

OBJECT ORIENTED SYSTEM (ECS-204)

Teacher Name:

DR. PRABHAT VERMA

Course Structure

Sr. No.	Course Code	Course Name	Credits	Details of Sessional Marks				ESM	Total Marks
				CT	TA	Lab	Total		
2	ECS-204	Object Oriented Systems	5 (3-1-2)	15	20	15	50	50	100

Prerequisite:

Any Programming Language Basics

Course Content:

Unit-1:

Object Oriented Design and Modeling: Object oriented fundamentals, Objects and Classes, Object-Oriented Design Process, importance of modeling, principles of modeling, OOAD Methods, Software Development Life Cycle, Introduction to Unified Process, Introduction to UML: UML Terminology, conceptual model of the UML, Use of UML in Unified Process.

Unit-2:

Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams. Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams, Links and Associations, Link Attributes and Link Classes, Generalization and Inheritance, Aggregation and Composition, Qualified Association, Handling multiplicity in Object creation, Abstract Classes, Specifying constraints in Class Diagrams, Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages, Use Case Modeling: Use Cases and Use Case Diagrams, Use Case driven Methodology.

Unit-3:

Behavioral Modeling: Interactions and Interaction Diagrams, Use-Case Realization: Scenario, Events Trace Diagram, Collaboration Diagrams, State Chart Diagrams, Nested State Diagrams, Activity Diagrams, Advanced Behavioral Modeling Concepts, Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams. Elementary Design Patterns, The MVC Architecture Pattern, Features of Elegant Software Design: Elegant variable, Elegant Classes, Elegant Methods, Elegant Packages, Introduction to Object Oriented Software Quality Metrics.

Unit-4:

Java Programming: Introduction to Java Programming, Operator, Data type, Variable, Arrays, Control Statements, Methods & Classes, Inheritance, Package and Interface, Exception Handling, Multithread programming, I/O, Java Applet, String handling, Networking, Event handling.

Unit-5:

Introduction to Advance Java Programming: Demonstration of concepts through example programs for AWT, Java Swing, Java Beans, Java Servlets, JSP, Modern Object Technologies and Web Services.

Lab Work:

1. Write a program in Java, to implements the Stack data Structure.
2. Write a program in Java to implement a simple Bank Account.
3. Write a program in Java showing the action from three threads using a suitable example
4. Write a program of threads in Java showing inter leaving of actions from two threads: t1 & t2 synchronizing on a shared object. Let t1 print message Ping → and t2 prints message ← Pong. Take as command line arguments the following inputs to the program:
Sleep interval for thread t1
Sleep interval for thread t2
Messages per cycle
Number of Cycles
5. Write a program in Java which converts a text file into all capital letters.
6. Write a program to create a sequential file that could store details about five products. Details include product code, cost, no. Of items available and number of items available and are provided through keyboard.
7. Create a Person class with private instance variables for Person's name and birth date. Add appropriate accessor methods to access the variables. Then create a subclass CollegeGraduate with private instance variables for the student's GPA and year of graduation and appropriate accessors for these variables. Don't forget to include appropriate constructors for your classes. Then create a class with a main() method that manages your classes.
8. Develop an applet that receives three numeric values from the user and displays the largest of the three on the screen. Write a HTML page that embeds this applet.
9. Write an applet which draws a human face with ovals and arcs.
10. Write servlets that accepts user preferences (color, hobby etc.) from user, saves it as cookie on user machine and reads the cookie from the user machine.
11. Write an AWT application with checkbox such that all cable TV channels will be displayed from the selected category.
12. Create a simple Swing based applet that displays two buttons. Each time a button is clicked, a message is displayed that states which button was clicked.

13. Create JSP code that uses a persistent cookie (i.e. a cookie with an expiration date in the future) to keep track of how many times the client computer has visited the page. Use setMaxAge method to remain on the client's computer for one month. Display the number of page hits (i.e. cookie's value) every time the page loads.
14. Write JSP program that asks user his favourite color as request parameter and sets it as the background color of the page or sets the background color white if the parameter value is null.
15. Write a program in Java to show the mouse click event. The program should change the background colour of window randomly at each mouse click.

