



# GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3153203

SUBJECT: Object Oriented Programming with Java

SEMESTER – V

Type of course: Professional Core

Prerequisite: none

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA	ESE (V)	PA (I)	
4	0	2	5	70	30	30	20	150

Contents:

Sr. No.	Content	Total Hrs	% Weightage
1	<b>Unit-1:</b> Basics of Java Features of Java, Byte Code and Java Virtual Machine, JDK, Data types, Operator, Control Statements – If , else, nested if, if-else ladders, Switch, while, do-while, for, for-each, break, continue. Single and Multidimensional Array, String class, StringBuffer class, Operations on string, Command line argument, Use of Wrapper Class.	5	10
2	<b>Unit-2: Classes, Objects and Methods</b> Class, Object, Object reference, Constructor, Constructor Overloading, Method Overloading, Recursion, Passing and Returning object form Method, new operator, this and static keyword, finalize() method, Access control, modifiers, Nested class, Inner class, Anonymous inner class, Abstract class.	6	15
3	<b>Unit-3: Inheritance and Interfaces</b> Use of Inheritance, Inheriting Data members and Methods, constructor in inheritance, Multilevel Inheritance – method overriding Handle multilevel constructors – super keyword, Stop Inheritance - Final keywords, Creation and Implementation of an interface, Interface reference, instanceof operator, Interface inheritance, Dynamic method dispatch , Understanding of Java Object Class, Comparison between Abstract Class and interface, Understanding of System.out.println – statements.	7	12
4	<b>Unit-4: Package and Exception Handling</b> Use of Package, CLASSPATH, Import statement, Static import, Access control, Exception and Error, Use of try, catch, throw, throws and finally, Built in Exception, Custom exception, Throwable Class.	6	12
5	<b>Unit-5: Multithreaded Programming</b> Use of Multithread programming, Thread class and Runnable interface , Thread priority, Thread synchronization, Thread communication, Deadlock	5	5
6	<b>Unit-6: IO Programming</b> Introduction to Stream, Byte Stream, Character stream, Readers and Writers, File Class, File InputStream, File Output Stream, InputStreamReader, OutputStreamWriter, FileReader, FileWriter, Buffered Reader	5	10
7	<b>Unit-7: Collection Classes and Networking</b> List, ArrayList, LinkedList, Enumeration, Vector, Properties, Introduction to Java.util package InetAddress class, Socket class, DatagramSocket class, DatagramPacket class	4	6



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8	<b>Unit-8: Introduction to Object orientation and Class Modeling</b> Modeling as a Design Technique Modeling Concepts, abstraction, The three models, Class Model, State model and Interaction model. Object and class concepts, link and association, Generalization and Inheritance, Advanced Object and class concepts, Association Ends, N-ary associations, aggregation, abstract classes, multiple inheritance, Metadata, Constraints, Derived data, Packages.	5	12
10	<b>Unit-9: State modeling, Interaction Modeling</b> Events, states, Transition and conditions, state diagram, state diagram behavior, Use case Models, sequence models, activity models	7	18
<b>Total</b>		<b>50</b>	<b>100</b>

## Suggested Specification table\* with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	45	10	5	--	--

**Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)**

*\*This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary from above table.*

## Reference Books:

1. Java Fundamentals A comprehensive introduction By Herbert Schildt and Dale Skrien, McGraw Hill.
2. Programming with Java - A Primer By E.Balaguruswamy, Tata McGraw Hill.
3. The Complete Reference, Java 2 (Fourth Edition) By Herbert Schild, Tata McGraw Hill.
4. Core Java Volume-I Fundamentals (Eight Edition) By Horstmann and Cornell, Pearson Education
5. Object Oriented Modeling and Design with UML (Second Edition) By Michael Blaha and James Rumbaugh, Pearson Education
6. UML Distilled: A Brief Guide to the Standard Object Modeling Language (3rd Edition) By Martin Fowler

**Course Outcomes:** Students will be able to

Sr. No.	CO Statement	Marks % Weightage
1	Understand object oriented programming concepts and its implementation in java.	30
2	Understand and apply Multithreading, Exception handling, Networking concepts in real world problems	30
3	Understand packages, collection classes, IO programming	20
4	Understand and prepare UML diagram for the software system	20

## List of Experiments:

1. Write a program to convert rupees to dollar. 60 rupees=1 dollar.
2. Write a program that calculate percentage marks of the student if marks of 6 subjects are given.
3. Write a program to enter two numbers and perform mathematical operations on them.
4. Write a program to find length of string and print second half of the string.



