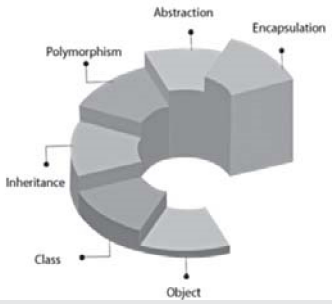
19CS201 OOPs THROUGH JAVA



Source:
https://static.javatpoint.com

Hours Per Week :

L	T	P	C
2	-	4	4

Total Hours :

L	T	P	CS	WA/RA	SSH	SA	S	BS
30	-	60	5	5	30	20	5	5

PREREQUISITE COURSES: Programming for Problem Solving - I & II, Data Structures

COURSE DESCRIPTION AND OBJECTIVES:

This course is about the fundamentals of Object-Oriented Programming (OOP) Concept and OOP-based software development methodology. Java as a class-based and pure OOP language is used to demonstrate and implement appropriate concepts and techniques. The students are exposed to the concepts, fundamental syntax, and the thought processes behind object-oriented programming. By end of the course, students will acquire the basic knowledge and skills necessary to implement object-oriented programming techniques in software development using Java.

COURSE OUTCOMES:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes	POs
1	Define, understand, differentiate the Object Oriented concepts and Java Programming concepts.	1
2	Apply object oriented concepts on real time scenarios.	1
3	Use Exception handling and multithreading mechanisms to create efficient software applications.	3
4	Utilize modern tools and collection framework to create Java applications to solve real world problems.	5
5	Design and develop GUI based applications using applets and swings for internet and system based applications.	3

SKILLS:

- ✓ *Analyze and develop algorithm for real life problems using Java.*
- ✓ *Experience with developing and debugging programs in different IDEs.*
- ✓ *Develop multi-threaded applications.*
- ✓ *Create web applications.*

UNIT– I **L- 6**

INTRODUCTION: History of Java, Byte code, JVM, Java buzzwords, OOP principles, Data types, Variables, Scope and life time of variables, Operators, Control statements, Type conversion and casting, Arrays.

CONCEPTS OF CLASSES AND OBJECTS: Introducing methods, Method overloading, Constructors, Constructor overloading, Usage of *static* with data and method, Access control, *this* key word, Garbage collection, String class, StringTokenizer.

UNIT – II **L- 6**

INHERITANCE - Inheritance basics, Types of inheritance, Member access rules, Usage of super key word, Method overriding, Usage of final, Abstract classes, Interfaces - differences between abstract classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces; Packages - defining, creating and accessing a package, importing packages, access control in packages.

UNIT – III **L-6**

EXCEPTION HANDLING: Concepts of exception handling, Types of exceptions, Usage of try, catch, throw, throws and finally keywords, Built-in exceptions, Creating user defined exception; **MULTITHREADING:** Concepts of multithreading, Differences between process and thread, Thread life cycle, Creating multiple threads using Thread class and Runnable interface, Synchronization, Thread priorities, Inter thread communication.

UNIT – IV **L- 6**

COLLECTION FRAMEWORK: Collections Overview, Collection Interfaces - List, Set, Map, List - ArrayList, Linked List, Vector, Set - HashSet, TreeSet, Map - HashTable, HashMap, Accessing a collection via an Iterator, comparator, comparable.

UNIT - V **L- 6**

GUI PROGRAMMING WITH SWING: Applets - Applet Class, Applet skeleton, Simple Applet; Delegation event model **-** Events, Event sources, Event Listeners, Event classes, handling mouse and keyboard events.

EXPLORING SWING CONTROLS: JLabel and Image Icon, JText Field, JButton, JCheckBox, JRadioButton, JTabbed Pane, JList, JCombo Box.

LABORATORY EXPERIMENTS

LIST OF EXPERIMENTS **TOTAL HOURS: 60**

Exercise-1

a) Write a Java program to print “Welcome”.

b) Write a Java program to find the sum of even numbers upto 100.

c) Write a Java program to print the following output.

1

2 3

4 5 6

7 8 9 10

d) Write a program in Java to print the Floyd’s Triangle.

1

01

101

0101

10101

Exercise-2

a) Write a Java program to read the different types of data from the user and display that data using Scanner class.

b) Write a Java program to read the different types of data from the user and display that data using command line arguments.

c) Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer.

Exercise-3

a) Write a Java program to illustrate type conversions.

b) Write a Java program to observe the effects of various bitwise operators.

c) Raju’s parents are celebrating their marriage anniversary. They have arranged a small party tonight. They are expecting their colleagues and Raju’s friends to attend the party. They have planned to serve ‘Coke’ and ‘Badam Milk’ to these guests. But they would like to serve ‘Badam Milk’ to teenagers and ‘Coke’ to adults. Please help them in finding teenagers and adults based on age. Write a Java program to find out the adults and teenagers based on their age.

Note: Teenagers are those whose age is between 13 and 19 (both inclusive).

