

**Bachelor of Computer Application**  
**(Semester – 3 and Semester - 4)**  
**Saurashtra University**  
**Effective from June - 2023**

<b>CS – 19 PROGRAMMING WITH JAVA</b>				
<p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>To provide fundamental concepts of Object Oriented Programming and familiar with Java environment and its applications.</li> <li>To be able to understand Control structures, Classes, methods and argument passing and iteration graphical user interface basics Programming and documentation style.</li> </ul> <p><b>Prerequisites:</b></p> <ul style="list-style-type: none"> <li>Basic knowledge of object-oriented approach in programming with basic skills using Java.</li> </ul>				
No	Topics	Details	Marks weight In %	Min Lec.
1	<b>History, Introduction and Language, Basics Classes and Objects</b>	<ul style="list-style-type: none"> <li>- History and Features of Java</li> <li>- Java Editions</li> <li>- JDK, JVM and JRE</li> <li>- JDK Tools</li> <li>- Compiling and Executing basic Java Program</li> <li>- Java IDE (NetBeans and Eclipse)</li> <li>- Data Type (Integer, Float, Character, Boolean)</li> <li>- Java Tokens (Keyword, Literal, Identifier, Whitespace, Separators, Comments, Operators)</li> <li>- Operators (Arithmetic, Relational, Boolean Logical, Bitwise Logical, Assignment, Unary, Shift, Special operators)</li> <li>- Java Keywords (assert, strictfp, enum)</li> <li>- Type Casting</li> <li>- Decision Statements (if, switch)</li> <li>- Looping Statements (for, while, do..while)</li> <li>- Jumping Statements (break, continue, return)</li> <li>- Array (One Dim., Rectangular, Jagged)</li> <li>- Command Line Argument Array</li> </ul>	<b>20</b>	<b>10</b>
		<ul style="list-style-type: none"> <li>- OOP Concepts (Class, Object,</li> </ul>		

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		<ul style="list-style-type: none"> <li>- Encapsulation, Inheritance, Polymorphism)</li> <li>- Creating and using Class with members</li> <li>- Constructor</li> <li>- finalize() method</li> <li>- Static and Non-Static Members</li> <li>- Overloading (Constructor &amp; Method)</li> <li>- Varargs, IIB (Instance Initialization Block) in Java</li> </ul>		
<b>2</b>	<b>Inheritance, Java Packages</b>	<ul style="list-style-type: none"> <li>- Universal Class (Object Class)</li> <li>- Access Specifiers (public, private, protected, default, private protected)</li> <li>- Constructors in inheritance</li> <li>- Method Overriding</li> <li>- Interface, Object Cloning,</li> <li>- Nested and Inner Class</li> <li>- Abstract and Final Class</li> <li>- Normal import and Static Import</li> <li>- Introduction to Java API Packages and imp. Classes <ul style="list-style-type: none"> <li>o java.lang</li> <li>o java.util</li> <li>o java.io</li> <li>o java.net</li> <li>o java.awt</li> <li>o java.awt.event</li> <li>o java.applet</li> <li>o java.swing</li> </ul> </li> <li>- java.lang Package Classes (Math, Wrapper Classes, String, String Buffer)</li> <li>- java.util Package Classes (Random, Date, GregorianCalendar, StringTokenizer, Collection in Java - Vector, HashTable, LinkedList, SortedSet, Stack, Queue, Map</li> <li>- Creating and Using UserDefined package and sub-package</li> </ul>	<b>20</b>	<b>15</b>
<b>3</b>	<b>Exception Handling, Threading and Streams (Input and Output)</b>	<ul style="list-style-type: none"> <li>- Introduction to exception handling</li> <li>- try, catch, finally, throw, throws</li> <li>- Creating user defined Exception class</li> <li>- Thread and its Life Cycle (Thread States)</li> </ul>	<b>20</b>	<b>10</b>

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		<ul style="list-style-type: none"> <li>- Thread Class and its methods</li> <li>- Synchronization in Multiple Threads (Multithreading)</li> <li>- Deamon Thread, Non-Deamon Thread</li> </ul>		
		<ul style="list-style-type: none"> <li>- Stream and its types (Input, Output, Character, Byte)</li> <li>- File and RandomAccessFile Class</li> <li>- Reading and Writing through Character Stream Classes (FileReader, BufferedReader, FileWriter, BufferedWriter)</li> <li>- Reading and Writing through Byte Stream Classes (InputStream, FileInputStream, DataInputStream, OutputStream, FileOutputStream, DataOutputStream)</li> <li>- StreamTokenizer Class</li> <li>- Piped Streams, Bridge Classes : InputStreamReader and OutputStreamWriter</li> <li>- ObjectInputStream, ObjectOutputStream</li> </ul>		
<b>4</b>	<b>Applets</b>	<ul style="list-style-type: none"> <li>- Introduction to Applet</li> <li>- Applet Life Cycle</li> <li>- Implement &amp; Executing Applet with Parameters</li> <li>- Graphics class</li> </ul>	<b>20</b>	<b>10</b>
	<b>Layout Managers</b>	<ul style="list-style-type: none"> <li>- FlowLayout</li> <li>- BorderLayout</li> <li>- CardLayout</li> <li>- GridLayout</li> <li>- GridBagLayout with GridBagConstraints</li> <li>- Intro. to BoxLayout, SpringLayout, GroupLayout</li> <li>- Using NO LAYOUT Manager</li> </ul>		
<b>5</b>	<b>GUI using SWING Event Handling</b>	<ul style="list-style-type: none"> <li>- Introduction to AWT and Swing</li> <li>- Difference Between AWT and Swing Components</li> </ul>	<b>20</b>	<b>15</b>

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		<ul style="list-style-type: none"> <li>- Swing Components <ul style="list-style-type: none"> <li>o JFrame, JPanel</li> <li>o JLabel, JButton, JRadioButton, JCheckBox, JProgressBar, JFileChooser</li> <li>o JTextField, JPasswordField, JTextArea</li> <li>o JScrollBar, JComboBox, JList</li> <li>o Menus (JMenuBar, JMenu, JMenuItem)</li> </ul> </li> <li>- Introduction to Event Handling</li> <li>- Event Delegation Model</li> <li>- Event Packages <ul style="list-style-type: none"> <li>o AWT Event Package</li> <li>o Swing Event Package</li> </ul> </li> <li>- Event Classes (ActionEvent, ItemEvent, FocusEvent, MouseEvent, MouseWheelEvent, AdjustmentEvent, TextEvent, WindowEvent, etc.)</li> <li>- Listener Interfaces (ActionListener, ItemListener, FocusListener, AdjustmentListener, KeyListener, MouseListener, MouseMotionListener, TextListener, WindowListener, etc.)</li> <li>- Adapter Classes (FocusAdapter, KeyAdapter, MouseAdapter, MouseMotionAdapter)</li> </ul>		
		<b>Total</b>	<b>100</b>	<b>60</b>

Student's seminar - 5 Lectures.  
Expert Talk - 5 Lectures  
Students Test - 5 Lectures.  
**TOTAL LECTURES 60+15=75**

**Course outcomes:**

- 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
- Apply parallel computations in solutions
- Develop programs to solve numeric and string-based problems