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- Write a program to accept a line and check how many consonants and vowels are there in line.
- Write a program to count the number of words that start with capital letters.
- Write a program to find that given number or string is palindrome or not.
- Create a class which ask the user to enter a sentence, and it should display count of each vowel type in the sentence. The program should continue till user enters a word “quit”. Display the total count of each vowel for all sentences.
- Write an interactive program to print a string entered in a pyramid form. For instance, the string “stream” has to be displayed as follows:

```
S
S t
S t r
S t r e
S t r e a
S t r e a m
```

- Write an interactive program to print a diamond shape. For example, if user enters the number 3, the diamond will be as follows:

```
  *
 * *
* * *
 * *
  *
```

- Create a class called Student. Write a student manager program to manipulate the student information from files by using FileInputStream and FileOutputStream
- Refine the student manager program to manipulate the student information from files by using the BufferedReader and BufferedWriter
- Refine the student manager program to manipulate the student information from files by using the DataInputStream and DataOutputStream. Assume suitable data
- Prepare a class diagram for given group of classes using multiplicity, generalization, association concepts. And add at least 5-7 attributes and 3-5 operations for particular class Page, Shape, Point, Line, Arc, Ellipse, Rectangle, Circle
- Prepare a class diagram for given group of classes using multiplicity, generalization, association concepts. And add at least 5-7 attributes and 3-5 operations for particular class. City, Airport, Airline, Pilot, Flight, Plane, Seat, Passenger
- Categorize the following relationships into generalization, aggregation or association.  
[A] A country has a capital city  
[B] A dining philosopher uses a fork  
[C] A file is an ordinary file or a directory file  
[D] Files contains records  
[E] A polygon is composed of an ordered set of points  
[F] A drawing object is text, a geometrical object, or a group  
[G] A person uses a computer language on a object  
[H] Modems and keyboards are input/output devices  
[I] Classes may have several attributes  
[J] A person plays for a team in a certain year  
[K] A route connects two cities  
[L] A student takes a course from a professor
- Prepare a state diagram for an interactive diagram editor for selecting and dragging objects
- Prepare a use case diagram and sequence diagram for a computer email system



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19. Prepare an activity diagram for computing a restaurant bill, there should be charge for each delivered item. The total amount should be subject to tax and service charge of 18% for group of six and more. For smaller groups there should be a blank entry. Any coupons or gift certificates submitted by the customer should be subtracted
20. Prepare a sequence diagram for issuing a book in the library management system

### **Design based Problems (DP)/Open Ended Problem:**

- 1) Remove duplicate lines from a large text or given document.
- 2) Write a program to compute if one string is a rotation of another. For example, pit is rotation of tip as pit has same character as tip.

### **List of Open Source Software/learning website:**

1. Java
2. NPTEL Videos
3. Java Development Kit: <http://www.oracle.com/technetwork/java/javase/downloads/index.html>
4. <http://docs.oracle.com/javase/specs/jls/se7/html/index.html>
5. <http://docs.oracle.com/javase/tutorial/java/index.html>
6. <http://www.javatpoint.com/>
7. <http://www.tutorialspoint.com/java/>
8. <http://www.learnjavaonline.org/>
9. <http://www.c4learn.com/javaprogramming/>
10. <http://www.learn-java-tutorial.com/>
11. <http://www.tutorialspoint.com/uml/>
12. <http://www.uml.org/>