



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

## COURSE CONTENT

PROGRAMMING WITH OBJECTS LABORATORY								
III Semester: CSE / CSE (AI & ML) / CSE (DS) / CSE (CS) / IT								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P		C	CIA	SEE
AITD02	Core	-	-	2	1	40	60	100
		Contact Classes: Nil		Tutorial Classes: Nil		Practical Classes: 45		Total Classes: 45
Prerequisite: Essentials of Problem Solving								

### I. COURSE OVERVIEW:

The course covers some of the general-purpose data structures and algorithms, and software development. Topics covered include managing complexity, analysis, static data structures, dynamic data structures and hashing mechanisms. The main objective of the course is to teach the students how to select and design data structures and algorithms that are appropriate for problems that they might encounter in real life. This course reaches to student by power point presentations, lecture notes, and lab which involve the problem solving in mathematical and engineering areas.

### II. COURSE OBJECTIVES:

#### The students will try to learn

- I. The basic concepts of object oriented programming.
- II. The application of object oriented features for developing flexible and extensible applications.
- III. The Graphical User Interface (GUI) with database connectivity to develop web applications.

### III. COURSE OUTCOMES:

#### At the end of the course students should be able to:

- CO 1 Demonstrate object oriented programming concepts that helps to organize complex problem solving.
- CO 2 Make use of the programming constructs like control Structures, arrays, parameter passing techniques and constructors to solve the real time problems.
- CO 3 Utilize the abstraction, encapsulation and polymorphism Techniques to solve different complex problems
- CO 4 Experiment all threading and thread synchronization problems in soft real time systems
- CO 5 Make use of inheritance, interfaces, packages and files to implement reusability in soft real time systems
- CO 6 Construct GUI based applications along with Exception handling using AWT, Swings and JDBC connectivity

### IV. COURSE CONTENT:

#### WEEK – 1: BASIC PROGRAMS

- 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.
- b. Write a java program that prints all real solutions to the quadratic equation  $ax^2+bx+c=0$ . Read in a, b, c and use the quadratic formula.
- c. The Fibonacci sequence is defined by the following rule. The first two values in the sequence are 1 and every subsequent value is the sum of the two values preceding it. Write a java program that uses both recursive and non- recursive functions

#### WEEK – 2: MATRICES, OVERLOADING, OVERRIDING

- a. Write a java program to multiply two given matrices.
- b. Write a java program to implement method overloading and constructors overloading.
- c. Write a java program to implement method overriding.

### **WEEK – 3: PALINDROME, ABSTRACT CLASS**

- a. Write a java program to check whether a given string is palindrome.
- b. Write a java program for sorting a given list of names in ascending order.
- 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.

### **WEEK – 4: INTERFACE**

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.

### **WEEK – 5: MUTITHREADING**

- a. Write a program to synchronize the threads acting on the same object. [Consider the example of any reservations like railway, bus, movie ticket booking, etc.]
- b. Write a java program that correct implements of producer consumer program.

### **WEEK – 6: FILES**

- 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.
- b. Write a java program that displays the number of characters, lines and words in a text file.
- c. Write a java program that reads a file and displays the file on the screen with line number before each line.

### **WEEK – 7: FILES**

- 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 gridlayout.
- b. Write a java program that connects to a database using JDBC and does add, delete, modify and retrieve operations.

### **WEEK – 8: JAVA PROGRAMMING WITH DATABASE**

- 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.
- b. Implement the above program with database instead of a text file.
- c. Write a program to perform CRUD operations on the student table in a database using JDBC

### **WEEK – 9: EXCEPTION HANDLING**

- a. Write a java program to handle checked and unchecked exceptions.
- b. Write a java program to create user defined exceptions.

### **WEEK – 10: TRAFFIC LIGHT**

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

### **WEEK – 11: MOUSE EVENTS**

- 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.
- b. Write a java program to demonstrate the key event handlers.

### **WEEK – 12: CALCULATOR**

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

### **WEEK – 13: APPLET**

- a. Develop an applet that displays a simple message.
- 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.

### **WEEK – 14: SWING**

- a. Write Java programs to develop swing application using JList, JTree, and Jtable.
- b. Write Java programs to develop swing application using JTabbedPane and JScrollPane.

### **V. TEXT BOOKS:**

1. Schildt, Herbert. Java: The Complete Reference 11th Edition, McGraw-Hill Education, 2018.
2. Deitel, Paul and Deitel, Harvey. Java: How to Program, Pearson, 11th Edition, 2018.

### **VI. REFERENCE BOOK**

1. Evans, Benjamin J. and Flanagan, David. Java in a Nutshell, O'Reilly Media, 7th Edition, 2018.
2. Bloch, Joshua. Effective Java, Addison-Wesley Professional, 3rd Edition, 2017.
3. Sierra, Kathy and Bates, Bert. Head First Java, O'Reilly Media, 2nd Edition, 2005.
4. Farrell, Joyce. Java Programming, Cengage Learning B S Publishers, 8th Edition, 2020

### **VII. ELECTRONICS RESOURCES**

1. <https://docs.oracle.com/en/java/>
2. <https://www.geeksforgeeks.org/java>
3. <https://www.tutorialspoint.com/java/index.htm>
4. <https://www.coursera.org/courses?query=java>

### **VIII. MATERIALS ONLINE**

1. Course template
2. Lab manual