- Step by Step guide
- Read the age as input from the user
- Check the age with the conditions mentioned
- Display the appropriate messages (Eg: Adult or Teenager) and also a message regarding the drink (Eg:Badam Milk or Coke)

d) Write a Java program to find the largest number out of 3 numbers using nested -if.

e) There is a telecommunication company called “PoweredAir” who have ap proached you to build their Interactive Voice Response (IVR) system. You should write a Java program and be able to provide the following menu (given below):

Note: User should provide an input for each menu display. Welcome to Powered Air service. What would you like to do?

1. Know my balance.
2. Know my validity date
3. Know number of free calls available.
4. More

- Prepaid Bill Request
- Customer Preferences
- GPRS activation
- Special Message Offers
- Special GPRS Offers
- 3G Activation
- Go back to Previous menu

If user types in 7 the first menu should be displayed. You are free o display your own messages in this IVR

Exercise-4

a) Write a Java program to print Fibonacci series using for loop.

b) Write a Java program to check whether given number is Armstrong or not using while loop.

c) Write a Java program to read 10 numbers from user and store it in a array. Display the maximum and minimum number in the array.

d) Write a Java program to sort the given list of elements in an array.

e) Write a Java program to search a given element in the array.

f) Write a Java program to calculate multiplication of 2 matrices.

Exercise-5

a) Create a class Rectangle. The class has attributes length and width. It should have meth ods that calculate the perimeter and area of the rectangle. It should have read Attributes method to read length and width from user.

Hint: Area of rectangle = length * widthPerimeter of rectangle = 2*(length+width).

b) Design a class “Company” which has as attributes year of establishment, annualTurnover, annualSales, etc., Moreover, these details need to be available to the outside world. Have appropriate methods for displaying these details. You will also need to calculate the profitability of this company (if annualTurnover/annualSales > 1 then profitability is high; <0.5 then profitability is low; between 0.5 and 1 then profitability is medium).

c) Write a Java program that implements method overloading.

d) Write a Java program to check weather given string is palindrome or not.

e) Write a Java Program that reads a line of integers, and then displays each integer, and the sum of all the integers (use StringTokenizer class)

f) Write a Java program for sorting a given list of names in ascending order.

g) Create an abstract class Media (id, description). Derive classes Book (pagecount) and CD (playtime). Define parameterized constructors. Create one object of Book and CD each and display the details.

h) Write a Java program that displays the number of characters, lines and words in a text file.

Exercise-6

a) Write a Java program to implement various types of inheritance

i. Single ii. Multi-Level iii. Hierarchical iv. Hybrid

b) Write a java program to implement runtime polymorphism.

Exercise-7

a) Define an interface, operations which has method area(), volume(). Define a constant PI having value 3.14. Create class a Cylinder which implements this interface (member-id, height). Create one object and calculate area and volume.

Exercise-8

a) Write a Java program to implement the following

1. Creation of simple package.
2. Accessing a package.

Exercise-9

a) Write a Java program which accepts withdraw amount from the user and throws an exception “In Sufficient Funds” when withdraw amount more than available amount.

b) Write a Java program to illustrate finally block.

Exercise-10

a) Write a Java program to create three threads and that displays “good morning”, for every one second ,”hello” for every 2 seconds and “welcome” for every 3 seconds by using extending Thread class.

b) Write a Java program that creates three threads. First thread displays “OOPS”, the second thread displays “Through” and the third thread Displays “JAVA” by using Runnable interface.

Exercise -11

a) Write a Java program to create a new array list, add some colors (string) and print out the collection.

b) Write a Java program to shuffle elements in a array list.

c) Write a Java program to iterate through all elements in a linked list.

d) Write a Java program to iterate through all elements in a HashMap.

e) Write a Java program to create a new tree set, add some colors (string) and print out the tree set.

Exercise-12

a) Implement a Java program for handling mouse events when the mouse entered, exited, clicked, pressed, released, dragged and moved in the client area.

b) Implement a Java program for handling key events when the key board is pressed, released, typed.

Exercise-13

a) Write a Java swing program that reads two numbers from two separate text fields and display sum of two numbers in third text field when button”add” is pressed.

b) Develop an Applet program to accept two numbers from user and output the sum, difference in the respective text boxes.

c) Write a Java program to design student registration form using Swing Controls. The form

which having the following fields and button SAVE

a. Form Fields are: Name, RNO, Mailid, Gender, Branch, Address.

TEXT BOOKS:

1. Herbert Schildt, “Java the complete reference”, 9th edition, McGraw Hill, Education, 2014.
2. T. Budd, “Understanding Object-Oriented Programming with Java”, updated edition, Pearson Education, 2000.

REFERENCE BOOKS:

1. J. Nino and F.A. Hosch,“An Introduction to programming and OO design using Java”, 3rd edition, John Wiley & sons, 2008
2. P. Radha Krishna,“Object Oriented Programming through Java”, 1st edition, Universities Press, 2007.
3. R. A. Johnson,“Java Programming and Object oriented Application Development”, 1st edition, Cengage Learning, 2006.