

## OBJECT ORIENTED PROGRAMMING THROUGH JAVA LABORATORY

<b>IV Semester: CSE / IT</b>								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
AITB06	Core	L	T	P	C	CIA	SEE	Total
		1	0	2	2	30	70	100
<b>Contact Classes: 13</b>		<b>Tutorial Classes: Nil</b>		<b>Practical Classes: 26</b>			<b>Total Classes: 39</b>	
<p><b>OBJECTIVES:</b></p> <p><b>The course will enable the students to:</b></p> <ol style="list-style-type: none"> <li>I. Practice object-oriented programs and build java applications.</li> <li>II. Implement java programs for establishing interfaces.</li> <li>III. Implement sample programs for developing reusable software components.</li> <li>IV. Create database connectivity in java and implement GUI applications.</li> </ol> <p><b>COURSE LEARNING OUTCOMES (CLOs):</b></p> <p><b>The students should enable to:</b></p> <ol style="list-style-type: none"> <li>1. Use object oriented programming concepts to solve real world problems.</li> <li>2. Explain the concept of class and objects with access control to represent real world entities.</li> <li>3. Demonstrate the behavior of programs involving the basic programming constructs like control structures, constructors, string handling and garbage collection.</li> <li>4. Use overloading methodology on methods and constructors to develop application programs.</li> <li>5. Demonstrate the implementation of inheritance (multilevel, hierarchical and multiple) by using extend and implement keywords.</li> <li>6. Describe the concept of interface and abstract classes to define generic classes.</li> <li>7. Use dynamic and static polymorphism to process objects depending on their class.</li> <li>8. Illustrate different techniques on creating and accessing packages (fully qualified name and import statements).</li> <li>9. Understand the impact of exception handling to avoid abnormal termination of program using checked and unchecked exceptions.</li> <li>10. Demonstrate the user defined exceptions by exception handling keywords ( try, catch, throw, throws and finally).</li> <li>11. Use multithreading concepts to develop inter process communication.</li> <li>12. Understand and implement concepts on file streams and operations in java programming for a given application programs.</li> <li>13. Describe the backend connectivity process in java program by using JDBC drivers.</li> <li>14. Develop java application to interact with database by using relevant software component (JDBC Driver).</li> <li>15. Understand the process of graphical user interface design and implementation using AWT or swings.</li> <li>16. Use different layouts (Flow Layout, Boarder Layout, Grid Layout, Card Layout) to position the controls for developing graphical user interface.</li> <li>17. Build the internet-based dynamic applications using the concept of applets.</li> <li>18. Develop applets that interact abundantly with client environment and deploy on the server.</li> <li>19. Knowledge on usage of graphical IDE for design and implementation of real time applications in java.</li> <li>20. Posses the knowledge and skills for employability and to succeed in national and international level competitive exams.</li> </ol>								

## LIST OF EXPERIMENTS

Week-1	BASIC PROGRAMS
<p>a. Try debug step by step with small program of about 10 to 15 lines which contains at least one if else condition and a for loop.</p> <p>b. Write a java program that prints all real solutions to the quadratic equation <math>ax^2+bx+c=0</math>. Read in a, b, c and use the quadratic formula.</p> <p>c. The Fibonacci sequence is defined by the following rule. The first two values in the sequence are 1 and 1. Every subsequent value is the sum of the two values preceding it. Write a java program that uses both recursive and non-recursive functions.</p>	
Week-2	MATRICES, OVERLOADING, OVERRIDING
<p>a. Write a java program to multiply two given matrices.</p> <p>b. Write a java program to implement method overloading and constructors overloading.</p> <p>c. Write a java program to implement method overriding.</p>	
Week-3	PALINDROME, ABSTRACT CLASS
<p>a. Write a java program to check whether a given string is palindrome.</p> <p>b. Write a java program for sorting a given list of names in ascending order.</p> <p>c. Write a java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.</p>	
Week-4	INTERFACE
<p>Write a program that creates a user interface to perform integer division. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 and Num2 were not integers, the program would throw a Number Format Exception. If Num2 were zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.</p>	
Week-5	MULTITHREADING
<p>a. Write a java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.</p> <p>b. Write a java program that correct implements of producer consumer program.</p>	
Week-6	FILES
<p>a. Write a java program that reads a file name from the user, and then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.</p> <p>b. Write a java program that displays the number of characters, lines and words in a text file.</p> <p>c. Write a java program that reads a file and displays the file on the screen with line number before each line.</p>	

<b>Week-7</b>	<b>FILES</b>
<p>a. Suppose that table named table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using labels in grid layout.</p> <p>b. Write a java program that connects to a database using JDBC and does add, delete, modify and retrieve operations.</p>	
<b>Week-8</b>	<b>JAVA PROGRAM WITH DATABASE</b>
<p>a. Write a java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (/t). It takes a name or phone number as input and prints the corresponding other value from the hash table. Hint: Use hash tables.</p> <p>b. Implement the above program with database instead of a text file.</p>	
<b>Week-9</b>	<b>FILES</b>
<p>a. Write a java program that takes tab separated data (one record per line) from a text file and insert them into a database.</p> <p>b. Write a java program that prints the metadata of a given table.</p>	
<b>Week-10</b>	<b>TRAFFIC LIGHT</b>
<p>Write a java program that simulates a traffic light. The program lets the user select one of three lights: Red, Yellow or Green with radio buttons. On selecting a button an appropriate message with -STOP   or -READY   or   GO   should appear above the buttons in selected color. Initially, there is no message shown.</p>	
<b>Week-11</b>	<b>MOUSE EVENTS</b>
<p>a. Write a java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired. Use adapter classes.</p> <p>b. Write a java program to demonstrate the key event handlers.</p>	
<b>Week-12</b>	<b>CALCULATOR</b>
<p>Write a java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +,-,*, % operations. Add a text field to display the result. Handle any possible exception like divided by zero.</p>	
<b>Week-13</b>	<b>APPLET</b>
<p>a. Develop an applet that displays a simple message.</p> <p>b. Develop an applet that receives an integer in one text field and computes its factorial value and returns it in another text field, when the button named -compute is clicked.</p>	
<b>Reference Books:</b>	
<ol style="list-style-type: none"> <li>1. P. J. Deitel, H. M. Deitel, -Java for Programmers  , Pearson Education, PHI, 4<sup>th</sup> Edition, 2007.</li> <li>2. P. Radha Krishna, -Object Oriented Programming through Javall, Universities Press, 2<sup>nd</sup> Edition, 2007</li> <li>3. Bruce Eckel, -Thinking in Javall, Pearson Education, 4<sup>th</sup> Edition, 2006.</li> <li>4. Sachin Malhotra, Saurabh Chaudhary, -Programming in Javall, Oxford University Press, 5<sup>th</sup> Edition, 2010.</li> </ol>	

**Web References:**

1. [www.niecdelhi.ac.in](http://www.niecdelhi.ac.in)
2. <https://www.linkedin.com/in/achin-jain-85061412>
3. [www.rank1infotech.com](http://www.rank1infotech.com)

**Course Home Page:****SOFTWARE AND HARDWARE REQUIREMENTS FOR A BATCH OF 24 STUDENTS:**

**HARDWARE:** Desktop Computer Systems: 24 nos.

**SOFTWARE:** Java Development Kit (Open source)