



Anurag Group of Institutions

(Formerly CVSR College of Engineering)

Accredited by NBA, Approved by AICTE & Affiliated to JNTU

AUTONOMOUS

Department of Computer Science and Engineering

Course Name : Object Oriented Analysis and Design(OOAD)

Course Number : A56037

Course Designation : Core

**Prerequisites : Software Engineering,
Object oriented Programming**

**III B Tech – II Semester
(2016-2017)**

G. BINDU MADHAVI

Assistant Professor

Course Coordinator

Faculty:

1. P. Vinaya Sree AssistantProfessor
2. Obulesh AssistantProfessor
3. Ravikishore AssistantProfessor

SYLLABUS

Unit – I	<p>Introduction to UML: Importance of modeling, principles of modeling, object oriented Modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.</p> <p>Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.</p>
Unit – II	<p>Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages</p> <p>Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams. Design class diagram for Library information system.</p>
Unit – III	<p>Basic Behavioral Modeling-I: Interactions, Interaction diagrams.</p> <p>Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity Diagrams. Design Use cases, Use case diagrams, Interaction diagram and Activity diagram for library system.</p>
Unit – IV	<p>Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams. Design State machine for different objects in library system</p> <p>.</p>
Unit – V	<p>Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams. Design and document of library system.</p>

TEXT BOOKS & OTHER REFERENCES

Text Books	
1.	Grady Booch, James Rumbaugh, Ivar Jacobson : The Unified Modeling Language User Guide, Pearson Education,2008
Suggested / Reference Books	
1.	Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd,2012
2.	Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education,2000
3.	Pascal Roques: Modeling Software Systems Using UML2, WILEY-Dreamtech India Pvt. Ltd.,2011
4.	Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies,2007

Websites References	
1.	www.uml-diagrams.org/uml-object-oriented-concepts.html
2.	https://onlinecourses.nptel.ac.in/noc16_cs19
3.	http://engineeringvidelectures.com/video/1237

PROGRAM EDUCATIONAL OBJECTIVES (PEO's)

PEO1	The Graduates are employable as software professionals in reputed industries.
PEO2	The Graduates analyze problems by applying the principles of computer science, mathematics and scientific investigation to design and implement industry accepted solutions using latest technologies.
PEO3	The Graduates work productively in supportive and leadership roles on multidisciplinary teams with effective communication and team work skills with high regard to legal and ethical responsibilities.
PEO4	The Graduates embrace lifelong learning to meet ever changing developments in computer science and Engineering.

Programme Specific Outcomes (PSOs)

1. **Professional Skill:** The ability to understand, analyze and develop software solutions.
2. **Problem-Solving Skills:** The ability to apply standard principles, practices and strategies for software development.
3. **Successful Career:** The ability to become Employee, Entrepreneur and/or Life Long Learner in the domain of Computer Science

PROGRAM OUTCOMES (PO's)

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization for the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling to complex engineering activities, with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Outcomes: Students will be able to

1. Recognize the concepts and principles of object oriented programming concepts.
2. Understand the purposes, major components and key mechanisms of Class and Object Diagram.
3. Describe the basic resource management responsibilities of Interaction Diagram.
4. Knowledge on State-chart Diagram.
5. Applying the techniques for Component and Deployment Diagrams.

Mapping of Course outcomes with PO's & PEO's

Course Outcomes	PO's	PEO's
1	1,2,4,5,9	2,3,4
2	1,2,3,5,9	2,3,4
3	1,2,5,11	1,3
4	1,2,3,5,9	1,3
5	1,2,3,5,9,11	2,3

MAPPING OF COURSE OUT COMES WITH PO's

CO #	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	2	2	3	2	2				2			
2	2	3	2		2				2			
3	2				2						1	
4	2	1	1		2				1			
5	2	2	2		2				1		1	

Mapping of Course Outcomes with PSO's

	PSO 1	PSO 2	PSO 3
CO 1	3	3	2
CO 2	3	3	1
CO 3	3	3	2
CO 4	3	3	2
CO 5	2	3	2

COURSE SCHEDULE

Distribution of Hours Unit – Wise

Unit	Topic	Chapters	No. of Hours
I	<p>Introduction to UML: Importance of modeling, principles of modeling, object oriented Modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.</p> <p>Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams</p>	1,2,4,5,6	10
II	<p>Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages</p> <p>Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams. Design class diagram for Library information system.</p>	8,9,10,11,12,14	10
III	<p>Basic Behavioral Modeling-I: Interactions, Interaction diagrams.</p> <p>Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity Diagrams. Design Use cases, Use case diagrams, Interaction diagram and Activity diagram for library system.</p>	15,16,17,18,19	10
IV	<p>Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams. Design State machine for different objects in library system</p>	20,21,22,23,24	7
V	<p>Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams. Design and document of library system.</p>	25,26,29,30	7
Contact classes for Syllabus coverage			44
Tutorial Classes : 04 ; Online Quiz : 2 Assignment Tests : 02 (Before Mid Examination) Revision classes : 2			64

The number of topic in every unit is not the same – because of the variation, all the units have an unequal distribution of hours

