INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad - 500 043

COMPUTER SCIENCE AND ENGINEERING

TUTORIAL QUESTION BANK

Course Title	**OBJECT ORIENTED ANALYSIS AND DESIGN PATTERNS**			
Course Code	**ACS015**			
Programme	**B.Tech**			
Semester	**VI Sem**			
Course Type	**Core**			
Regulation	**IARE - R16**			
Course Structure	**Lectures**	**Tutorials**	**Practicals**	**Credits**
	3	**-**	**-**	**3**
Course Faculty	**Dr. Y Mohanaroopa, Professor** **Ms. N Shalini, Assistant Professor** **Mr. C Raghavendra, Assistant Professor** **Mr. R M Noorullah, Assistant Professor**			

COURSE OBJECTIVES:

The course should enable the students to:

I.	Develop the skills to analyze and design object-oriented problems.
II.	Create design patterns to solve problems based on object oriented concepts.
III.	Understand the various processes and techniques for building object-oriented software systems.
IV.	Prepare unified modeling techniques for case studies.

COURSE LEARNING OUTCOMES:

Students, who complete the course, will have demonstrated the ability to do the following:

SI. No.	Description
ACS015.01	Able to show the importance of modeling concept for object oriented development in system.
ACS015.02	Demonstrate the Conceptual model of UML and SDLC.
ACS015.03	Able to understand the role and function of each UML model in software development using object-oriented approach.
ACS015.04	Illustrate the importance of classes and their associated relationships by understanding various common mechanisms.
ACS015.05	Able to differentiate advance object-oriented approach from the traditional approach for design and development of System.
ACS015.06	Analyze the Objects and Classes are required for the development of software system.
ACS015.07	Creation of interaction diagram that model the dynamic aspects of a software system.
ACS015.08	Use case and activity studies to illustrate the analysis and design concepts.
ACS015.09	Identify, analyze, and model behavioral concepts of the system and also know the importance of events and signals and their modeling techniques.
ACS015.10	Analyze and understand the uses of process and threads and time and space to model and development of a system.
ACS015.11	Demonstrate state machines and state chart diagrams and their modeling techniques.
ACS015.12	Illustrate the uses of component and deployment diagram and their modeling techniques.
ACS015.13	Understands how to apply the pattern based analysis and design to the software to be developed.
ACS015.14	Describe how design patterns facilitate development and list several of the most popular patterns.
ACS015.15	Identify and describe design patterns and their application in a software design project.

ACS015.16	An Ability to refactor poorly designed solutions by using the appropriate design patterns.
ACS015.17	Develop UML models for design patterns using currently available software modeling tools.
ACS015.18	Evaluate and apply design patterns, architectural patterns and enterprise patterns to the development of software systems.
ACS015.19	Assess the use of Design patterns in the design of software systems and the refactoring of existing systems.
ACS015.20	Analyze software components and case studies of system architecture and determine how integration with new and existing systems may be achieved.

