Evaluation (CCE)/ Formative Assessment: 40 Marks Formative Assessment shall be based on – Quiz, Seminar, Presentation, Written test, Case Study, Project, Assignment etc. The division of marks is as follows:			**External Evaluation (Summative Assessment):** **End Semester Exam:60 Marks** Time: 03 hours	
Test I	20 Marks	Best two test Marks = (20 + 20)	**Section (A):** 5 Objective Questions (1 mark each)	5 x 1= 5
Test II	20 Marks		**Section (B):** 5 Short Questions out of eight questions (200 words each) (7 Marks each)	5 x 7 = 35
Test III	20 Marks		**Section (C):** Two long questions out of four questions (500 Words each) (10 Marks each)	2 x 10 = 20
Total Internal Assessment (CCE) Marks		**40 Marks**	Total External Evaluation (Theory) Marks (A+B+ C)	**60 Marks**
Note;-	**1.**	**For Major, Minor, Open Elective, Foundation and Vocational Courses, Part D will be as per the scheme of marks given.**		
	2.	**The student should secure 35% marks in Internal Assessment (CCE) and External Evaluation (theory) combined.**		

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27/02/25

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Computer Science Department

Part A- Introduction (Practical)			
Programme - B.Sc. (Computer Science - Major)	**Class** – B.Sc. IV Semester	**Year- 2025**	Session- 2024-25
Course Type (Computer Science) – Major			
1.	Course Code	S4-CSC1TP	
2.	Course Title	Java Programming Lab	
3.	Pre-requisite (if any)	To study this course, a student must have successfully completed the course on Programming Methodology at Certificate Level.	
4.	Course Learning Outcomes (CLO)	**After the completion of this course, a student shall be able to do the following:** 1. Demonstrate a solid grasp of Java syntax, data types, control structures, and object-oriented programming concepts. 2. Develop practical skills in designing and building Java applications to solve real-world problems. 3. Master debugging techniques to identify and rectify errors in Java code effectively. 4. Gain proficiency in advanced Java topics such as multithreading, exception handling, and stream handling. 5. Showcase the ability to develop Java projects, demonstrating competence in software development and problem-solving.	
5.	Credit Value	2 Credits	
6	**Total Marks**	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks **Total 40+60= 100 Marks**	**Minimum Pass Marks – 35**

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27/02/25

Part B- Content of the Course	
Total no. of lectures – As per UGC rules: 30	
Suggestive List of Practicals	
1.	Find greater number between two numbers -using conditional operator.
2.	Find the factorial of number if number is given by user using command line argument.
3.	Write a program to check if a number is prime or not.
4.	Write a program to display tables from 2 to 10.
5.	Write a program to print Fibonacci series.
6.	Enter a no. and check whether it is even or odd.
7.	Write a Program to find sum & average of 10 no. using arrays.
8.	Write a program to display reverse of a digit no. using array.
9.	Write a program to demonstrate function overloading.
10.	Write a program to display grade according to the marks obtained by the student.
11.	Write a program to calculate the salary of an employee if salary is greater than or equal to 20000 and year of service is greater than or equal to 5 years then bonus will be 2000 otherwise 1000 and print grass salary of employee.
12.	Write a program to convert the given no. of days into months & days using with classes, objects and method.
13.	Write a program to convert given string into Uppercase and lowercase and get the length of string using array.
14.	Create a package called "Arithmetic" that contains methods to deal all arithmetic operations. Also write a program to use the package.
15.	Write a program to demonstrate use of constructor and destructor.
16.	Define an exception called "Marks out of Bound" exception that is thrown if the entered marks are greater than 100.
17.	Write a program using application of single inheritance. Find the area of rectangle & volume of cube.
18.	Develop a simple real-life application to illustrate the use of multithreading.
19.	Write a program using multiple inheritances to calculate area and perimeter of a circle using interface.
20.	Write an applet program to draw a Rectangle (color = orange) and a 30 right aligned oval.
21.	Develop an applet that receives 3 numeric values as inputs from the user and then displays the largest no. on the screen.
22.	Write a Java Program to read data from the inputted text file name, and print its content on the console.
23.	Write a Java Program to merge two files into third file
24.	Write a Java program to delete duplicate lines in text file
25.	Write a Java Program to implement File Input Stream class to read binary data from any image file.

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Part – C Learning Resources
Text Books, Reference Books, Other Resources

Suggested Readings:

Textbooks:

1. E Balguruswami, Programming with Java, Tata McGraw-Hill Publication.

Reference Books:

1. Bruce Eckel, Thinking in Java.
2. Herbert Schildt, Java: The Complete Reference.
3. Y. Daniel Liang, Introduction to Java Programming.
4. Paul Deitel, Harvey Deitel, Java: How to Program.
5. Cay S. Horsttnann, Core Java Volume I —Fundamentals.
6. Java Projects, BPB Publication.
7. Dr. S.S. Kandare, Programming in Java, S Chand Publication.
8. Books published by M.P. Hindi Granth Academy, Bhopal

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1. https://www.cs.emu.ediJafs/cs.cniu.edu/user/qc1ien/www/doum1oad/java/LeainJava.pdf
2. https://www.tutoria1spoint.confjava/java tutorial.pdf
3. https://www.yoiitube.com/watc1i?v=7soxDfdqfDw
4. https://www.mphindigranthacademy.org/

Suggested equivalent online courses:

1. https://www.nptel.ac.in/courses/106/105/106105191

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Part D- Assessment and Evaluation	
Suggested Continuous Evaluation methods:	
Internal Assessment/Formative Examination(A):	**40 Marks**
Lab Record	15 Marks
Attendance in the Lab	05 Marks
Assignments (It can be in different modes)	20 Marks
End Semester External Evaluation (B):	**60 Marks**
Viva Voce on Practical	10 Marks
Practical Record File	10 Marks
Experiments	40 Marks
Total Marks (A+B)	**(40 + 60 =100 Marks)**

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