

Course Title	Object Oriented Analysis & Design
Course Code	CE414
Course Credit	Theory : 03
	Practical : 01
	Tutorial : 00
	Credits : 04

Course Learning Outcomes

On the completion of the course, students will be able to:

- **Demonstrate** the importance of modeling in the Software Development Life Cycle.
- Become **Conversant** with UML notations and Symbols.
- **Understand** the Object oriented approach to **analyzing** and **designing** system and software solutions.
- **Employ** the UML notation to create efficient and effective system design.
- **Build** use case diagrams by identifying use cases, actors and their relationships for a given application
- **Develop Class** diagrams by identifying classes, associations and the multiplicity.
- **Produce State** diagrams by identifying states, events and transitions.
- **Construct** Component diagrams and deployment diagrams for a given problem
- **Explore** the development life cycle along with the stages and **Understand** domain-application analysis models.

Sr. No.	Name of chapter & details	Hours Allotted
Section – I		
1	Introduction to Object Oriented Analysis And Design: Introduction: About Object Orientated Technology, Characteristics of objects, Development and OO Modeling, Object Oriented development Stages, Summary, History, OO Themes.	04
2	Modeling Concepts: Modeling design Technique, Purpose of model, Three models, Class Model, State model and Interaction model, Relationship between models.	04

3	Class Modeling: Object and class concepts, link and association, Generalization and Inheritance, Advanced class modeling- aggregation, Abstract class metadata, constraints.	08
4	State Modeling: Event, state, Transition and conditions, state diagram, state diagram Behavior, Nested State Diagram, concurrency, Relation of Class and State models.	08
Section – II		
5	Interaction Modeling: Use case Model – Use case, actor, Guidelines of use case model, Use case relationships. Sequence models - Scenario and Sequence Diagram, Guide lines for Sequence model. Activity model -Branch , Activities, Initiation and Termination, Concurrent Activity and Executable Activity, Guide Lines for Activity Model.	08
6	Component, Deployment and package: Component Diagram, Application of component diagram, Component diagram syntax and notation. Deployment Diagram, application of deployment diagram, Deployment notation and syntax. Package Diagram, application of package diagram, Package notation and syntax.	06
7	Analysis and Design: Development Life cycle, Development stages, Domain Analysis- Domain class model, domain state model, domain interaction model, Iterating and analysis. Application Interaction model, Application class model, Application state Model, Adding operation.	10

Instructional Method and Pedagogy

- Lectures will be conducted in audio-visual class room to discuss important concepts with the help of animations / videos / PPTs / case studies to understand the concepts effectively.
- Problems based on concepts discuss in each unit/topic will be given followed by discussion with professor which improves problem solving skills.
- Team project / Problem will be given such that students can apply their OO analysis and designs skills.

Reference Books

- James Rumbaugh, Object-Oriented Modeling and Design with UML, Second Edition, PHI.
- Grady Booch, Object-Oriented Analysis and Design with Applications, Third Edition, Addison Wesley
- Simon Bennett, Object-Oriented Systems Analysis and Design Using UML, Second Edition, TMH
- Craig Larman, Applying UML and Patterns: An Introduction to object-oriented Analysis, Design and Iterative Development, Third Edition, PHI

Additional Resources

- NPTEL video lectures of management information system OOAD by Prof. Biswajit Mahanty, Department of industrial Engineering and Management, IIT Kharagpur.[<http://nptel.ac.in/courses/122105022/27>].

List of Experiments

Tutorial 1:

1. Collect basic information on Unified Modeling Language (UML).Elaborate history and versioning part of UML, along with various types of UML Diagram.
2. Prepare a document which consists of various UML tools by examining their work pattern.

Tutorial 2:

1.Class Diagram:

- When to use: Class diagram
- How to use: Class diagram
- Sketch out Basic Class Diagram Symbols and Notations.

2.**Generate** a class diagram for Hotel management system where

The system should supports chain of hotels. A hotel contains two categories of rooms: executive and normal, both AC and non-AC. The customers of executive rooms can avail extra facilities like games, swimming, food service in rooms, etc. The booking is possible by internet or by phone. If the booking is through phone, process is done by receptionist, and if booking is done through internet the process is carried out by customer through hotel website. Depending on the number of days customer stays, appropriate bill is generated. The bill also contains amount for transport, food and other facilities enjoyed by the customerAlong with necessary taxes. The manager should be able to generate reports like list of customers staying in the hotel, list of rooms empty, monthly/yearly income, etc.

Tutorial 3:

1. State Diagram:

- When to use: State diagram
- How to use: State diagram
- Sketch out Diagram Symbols and Notations

2. **Produce** state transition diagram for coffee/tea vending machine with each operation.

Tutorial 4:

1. Use cases:

- When to use: Use Case diagram
- How to use: Use Case diagram
- Sketch out Basic Use Case Diagram Symbols and Notations

2. **Sketch out** Use case diagram for Indian railway reservation system(IRCTC) for various users like admin and passenger.

Tutorial 5:

1. Sequence Diagram:

- When to use: Sequence diagram
- How to use Sequence diagram
- Sketch out Basic Sequence Diagram Symbols and Notations

2. **Generate** a sequence diagram for bank management system for the following functions:

- Login & Logout Sequence Diagram
- ATM Transaction Sequence Diagram
- Card Validation Sequence Diagram
- Pin Validation Sequence Diagram
- Web merchant Transaction Sequence Diagram
- Online Transaction Sequence Diagram

Tutorial 6:

1. Activity Diagram:

- When to use: Activity diagram
- How to use Activity diagram
- Sketch out Basic Activity Diagram Symbols and Notations

2. **Produce** Activity Diagram for online E-Commerce system where a customer completes a successful order processing cycle.

Tutorial 7:

1. Component Diagram:

- When to use: Component diagram
- How to use Component diagram
- Sketch out Basic Component Diagram Symbols and Notations

2. **Produce** Component Diagram for system where a customer completes a successful order processing cycle.

Tutorial 8:

1. Deployment Diagram:

- When to use: Deployment diagram
- How to use Deployment diagram
- Sketch out Basic Deployment Diagram Symbols and Notations

2. **Produce** Deployment Diagram for any system which is based on client-server architecture.

Tutorial 9:

Prepare a case to present your view about traffic management system with the help of various UML diagrams.

It is advisable to use each and every UML diagram as per the case.