TUTORIAL QUESTION BANK

S. No	Question	Blooms Taxonomy Level	Course Outcomes	Course Learning Outcome
UNIT – I STRUCTURAL MODELLING				
PART - A (Short Answer Questions)				
1	State why is it necessary to have a variety of diagrams in a model of a system	Understand	CO 1	ACS015.01
2	Write short notes on Use case Vs. Algorithm.	Remember	CO 1	ACS015.01
3	List static and dynamic diagrams in UML.	Remember	CO 1	ACS015.02
4	What are the phases of software development?	Remember	CO 1	ACS015.01
5	Define Unified Modeling Language.	Remember	CO 1	ACS015.02
6	List static and dynamic diagrams in UML.	Remember	CO 1	ACS015.02
7	Write short notes on the things in UML.	Understand	CO 1	ACS015.01
8	Classify structural things.	Understand	CO 1	ACS015.02
9	Classify behavioral things in UML.	Understand	CO 1	ACS015.03
10	Define annotational things.	Remember	CO 1	ACS015.02
11	Define grouping things.	Remember	CO 1	ACS015.03
12	List out the various rules of the UML.	Remember	CO 1	ACS015.03
13	Write short notes on Extensibility mechanisms	Understand	CO 1	ACS015.02
14	What is software architecture?	Remember	CO 1	ACS015.03
15	List out the phases existing in SDLC.	Remember	CO 1	ACS015.01
16	Write short notes on Class.	Understand	CO 1	ACS015.03
17	Discuss about attributes and operations.	Understand	CO 1	ACS015.03
18	What are responsibilities in classes?	Remember	CO 1	ACS015.02
19	Define how we model the vocabulary of a system	Understand	CO 1	ACS015.03
20	How we model non-software things.	Understand	CO 1	ACS015.04
21	What is Dependency and Generalization	Remember	CO 1	ACS015.03
22	Write a short note on Association.	Understand	CO 1	ACS015.04
23	How we model a Structural relationships discuss?	Remember	CO 1	ACS015.02
24	What is Note? Discuss its importance.	Understand	CO 1	ACS015.04
25	Write short notes on Adornments.	Remember	CO 1	ACS015.04
26	What are Stereotypes?	Remember	CO 1	ACS015.03
27	Illustrate the usage of Tagged Values.	Understand	CO 1	ACS015.04
28	Classify the Structural diagrams.	Understand	CO 1	ACS015.02
29	Classify the Behavioral diagrams	Remember	CO 1	ACS015.04
30	Define the basic building blocks of UML	Remember	CO 1	ACS015.01
31	State the goals of UML	Understand	CO 1	ACS015.03
32	Define the basic building blocks of UML	Remember	CO 1	ACS015.02
PART-B (Long Answer Questions)				
1	Demonstrate the various principles of Modeling in UML.	Understand	CO 1	ACS015.01
2	Discuss in detail the importance of the UML.	Remember	CO 1	ACS015.01
3	Illustrate various relationships with UML Notation.	Understand	CO 1	ACS015.02
4	Explain briefly the importance of object-oriented modeling in UML.	Understand	CO 1	ACS015.03

5	Discuss in detail different kinds of things in UML.	Remember	CO 1	ACS015.02
6	Explain briefly the overview of UML.	Understand	CO 1	ACS015.03
7	List and explain the Structural diagrams in UML.	Understand	CO 1	ACS015.02
8	List and explain the Behavioral diagrams in UML.	Understand	CO 1	ACS015.03
9	Explain Software architecture in the UML.	Remember	CO 1	ACS015.03
10	What is Software Development Life Cycle? Explain in detail?	Remember	CO 1	ACS015.04
11	Discuss briefly about classes and its importance.	Understand	CO 1	ACS015.02
12	Explain any two common modeling techniques of classes.	Remember	CO 1	ACS015.04
13	List the terms and concepts of relationships.	Understand	CO 1	ACS015.03
14	Explain Stereotypes and Tagged Values with neat diagram.	Understand	CO 1	ACS015.04
15	How we model a new building blocks?	Remember	CO 1	ACS015.01
16	Describe the iterative and evolutionary development	Remember	CO 1	ACS015.04
17	Give a detailed note on Software Development Life Cycle (SDLC) and phases of it.	Remember	CO 1	ACS015.02
	PART-C (Analytical Questions)			
1	Explain Software Development Life Cycle (SDLC). What are the phases (stages) of it? Which phase requires maximum efforts?	Understand	CO 1	ACS015.01
2	Illustrate the evolution of UML.	Understand	CO 1	ACS015.03
3	Discuss in detail a conceptual model of the UML.	Remember	CO 1	ACS015.02
4	Explain the term and concepts of classes.	Understand	CO 1	ACS015.05
5	What is the use of Diagram? Explain different diagrams in UML.	Remember	CO 1	ACS015.04
6	Consider a computer-based system that plays chess with a user. Which UML diagrams would be helpful in designing the system?	Remember	CO 1	ACS015.02
7	Explain the UML approach to Software architecture?	Remember	CO 1	ACS015.20
8	Which UML diagram gives a static view and which give a dynamic view of a system?	Remember	CO 1	ACS015.04
9	What are the application areas of UML? Give any five?	Remember	CO 1	ACS015.02
10	What are rules of the UML and why is UML used?	Remember	CO 1	ACS015.01
	UNIT-II **ADVANCED BEHAVIORAL MODELING**			
	PART – A (Short Answer Questions)			
1	Which of the UML diagrams has a static view.	Remember	CO 2	ACS015.05
2	Which diagram in UML shows a complete or partial view of the structure of a modeled system at a specific time?	Understand	CO 2	ACS015.05
3	What is Visibility? Discuss its importance in classes.	Understand	CO 2	ACS015.04
4	Illustrate the diagrams used to represent tasks are completed based on timeline.	Remember	CO 2	ACS015.05
5	What are Template classes?	Understand	CO 2	ACS015.05
6	Discuss UML defines four standard stereotypes that apply to classes.	Remember	CO 2	ACS015.06
7	Illustrate the advanced Dependency relationship.	Remember	CO 2	ACS015.05
8	Define generalization concept.	Remember	CO 2	ACS015.06
9	What is Association? Discuss its importance.	Understand	CO 2	ACS015.05
10	Write a short note on interface.	Understand	CO 2	ACS015.06
11	What is package? Discuss its terms and concepts.	Remember	CO 2	ACS015.06
12	Discuss the use of importing and exporting in Package.	Understand	CO 2	ACS015.05
13	Illustrate how the generalization among the packages will be happened.	Understand	CO 2	ACS015.06
14	Define UML five standard stereotypes that apply to packages.	Remember	CO 2	ACS015.04
15	Discuss the common properties of object diagram.	Remember	CO 2	ACS015.06
16	Define common modeling technique of object diagram.	Remember	CO 2	ACS015.05
17	Discuss the uses of Use cases.	Understand	CO 2	ACS015.08
18	What use case diagrams commonly contains?	Understand	CO 2	ACS015.08
19	Describe the common modeling techniques of Use cases.	Remember	CO 2	ACS015.08
20	Illustrate the common uses of Interaction diagrams.	Understand	CO 2	ACS015.07
21	What Interaction diagrams commonly contains?	Understand	CO 2	ACS015.08
22	What Activity diagrams commonly contains?	Remember	CO 2	ACS015.07
23	Write a short note on Transition in Activity diagram.	Remember	CO 2	ACS015.06

24	Discuss about branching, forking and joining.	Understand	CO 2	ACS015.07
25	Describe four defined properties that can be used in operations.	Understand	CO 2	ACS015.07
26	What is Visibility? Discuss its importance in classes.	Remember	CO 2	ACS015.05
27	Describe four defined properties that can be used in operations.	Remember	CO 2	ACS015.06
28	Discuss the common modeling techniques used in Activity diagram.	Remember	CO 2	ACS015.05
PART-B (Long Answer Questions)				
1	Explain briefly terms and concepts and common modeling techniques of advanced classes.	Understand	CO 2	ACS015.05
2	Discuss the use of Advanced relationships. Explain its common modeling techniques with suitable examples.	Understand	CO 2	ACS015.05
3	Explain in detail about Interfaces, Types and Roles with suitable examples	Remember	CO 2	ACS015.06
4	What are the uses of Packages? Discuss its common modeling techniques.	Remember	CO 2	ACS015.05
5	Discuss the common modeling techniques of Class diagram.	Remember	CO 2	ACS015.06
6	Define the common modeling techniques of Object diagram.	Remember	CO 2	ACS015.06
7	What are Interactions? Explain its terms and concepts and common modeling techniques.	Understand	CO 2	ACS015.07
8	Discuss in detail about Interaction diagrams with neat sketch.	Remember	CO 2	ACS015.06
9	What are Use cases? Explain its terms and concepts and common modeling techniques.	Understand	CO 2	ACS015.08
10	Discuss in detail about Use case diagrams with neat sketch.	Understand	CO 2	ACS015.08
PART-C (Analytical Questions)				
1	Draw the use case diagram to show the functions of a “cellular phone”.	Understand	CO 2	ACS015.06
2	How to model Static and Dynamic Type selling, Static and Dynamic Types.	Understand	CO 2	ACS015.05
3	Enumerate the steps to model webs of relationships.	Remember	CO 2	ACS015.06
4	Describe the steps to model a group of elements by using Packages.	Remember	CO 2	ACS015.08
5	Explain about Links, Messages and Sequencing in Interactions.	Understand	CO 2	ACS015.07
6	Describe the steps to model a behavior of system in Use cases.	Understand	CO 2	ACS015.08
7	Design Use case diagram for Cellular Phone.	Understand	CO 2	ACS015.06
8	Draw and explain Use case diagram for online shopping validation system.	Remember	CO 2	ACS015.08
9	Draw and explain Sequence diagram for ATM system.	Remember	CO 2	ACS015.07
10	Design a Sequence diagram that specifies the flow of control involved in initiating a simple, two-party phone call.	Understand	CO 2	ACS015.07
11	Draw Object diagram that contains a three-level Hierarchy of objects	Understand	CO 2	ACS015.06
12	Draw the use case diagram to show the functions of a “credit card validation system”	Understand	CO 2	ACS015.08
UNIT – III ARCHITECTURAL MODELING				
PART - A (Short Answer Questions)				
1	Define call Events.	Remember	CO 3	ACS015.09
2	Define event and signal.	Understand	CO 3	ACS015.08
3	Write a short note on time and change event.	Remember	CO 3	ACS015.09
4	How to model a Family of signals?	Understand	CO 3	ACS015.07
5	Define sending/receiving events.	Understand	CO 3	ACS015.09
6	How many kinds of events can be modeled?	Remember	CO 3	ACS015.09
7	Discuss any three parts of transitions.	Understand	CO 3	ACS015.10
8	What is guard condition?	Remember	CO 3	ACS015.08
9	Define state Machine.	Understand	CO 3	ACS015.10
10	Write about transitions and transition elements.	Remember	CO 3	ACS015.11
11	Describe importance of Node.	Understand	CO 3	ACS015.10
12	Define process and threads.	Understand	CO 3	ACS015.10