Lecture Plan

S. No.	Topic	Expected Date of completion	Actual Date of Completion	Teaching Learning Process
Unit-1				
1.	Importance of modeling	21/11/2016		
2.	Principles of modeling	22/11/2016		
3.	Object oriented modeling	23/11/2016		
4.	Conceptual model of the uml	24/11/2016 28/11/2016		PPT
5.	Architecture, Software Development Life Cycle	29/11/2016 30/11/2016		Animated Video
6.	Classes	1/12/2016		
7.	Relationships	5/12/2016		
8.	Common Mechanisms	6/12/2016		
9.	Diagrams	7/12/2016		
Unit-2				
10.	Advanced Structural Modeling :Advanced Classes	13/12/2016 14/12/2016		
11.	Advanced Relationships	15/12/2016		PPT
12.	Interfaces	19/12/2016		
13.	Types and Roles, Packages	20/12/2016		
14.	Class & Object Diagrams: Terms, concepts Terms	21/12/2016 22/12/2016		
15.	Modeling Techniques for Class Diagrams	27/12/2016 28/12/2016		Animated Video
16.	Modeling Techniques for object Diagrams	28/12/2016		
17.	Design Class Diagram for Library Management System	2/1/2017		

Unit-3				
18.	Basic Behavioral Modeling-I: Interactions	16/1/2017		
19.	Interaction Diagrams	17/1/2017		
20.	Basic Behavioral Modeling-II: Use cases	18/1/2017		PPT
21.	Use Cases Diagrams	19/1/2017		
22.	Activity Diagrams	30/1/2017		
23.	Design Use cases, Use case diagrams	31/1/2017		Video Lecture
24.	Interaction diagram for library system.	1/2/2017		
25.	Activity diagram for library system	2/2/2017		
Unit-4				
26.	Advanced Behavioral Modeling: Events and Signals	6/2/2017		
27.	State Machines	7/2/2017		
28.	Processes and Threads	8/2/2017		
29.	Time and Space	9/2/2017		
30.	State Chart Diagrams	13/2/2017		PPT
31.	Design State machine for different objects in library system	14/2/2017 15/2/2017		
Unit-5				
32.	Architectural Modeling: Component	22/2/2017		
33.	Deployment	23/2/2017		
34.	Component Diagrams	1/3/2017 2/3/2017		
35.	Deployment Diagrams	6/3/2017 7/3/2017		PPT
36.	Design and document of library system.	8/3/2017		

Date of Unit Completion & Remarks

Unit – 1		
Date	:	__ / __ / __
Remarks: _____ _____		
Unit – 2		
Date	:	__ / __ / __
Remarks: _____ _____		
Unit – 3		
Date	:	__ / __ / __
Remarks: _____ _____		
Unit – 4		
Date	:	__ / __ / __

Remarks:

Unit – 5

Date : __ / __ / __

Remarks:

Unit Wise Assignments (With different Levels of thinking (Blooms axonomy))

Note: For every question please mention the level of Blooms taxonomy

Unit – 1	
1.	Differentiate traditional software approach& Object oriented approach.(L4)
2.	Categorize the things in Building blocks of UML.(L4)
3.	Describe the architecture of UML .(L2)
4.	List various common mechanisms in UML.(L1)
Unit – 2	
1.	Contrast Interface with Abstract class.(L4)
2.	Enumerate the steps to model the multiple inheritance.(L1).
3.	Differentiate 'is-a' & 'has-a' relationship.(L4)
4.	Identify the importance of class and class diagram?(L2)
Unit – 3	
1.	Identify the importance of use case and use case diagrams(L2)
2.	Design the use case diagram for course registration system?(L5)
3.	Illustrate an Activity diagram for online purchasing order?(L3)
4.	Analyze swim lane in activity diagram with an example? (L4)
Unit – 4	
1.	Enumerate the steps to model a family of signals? (L1).
2.	Design the state diagram for software that controls the elevator in a building with five floors?(L5)
3.	Explain the four kinds of events modeled by UML?(L1)

4.	What is the purpose of stat chart diagram? How to draw stat chart diagram? Explain?(L1)
Unit – 5	
1.	Explain the common uses of component diagram?(L1)
2.	Discuss about IML deployment and component diagrams. Draw the diagrams for a banking application?(L2)
3.	Demonstrate the contents, common properties and common uses of component diagrams?(L3)
4.	Define node. Contrast node with components?(L4)

Case Studies (With different Levels of thinking (Blooms Taxonomy))**Note: For every Case Study please mention the level of Blooms taxonomy**

Design UML diagrams for	
1.	Online Course Registration system (L6) Rubric 8-Understanding of Engineering Knowledge
2.	Online shopping (L6) Rubric 8-Understanding of Engineering Knowledge
3.	Online Movie Ticket Reservation (L6) Rubric 8-Understanding of Engineering Knowledge

Unit Wise Short Answer Questions

Unit – I:

1. Describe the importance of Modeling.(L1)
2. Classify Behavioural things in UML.(L3)
3. Compare the relationships in UML.(L4)
4. Draw a relationship between given objects(L3)
Pen, rollpen, Ball pen, top
5. Outline the extensibility mechanisms in UML(L2)

Unit – II:

1. Discuss the stereotypes applied to dependency relationship among classes.(L2)
2. Define distribution of responsibilities in a system.(L1)
3. Illustrate how to model a comment.(L3)
4. Discuss the notations used in Class diagram.(L2)
5. Define Object Diagram.(L1)

Unit – III:

1. Write the common uses of Usecase diagrams.(L1)
2. Illustrate common properties of Usecase diagram. (L3)
3. Compare & Contrast Interaction diagrams. .(L3)
4. Define Object. Name the roles & multiplicity for person and organization. .(L1)
5. Compare fork & join used in Activity diagram.(L3)

Unit – IV:

1. Discuss the several parts of a State.(L2)
2. Explain parts of a Transition.(L3)
3. Illustrate the stereotypes that apply to active classes.(L2)
4. Describe how to model Inter process communication(L2)
5. Illustrate the contents of Statechart diagrams.(L2)

Unit – V:

1. State how component & interface are related.(L1)
2. Demonstrate how nodes are organized.(L3)
3. Explain package in library application.(L2)
4. Explain how to organize nodes.(L2)
5. Categorize the stereotypes that apply to components.(L4)

University Question Papers

Tutorial Sheet

Unit-I Topics Revised	
Topic Name	Date

Unit-II Topics Revised	
Topic Name	Date

Unit-III Topics Revised	
Topic Name	Date

Unit-IV Topics Revised	
Topic Name	Date

Unit-V Topics Revised	
Topic Name	Date

TOPICS BEYOND SYLLABUS

S.No.	Name of the Topic
1.	Forward & Reverse Engineering of all UML diagrams.

ASSESSMENT OF LEARNING OBJECTIVES AND OUT COMES: DIRECT**Blooms Taxonomy:**

LEVEL 1	REMEMBERING	Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers
LEVEL 2	UNDERSTANDING	Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas.
LEVEL 3	APPLYING	Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way
LEVEL 4	ANALYZING	Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations.
LEVEL 5	EVALUATING	Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.
LEVEL 6	CREATING	Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.

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ASESMENT OF LEARNING OBJECTIVES AND OUT COMES: INDIRECT

CSP Rubric			
S.NO	Criteria	LEVEL (Level : 3-Excellent Level :2-Good Level : 1-Poor	
1	Subject knowledge	3	Student speaks in phase with the given topic confidently using Audio-Visual aids. Vocabulary is good
		2	Student speaking without proper planning, fair usage of Audio-Visual aids. Vocabulary is not good
		1	Student speaks vaguely not in phase with the given topic. No synchronization among the talk and Visual Aids
2	Ability to answer the questions in class	3	Proper structuring of the document with relevant subtitles, readability of document is high with correct use of grammar. Work is genuine and not published anywhere else
		2	Information is gathered without continuity of topic, sentences were not framed properly. Few topics are copied from other documents
		1	Information gathered was not relevant to the given task, vague collection of sentences. Content is copied from other documents
3	Sincere in submitting the assignments	3	Student identifies most potential ethical or societal issues and tries to provide solutions for them discussing with peers
		2	Student identifies the societal and ethical issues but fails to provide any solutions discussing with peers
		1	Student makes no attempt in identifying the societal and ethical issues
4	Student Participation	3	Listens carefully to the class and tries to answer questions confidently
		2	Listens carefully to the lecture but doesn't attempt to answer the questions
		1	Student neither listens to the class nor attempts to answer the questions
6	Technical and analytical Skills	3	The program structure is well organized with appropriate use of technologies and methodology. Code is easy to read and well documented. Student is able to implement the algorithm producing accurate results
		2	Program structure is well organized with appropriate use of technologies and methodology. Code is quite difficult to read and not properly documented. Student is able to implement the algorithm providing accurate results.
		1	Program structure is not well organized with mistakes in usage of appropriate technologies and methodology. Code is difficult to read and student is not able to execute the program
7	Practical Knowledge	3	Independently able to write programs to strengthen the concepts covered in theory
		2	Independently able to write programs but not able to strengthen the concepts learned in theory
		1	Not able to write programs and not able to strengthen the concepts learned in theory

8	Understanding of Engineering core	3	Student uses appropriate methods, techniques to model and solve the problem accurately in the context of multidisciplinary projects
		2	Student tries to model the problem but fails to solve the problem in the context of multidisciplinary projects
		1	Student fails to model the problem and also fails to solve the problem in the context of multidisciplinary projects

CSP Rubric Name & Number:

S.No.	Hall Ticket Number	Rubric Assessment	Blooms Taxonomy Assessment	Remarks
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Remedial Classes:

Unit Number	Date Conducted	Topics Revised
Unit-I		
Unit-II		
Unit-III		
Unit-IV		
Unit-V		

Add-on Programmes:

1. Video Lectures on Basic Structural Modeling
2. Guest Lecture on Basic Behavioral Modeling

Unit Wise PPT's & Lecture Notes:

