



B.C.A. (Honours) & B.C.A. (Honours with Research)
(Semester - 3 and Semester - 4)
Saurashtra University
To be effective from June – 2024

CS-22: Programming with Java		
<p>Objectives:</p> <ul style="list-style-type: none"> To provide fundamental concepts of Object-Oriented Programming and familiar with Java environment and its applications. To be able to understand control structures, classes, methods and argument passing and iteration graphical user interface basics programming and documentation style. <p>Prerequisites:</p> <ul style="list-style-type: none"> Basic knowledge of object-oriented approach in programming with basic skills using Java. 		
Unit No.	Topic	Detail
1	History, Introduction and Language Basics, Classes and Objects	<ul style="list-style-type: none"> History and Features of Java Java Editions JDK, JVM and JRE JDK Tools Compiling and Executing basic Java Program Java IDE (NetBeans and Eclipse) Data Type (Integer, Float, Character, Boolean) Java Tokens: Keyword, Literal, Identifier, Whitespace, Separators, Comments, Operators: Operators: Arithmetic, Relational, Boolean Logical, Bitwise Logical, Assignment, Unary, Shift, Special operators Java Keywords (assert, strictfp, enum) Type Casting - Decision Statements (if, switch) Looping Statements (for, while, do..while) Jumping Statements (break, continue, return) Array (One Dim., Rectangular, Jagged) Command Line Argument Array <hr/> <ul style="list-style-type: none"> OOP Concepts (Class, Object, Encapsulation, Inheritance, Polymorphism) Creating and using Class with members Constructor finalize() method Static and Non-Static Members Overloading (Constructor & Method) Varargs, IIB (Instance Initialization Block) in Java



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2	Inheritance, Java Packages	<ul style="list-style-type: none">• Universal Class (Object Class)• Access Specifiers (public, private, protected, default, private protected)• Constructors in inheritance• Method Overriding• Interface, Object Cloning,• Nested and Inner Class• Abstract and Final Class• Normal import and Static Import• Introduction to Java API Packages and imp. Classes<ul style="list-style-type: none">o java.lang,o java.utilo java.io,o java.neto java.awt,o java.awt.evento java.applet,o java.swing• java.lang Package Classes (Math, Wrapper Classes, String, StringBuffer)• java.util Package Classes (Random, Date, GregorianCalendar, StringTokenizer, Collection in Java• Vector, HashTable, LinkedList, SortedSet, Stack, Queue, Map• Creating and Using UserDefined package and sub-package
3	Exception Handling, Threading and Streams (Input and Output)	<ul style="list-style-type: none">• Introduction to exception handling• try, catch, finally, throw, throws• Creating user defined Exception class - Thread and its Life Cycle (Thread States)• Thread Class and its methods• Synchronization in Multiple Threads (Multithreading)• Deamon Thread, Non-Deamon Thread <ul style="list-style-type: none">• Stream and its types (Input, Output, Character, Byte)• File and RandomAccessFile Class• Reading and Writing through Character Stream Classes (FileReader, BufferedReader, FileWriter, BufferedWriter)• Reading and Writing through Byte Stream Classes (InputStream, FileInputStream, DataInputStream, OutputStream, FileOutputStream, DataOutputStream)• StreamTokenizer Class• Piped Streams, Bridge Classes: InputStreamReader and OutputStreamWriter• ObjectInputStream, ObjectOutputStream
4	JavaFx Basics and	<ul style="list-style-type: none">• Basic Structure of JAVAFX program,



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	Event-driven programming and animations	<ul style="list-style-type: none"> • Panes, • UI Control and Shapes, • Property binding, • the Color and the Font class, • the Image and Image-View class, • layout panes and shapes, • Events and Events sources, • Registering Handlers and Handling Events, • Inner Classes, anonymous inner class handlers, • mouse and key events, • listeners for observable objects, • animation
5	JavaFx UI controls and multimedia	<ul style="list-style-type: none"> • Labeled and Label • Button • Checkbox • Radiobutton • Textfield • Textarea • Combobox • Listview • Scrollbar • Slider • Video and Audio

Seminar - 5 Lectures
 Expert Talk - 5 Lectures
 Test - 5 Lectures

Total Lectures 60 + 15 = 75

Reference Books:

- Java: A Beginner’s Guide – Jul 2014 by Herbert Schildt
- Java Programming (Oracle Press) by Poornachandra Sarang
- Java The Complete Reference, 8th Edition – by Herbert Schildt
- Ivor Horton’s “Beginning Java 2” JDK 5 Edition, Wiley Computer Publishing.
- Ken Arnold, James Gosling, David Holmes, “The Java Programming Language”, Addison-Wesley Pearson Education
- JavaFx A Beginners Guide by J. F. DiMarzio, McGraw Hill Computing
- Getting Started with JavaFx by Oracle:
<https://docs.oracle.com/javase/8/javafx/JFXST.pdf>
- James Gosling, Bill Joy, Guy Steele, Gilad Bracha, “The Java Language Specifications”, Addison-Wesley Pearson Education (3rd edition) Download at
<http://docs.oracle.com/javase/specs/>

Course outcomes:



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- Understand basic concepts and Java Programming Constructs
- Demonstrate Object Oriented Programming Concepts using JAVA
- Develop robust application by demonstrating professionally acceptable coding
- Design attractive user interface using AWT