13	Write a short note on Time and Location.	Remember	CO 3	ACS015.11
14	Define time and space.	Understand	CO 3	ACS015.09
16	What is the common use of state chart diagram?	Remember	CO 3	ACS015.11
17	Define the common properties of state chart diagram.	Understand	CO 3	ACS015.10
18	How to model a reactive objects by using state chart diagram?	Remember	CO 3	ACS015.11
19	List out the steps to model a fully distributed system.	Understand	CO 3	ACS015.12
20	Discuss the common properties of component diagram.	Remember	CO 3	ACS015.10
21	What are the common uses of component diagram?	Understand	CO 3	ACS015.12
22	Derive the steps to model a source code and executable release.	Remember	CO 3	ACS015.11
23	Write a short note on deployment diagram.	Understand	CO 3	ACS015.12
24	Discuss the common properties of deployment diagram.	Understand	CO 3	ACS015.11
25	List out the steps to model an embedded system by using deployment diagrams.	Remember	CO 3	ACS015.10
26	Write a short note on forward and reverse engineering.	Remember	CO 3	ACS015.12
	PART-B (Long Answer Questions)			
1	Explain Signals, Call Events, Time Events, Change Events and Sending/ Receiving Events.	Understand	CO 3	ACS015.09
2	Illustrate modeling a family of signals and modeling exceptions.	Remember	CO 3	ACS015.09
3	Define State Machines. Explain States, Initial and Final states.	Remember	CO 3	ACS015.11
4	Explain transitions and advanced states and transitions.	Understand	CO 3	ACS015.10
5	Illustrate the modeling of lifetime of an object.	Understand	CO 3	ACS015.11
6	Define process and threads. Explain flow of control, classes and events.	Remember	CO 3	ACS015.10
7	Explain standard elements, communication and Synchronization.	Understand	CO 3	ACS015.10
8	Describe the common modeling techniques of process and threads.	Understand	CO 3	ACS015.11
9	Explain the terms and concepts of time and space with suitable examples.	Remember	CO 3	ACS015.10
10	Exemplify the steps to model timing constraints and distribution of objects.	Understand	CO 3	ACS015.09
11	Discuss in detail about state chart diagram. And also explain its contents and common uses.	Remember	CO 3	ACS015.11
12	Explain the common modeling techniques of state chart diagram.	Understand	CO 3	ACS015.11
13	Define Components. Explain its terms and concepts with suitable examples.	Remember	CO 3	ACS015.12
14	Explain different kinds of components with suitable examples.	Understand	CO 3	ACS015.12
15	Discuss the common modeling techniques are used in component diagrams with suitable examples.	Understand	CO 3	ACS015.10
16	Define component diagrams. Explain common properties, contents and Common Uses.	Remember	CO 3	ACS015.12
17	Explain modeling source code and modeling an executable release.	Understand	CO 3	ACS015.11
18	Define Deployment diagrams. Explain its common modeling techniques with neat sketch.	Understand	CO 3	ACS015.12
19	Explain the steps to model a physical database and modeling adaptable systems.	Remember	CO 3	ACS015.11
20	Discuss in detail about terms and concepts of deployment diagrams.	Remember	CO 3	ACS015.10
21	What are the various kinds of components? Explain the components and interfaces with a neat sketch.	Remember	CO 3	ACS015.12
	PART-C (Analytical Questions)			
1	Explain about state machines with suitable examples.	Understand	CO 3	ACS015.11
2	What is time and space? Discuss in detail about time and space with suitable examples.	Understand	CO 3	ACS015.10
3	What are process and threads? Explain in detail.	Remember	CO 3	ACS015.10
4	Design a state Machine for the controller of a home security system, which is responsible for monitoring various sensors around the perimeter of the house.	Understand	CO 3	ACS015.11

5	Design a state chart diagram for the ATM system.	Understand	CO 3	ACS015.11
6	Design a state chart diagram for the Library Management System.	Remember	CO 3	ACS015.10
7	Design a state chart diagram for the online railway reservation system.	Remember	CO 3	ACS015.11
8	Draw a component diagram for ATM system.	Remember	CO 3	ACS015.12
9	With neat sketch design a component diagram of airport check-in and boarding of passengers.	Understand	CO 3	ACS015.10
10	Give a Sketch of a State Machine For the Controller in a Home security System, Which is Responsible For monitoring Various Sensors around the perimeter of the house.	Understand	CO 3	ACS015.11
UNIT – IV DESIGN PATTENS				
PART - A (Short Answer Questions)				
1	How to choose the initial domain object?	Understand	CO 4	ACS015.13
2	Define the uses of patterns.	Understand	CO 4	ACS015.12
3	What do you mean by design patterns?	Remember	CO 4	ACS015.13
4	Define the term GRASP.	Understand	CO 4	ACS015.10
5	Write short notes on information expert.	Remember	CO 4	ACS015.13
6	Discuss about creator pattern.	Understand	CO 4	ACS015.12
7	What is the basic objective of low coupling?	Understand	CO 4	ACS015.14
8	Define High cohesion in terms on design pattern.	Understand	CO 4	ACS015.14
9	List out some scenarios that illustrate varying degrees of functional cohesion.	Remember	CO 4	ACS015.13
10	What are the advantages of Factory objects?	Understand	CO 4	ACS015.14
11	What do you mean by cohesion? Give the types of cohesion.	Understand	CO 4	ACS015.15
12	Discuss the three basic types of attributes?	Remember	CO 4	ACS015.14
13	When should we use the design patterns?	Remember	CO 4	ACS015.15
14	Give the three UI design rules.	Understand	CO 4	ACS015.16
15	What is the use of factory method?	Remember	CO 4	ACS015.14
16	Write short notes on adapter pattern.	Understand	CO 4	ACS015.16
17	Discuss about behavioral pattern.	Remember	CO 4	ACS015.15
PART-B (Long Answer Questions)				
1	Compare the differences between High cohesion and Low coupling with suitable examples.	Understand	CO 4	ACS015.13
2	Discuss the process of assigning responsibilities to the object.	Remember	CO 4	ACS015.13
3	Explain about factory and observer patterns.	Understand	CO 4	ACS015.14
4	Compare the differences between Bridge and Adapter.	Remember	CO 4	ACS015.16
5	How will you design the behavioral pattern?	Remember	CO 4	ACS015.14
6	What is GRASP? Explain the following GRASP patterns: Creator, Information Expert, Low coupling, and High Cohesion.	Understand	CO 4	ACS015.13
7	Explain in detail about creational patterns.	Remember	CO 4	ACS015.15
8	State the role and patterns while developing system design.	Understand	CO 4	ACS015.16
9	Discuss in detail about advantages of design pattern.	Remember	CO 4	ACS015.15
10	Explain briefly about structural, behavioral pattern with suitable examples	Understand	CO 4	ACS015.16
PART-C (Analytical Questions)				
1	List out some scenarios that illustrate varying degrees of functional cohesion.	Remember	CO 4	ACS015.13
2	Explain GRASP: Patterns of general principles in assigning responsibilities.	Understand	CO 4	ACS015.13
3	Discuss in detail about creator and information expert with suitable example.	Understand	CO 4	ACS015.14
4	What is low coupling? Explain with suitable example.	Understand	CO 4	ACS015.13
5	Explain about Patterns for assigning responsibilities.	Understand	CO 4	ACS015.14