Text and Reference Books:

1. Balagurusamy E, "Programming in JAVA", TMH
2. Herbert Schildt, "The Complete Reference JAVA", TMH
3. Bruce Eckel, "Thinking in Java", Prentice Hall PTR.
4. Grady Booch, James Rumbaugh, Ivar Jacobson: The Unified Modeling Language User Guide, Pearson Education.
5. Mark Priestley: Practical Object-Oriented Design with UML, TATA Mc-GrawHill.
6. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
7. Pascal Roques: Modeling Software Systems Using UML2, WILEY-Dreamtech India Pvt. Ltd.
8. Applying UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.
9. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.

Course Outcomes:

1. Analyse information systems in real-world settings and use an object-oriented method for analysis and design. (Analyse)
2. Understand features of object-oriented design such as encapsulation, polymorphism, inheritance, and UML. (Understand)
3. Understand and prepare different types of UML diagrams like use case diagrams, interaction diagrams, nested state diagrams, state chart diagrams, activity diagram etc. (Understand, Apply)
4. Understand and appreciate the use of Design Patterns in the Software Development. (Understand, Apply)
5. Understand the core and advance Java Programming features and apply them in complex problem solving. (Understand, Apply)

Object Oriented Systems (ECS-204)**Course Plan**

Unit	Week#	Lecture #	Topic to be covered
I	1.	1.	Object Oriented Design and Modeling: Object oriented fundamentals, Objects and Classes,
		2.	Object-Oriented Design Process, importance of modeling, principles of modeling,
		3.	OOAD Methods, Software Development Life Cycle,
		4.	Introduction to Unified Process, Introduction to UML:
	2.	5.	UML Terminology, conceptual model of the UML,
		6.	Use of UML in Unified Process.
		7.	Object Oriented Vs. Procedural Development
		8.	Benefits of Object oriented Software Development
IV	3.	9.	Java Programming: Introduction to Java Programming, Features of Java Programming Language, Operator, Data type, Variable, Arrays, Control Statements
		10.	Methods & Classes,
		11.	Inheritance,
		12.	Package and Interface,
	4.	13.	Exception Handling,
		14.	Multithread programming, I/O,
		15.	Java Applet, String handling,
		16.	Networking, Event handling.
III	5.	17.	Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams. Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams,
		18.	Links and Associations, Link Attributes and Link Classes,
		19.	Generalization and Inheritance, Aggregation and Composition,.
		20.	Qualified Association, Handling multiplicity in Object creation,
	6.	21.	Abstract Classes, Specifying constraints in Class Diagrams,
		22.	Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles,
		23.	Packages
		24.	Use Case Modeling: Use Cases and Use Case Diagrams, Use Case driven Methodology
IV	7.	25.	Behavioral Modeling: Interactions and Interaction Diagrams
		26.	Use-Case Realization: Scenario, Events Trace Diagram,
		27.	Collaboration Diagrams,
		28.	State Chart Diagrams, Nested State Diagrams,

	8.	29.	Activity Diagrams, Advanced Behavioral Modeling Concepts,
		30.	Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.
		31.	Elementary Design Patterns, The MVC Architecture Pattern,
		32.	Features of Elegant Software Design: Elegant variable, Elegant Classes, Elegant Methods, Elegant Packages, Introduction to Object Oriented Software Quality Metrics.
V	9.	33.	Introduction to Advance Java Programming: Demonstration of concepts through example programs for AWT
		34.	Java Swing-I
		35.	Java Swing-II
		36.	Java Beans-I
	10.	37.	Java Beans-II
		38.	Java Servlets
		39.	JSP
		40.	Modern Object Technologies and Web Services.

Assignments

B. Tech. II Year (CSE / IT) Session 2018-19

Object Oriented Systems (ECS-204)

Home Assignment: 1 Due Date: 28.02.2019

Model a "Traffic Signal System for a City Traffic Crossroad Circle" using Object Oriented Methodology. Traffic Signal may be designed as a Class. Design Class Diagram and implement the class in Java. You may use Java Graphics library to make a Visual Model of Traffic System to simulate the real one.

Home Assignment: 2 Due Date: 28.03.2019

1. What are the benefits of using Object Oriented Programming methodology for software development?
2. Why, Java is considered a preferred programming language for internet?
3. How does Java achieve its feature of portability? What is the precondition for it?
4. Give three differences between Java Application and Applet.
5. What are the various components of JDK?
6. What is the difference between normal and short-circuit logical operators?
7. What are the four integer types supported by Java?
8. What is the difference between automatic type conversion and type casting?
9. What are the type promotion rules in Java Expressions?

10. What are the Literals? How they are useful?
11. What is the difference between break and continue statement?
12. What is the difference between while and do-while loop?
13. Which data types may be used for the expression controlling the switch statement in Java?
14. How, you can create an infinite loop in Java? How it can be terminated?
15. How you can use multiple loop control variables in the for loop?
16. What is referred by 'this' keyword? What is its use?
17. What is a constructor? What are its features?
18. How garbage collection is done in Java?
19. What is the 'finalize()' method?
20. What are parameterized constructors? What are their advantages?
21. Create a two dimensional array named 'marks' and initialize it.
22. What are command line arguments? How they are used in a program.
23. What is the use of bitwise operators?
24. How does Java support the use of irregular arrays?
25. What are various methods that operate on strings?
26. What is the base case in a recursive function? Why it is required?
27. What makes the signature of a method?
28. Assume, you want to keep track of how many objects are created of a particular class. Which type of data member would be preferred by you?
29. What are 'varargs' in Java?
30. Can a private data member can be accessed from outside of its class? If yes, how?
31. What is the difference between method overloading and method overriding?
32. What is 'dynamic method dispatch'?
33. Can a reference variable of one type refer to object of other type in Java? Is there any exception to it?
34. What is 'Object' class in Java?
35. What are the advantages/ disadvantages of using inheritance?
36. What is the use of an interface reference?
37. What is the advantage of using interfaces?
38. What are the restrictions on the members of an interface?
39. What is the difference between an abstract class and an interface?
40. How would you define a group of constants that will be used by many classes?
41. What are the advantages of using the packages?
42. How can you create your own package in Java?
43. What is the Java API's package hierarchy?
44. What is static import in Java?
45. What are the access specifiers?
46. Give the syntax of using try and catch?
47. What are the advantages of exception handling mechanism?
48. How can you manually throw an exception? What is its use?
49. Name few Java's built in exceptions.
50. What is the use of 'finally' keyword?
51. What are the two parallel streams for I/O in Java?
52. What are the advantages of using the character stream?

53. What are the Java's type wrapper classes? What is their use?
54. Why user input for primitive types is not permitted directly in Java?
55. What is Scanner class?
56. What is the difference between a process and a thread?
57. What are the two methods to create a thread?
58. What are the advantages of multithreading?
59. What are the three methods using which a running thread may be brought to suspended state?
60. What do you understand by synchronization among threads?
61. What are the advantages of using Enumerations?
62. What are the restrictions with enum ?
63. What is the Autoboxing feature of Java?
64. What is annotation in Java?
65. Name few built-in Annotation in Java.
66. What is meant by generic?
67. What are bounded type parameters in generic class?
68. What are generic methods?
69. What is generic class hierarchy?
70. What are generic interfaces?
71. What are Applets? How they are different from other applications?
72. What are the features of Java Applets?
73. What is an applet life cycle?
74. What is the difference between paint() and repaint() methods of Applet class?
75. How can you pass parameter to an applet from its HTML file? How does applet retrieve the parameter value?
76. What are the advantages of Java Swing over AWT?
77. What is MVC architecture? How does Java Swing make use of it?
78. What are the 4 top level containers in swing? What are their features?
79. What are the four top level container Panes?
80. What is the event delegation model used by Java swing?
81. What is the difference between a checkbox and a radio button?
82. How can you determine which item is currently selected in checkbox or radio button?
83. (Using isSelected() on each box or button.
84. What is a Combo Box?
85. Give a use of JTree class of javax.swing?
86. How can you use JTable class of javax.swing?
87. Name the classes used in Java Swing Menu System.
88. What is the difference between adding mnemonics and accelerators to menu items?
89. How can you create dynamic menus that change at run time to suit user requirements?
90. Which types of items can be added to a menu in Java Swing system?
91. How can you create a popup menu that is activated using right click of mouse?
92. What are the various uses of JOptionPane?
93. What is the difference between a modal and modless dialog? Which type is supported by
94. JDialog?
95. What are the benefits of using JFileChooser?

96. How can you display only a particular type of files (e.g. files with .docx extension) using JFileChooser?
97. Differentiate between JOptionPane and JDialog.
98. How multithreading is important to Java Swing?
99. What is the difference between invokeLater() and invokeAndWait() methods?
100. What are the special rules that apply to Swing Applets?
101. How can you use the Timer class of Javax.Swing package to use a separate thread to update GUI?
102. What is the SwingWorker class?
103. What is meant by the immutability of String type objects?
104. Why String class has been declared as final?
105. What are the important methods of String class?
106. What methods of String class is used to search a substring in it (i.e. pattern matching)?
107. How you can modify the content of an existing string?
108. What are the important classes of java.lang package?
109. What are the type wrapper classes? What are their uses?
110. How can you obtain the information of your computer's operating system from within a Java program?
111. How can you redirect the console output to a file from a Java program?
112. Why is Java.lang automatically available to all Java programs?
113. How can you obtain the current date and time of the system using java program?
114. How can you generate random numbers using Java programs?
115. What is Observable class? What is its use?
116. How can you schedule a task at a predefined time using Java program?
117. How can you print the names of months in Hindi using a Java program?
118. What is the collection framework in java.util?
119. What is an iterator with respect to collection framework?
120. How does the ArrayList differ from an array?
121. What is a map in collection framework?
122. What is the use of Comparators?
123. What is a Socket? What is its use?
124. What is a port?
125. What is the difference between TCP and UDP?
126. Name few classes of java.net package?
127. What are the datagrams? Which java class supports datagrams?
128. What are Semaphores? How they can be implemented in Java?
129. Name the important classes that are used for synchronization using concurrent API?
130. What is the primary purpose of Phaser?
131. What is the Callable interface? What is its use?
132. What provision of parallel programming is available in Java for parallel programming?

Home Assignment: 3 Due Date: 15.04.2019

Question 1:

Write a JSP program which displays a webpage containing arrival of new items within a particular month in the different branches of a retail company.

Question 2:

What does an EJB consists of? Explain in brief about its components.

Home Assignment: 4 Due Date: 20.04.2019

Question 1:

Write a program using Servlet and JDBC for developing an online submission of an examination form. You are required to create a database comprising of the following fields:-

I. Student Name

II. Enrollment No.

III. Course Code (s)

IV. Regional Center Code

V. E-mail Id

OR

Question 2: Using Java Servlet, JSP, JDBC, create a web application for a courier company to provide online help in tracking the delivery status of items.

Home Assignment: 5 Due Date: 28.04.2019

Make a complete design for one of the following Systems using Unified Process (UML 2.0). Students have to form Group not more than 10 students per group.

Group 1: Hospital Management System

Group 2: Restaurant Management System

Group 3: Library Management System

Group 4: Inventory Management System

Group 5: Online Shopping Mall System

Group 6: University Student Management System