UNIT – V APPLYING DESIGN PATTENS				
PART - A (Short Answer Questions)				
1	Illustrate the alternative UML Package diagram notations.	Understand	CO 5	ACS015.17
2	Describe the inception in modeling.	Remember	CO 5	ACS015.17
3	What is meant by System Behavior?	Understand	CO 5	ACS015.18
4	Define Inter-System SSDs?	Remember	CO 5	ACS015.17
5	How to name system events and operations?	Understand	CO 5	ACS015.16
6	What is meant by interaction diagram?	Remember	CO 5	ACS015.18
7	List the relationships used in class diagram?	Remember	CO 5	ACS015.16
8	What is Inception?	Understand	CO 5	ACS015.18
9	What artifacts may start in inception?	Understand	CO 5	ACS015.17
10	Define requirements and mention its types.	Remember	CO 5	ACS015.18
11	What are various actors?	Remember	CO 5	ACS015.19
12	What is a scenario?	Remember	CO 5	ACS015.19
13	Define Use case.	Understand	CO 5	ACS015.18
14	What are three kinds of actors?	Remember	CO 5	ACS015.19
15	Describe are use case diagrams?	Understand	CO 5	ACS015.19
16	What is a domain model?	Understand	CO 5	ACS015.20
17	How the domain model is illustrated?	Remember	CO 5	ACS015.19
18	What are the elements not suitable in a domain model?	Remember	CO 5	ACS015.20
19	How to create a domain model?	Understand	CO 5	ACS015.18
20	Draw a Use case diagram for payment for the product by using include relationship.	Remember	CO 5	ACS015.20
21	What is meant by system sequence diagrams?	Remember	CO 5	ACS015.17
22	Define system events and the system boundary.	Understand	CO 5	ACS015.19
PART-B (Long Answer Questions)				
1	Explain system sequence diagram with an example.	Understand	CO 5	ACS015.17
2	Describe logical architecture and UML package diagram.	Remember	CO 5	ACS015.18
3	Discuss in detail about NextGen POS system.	Remember	CO 5	ACS015.20
4	Write about inception and its uses.	Understand	CO 5	ACS015.20
5	Explain different steps involved in inception.	Remember	CO 5	ACS015.19
6	What are UML package diagrams? Discuss in detail about suitable examples.	Understand	CO 5	ACS015.18
7	Explain in detail about logical architecture refinement.	Remember	CO 5	ACS015.19
8	Explain with the example, how interaction diagram are used to model the dynamic aspects of the system.	Remember	CO 5	ACS015.20
9	What are the concepts involved in domain refinement?	Understand	CO 5	ACS015.18
10	Define the use of extend and generalization with suitable examples.	Remember	CO 5	ACS015.20
11	Describe the guidelines to define package in modeling and draw a model for class package.	Remember	CO 5	ACS015.17
PART-C (Analytical Questions)				
1	Explain with an example, how use case modeling is used to describe functional requirements.	Understand	CO 5	ACS015.18
2	Discuss in detail about “Relating Use cases with suitable examples.	Remember	CO 5	ACS015.19
3	What is the use of domain model? Explain with suitable example.	Remember	CO 5	ACS015.18
4	Draw the partial implementation of ATM system by using domain model.	Understand	CO 5	ACS015.18
5	Discuss in detail about different types of Actors involved in Use cases.	Remember	CO 5	ACS015.17
6	Consider the use case “withdraw amount” related to ATM transaction modeling. Draw both the interaction diagrams for the use case. Explain briefly	Understand	CO 5	ACS015.20
7	State the sketch of a state machine for the controller in a home security system, which is responsible for monitoring various sensors around the perimeter of the house. Briefly explain.	Understand	CO 5	ACS015.17

Prepared by:
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HOD, CSE