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OBJECT ORIENTED ANALYSIS AND DESIGN
Department of Computer Science Engineering
VERSION-5

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Course File Index

S.No.	Item Description	Page Number
1	Course Information Sheet	3
2	Syllabus	4
3	Text Books, Reference Book, Web/Other Resources	5
4	Programme Educational Objectives(PEO's)	6
5	Programme Outcomes(PO's)	7
6	Programme Specific Outcomes (PSOs)	8
7	Bloom's Taxonomy	9
8	Course Outcomes(CO's), Mapping & Articulation Matrix	10
9	Course Schedule	11
10	Lecture Plan	12
11	Minutes of Course Review Meeting	14
12	Unit Wise Questions	15
13	Case Study	16
14	Previous Question Papers	17
15	Tutorial Sheet	19
16	Course Assessment Report	20
17	Direct Assessment Sheet	21
18	CSP Rubric Name & Number	22
19	Indirect Course Assessment Sheet	24
20	Add-ons , PPT's& Lecture Notes	25



Anurag Group of Institutions

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(Formerly CVSR College of Engineering)
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Department of Computer Science and Engineering

Course Name : Object Oriented Analysis and Design

Course Number : A55043

Course Designation : Elective

Credits : 4

Prerequisites : Software Engineering, Object oriented Programming

III B Tech – I Semester
(2019-20)

Name of Faculty	Academic Year/Regulation	Version No
Mrs G. Bindu Madhavi	R09	1
Mrs G. Bindu Madhavi	R14	2
Mrs G. Bindu Madhavi	R15	3

Mrs G. Bindu Madhavi
Assistant Professor
Course Coordinator

Syllabus

<p>Unit – I</p>	<p>Introduction to UML: Importance of modeling, principles of modeling, object oriented Modeling, conceptual model of the UML, Architecture, Software Development Life Cycle. (TB-1,Ch-1,2,) Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams. .(TB-1,Ch-4,5,6)</p>
<p>Unit – II</p>	<p>Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages. (TB-1,Ch-9,10,11,12) Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams. Design class diagram for Library information system. (TB-1,Ch-8,14)</p>
<p>Unit – III</p>	<p>Basic Behavioral Modeling-I: Interactions, Interaction diagrams. .(TB-1,Ch-15,18) 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. (TB-1,Ch-16,17,19)</p>
<p>Unit – IV</p>	<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. (TB-1,Ch-20,21,22,23,24) .</p>
<p>Unit – V</p>	<p>Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams. Design and document of library system. .(TB-1,Ch-25,26,29)</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.	AtulKahate: Object Oriented Analysis & Design, The McGraw-Hill Companies,2007
Other Resources	
1.	www.uml-diagrams.org/uml-object-oriented-concepts.html
2.	https://onlinecourses.nptel.ac.in/noc16_cs19
3.	http://engineeringvidelectures.com/video/1237

Programme Educational Objectives (PEO's)

1. The graduates are employable as software professionals in reputed industries.
2. 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.
3. 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.
4. The graduates embrace lifelong learning to meet ever changing developments in Computer Science and Engineering.

Programme 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.

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.

Blooms Taxonomy Direct

Level No	Level of Thinking	Description	Action Verbs
Level 1	Remembering	Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.	List Identify Outline
Level 2	Understanding	Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas.	Explain Describe ,Interpret Distinguish
Level 3	Applying	Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	Apply Calculate Solve
Level 4	Analyzing	Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations.	Analyze Compare Describe
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.	Determine Optimize Evaluate
Level 6	Creating	Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.	Formulate Design Create

Course Outcomes:

At the end of this course 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. Construct State-chart Diagram for the given application.
5. Applying the techniques for Component and Deployment Diagrams.

Mapping of Course outcomes with PO's , PEO's& PSO'S

Course Outcomes	PO's	PEO's	PSO's
C01	1,2,4,5,9	2,3,4	1,2,3
C02	1,2,3,5,9	2,3,4	1,2,3
C03	1,2,5,11	1,3	1,2,3
C04	1,2,3,5,9	1,3	1,2,3
C05	1,2,3,5,9,11	2,3	1,2,3

Articulation matrix of Course outcomes with PO's&PSO's

	Program Outcome's												Program Specific Outcome's		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	2	2	3	2	2				2				3	3	2
CO 2	2	3	2		2				2				3	3	1
CO 3	2				2						1		3	3	2
CO 4	2	1	1		2				1				3	3	2
CO 5	2	2	2		2				1		1		2	3	2

Course Schedule

Distribution of Hours in Unit – Wise

Unit	Topic	Chapters	Total No. of Hours
		Book1	
I	Introduction to UML: Importance of modeling, principles of modeling, object oriented Modeling, conceptual model of the UML, Architecture, Software Development Life Cycle. Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams	1,2,4,5,6	10
II	Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams. Design class diagram for Library information system.	8,9,10,11,12,14	10
III	Basic Behavioral Modeling-I: Interactions, Interaction diagrams. 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.	15,16,17,18,19	10
IV	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	20,21,22,23,24	7
V	Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams. Design and document of library system.	25,26,29,30	7
Total contact classes for Syllabus coverage			44
<i>Tutorial Classes : 1 per week</i> <i>Assignment Tests : 02 (Before Mid1 & Mid2 Examinations)</i> <i>Online Quiz: 1 Per Unit</i>			

Number of hours / lectures available in Semester / Year: 64

Lecture Plan:

S. No.	Topic	No of Lecture Hours	Teaching Learning Process
UNIT-1			
1.	Importance of modeling	1	Chalk & Board
2.	Principles of modeling	1	Chalk & Board
3.	Object oriented modeling	1	Chalk & Board
4.	Conceptual model of the uml	2	Chalk & Board
5.	Architecture, Software Development Life Cycle	1	Animation video
6.	Classes	1	Power Point Presentation
7.	Relationships	1	Chalk & Board
8.	Common Mechanisms	1	Power Point Presentation
9.	Diagrams	1	Power Point Presentation
UNIT-2			
1	Advanced Structural Modeling :Advanced Classes	1	Chalk & Board
2	Advanced Relationships	2	Chalk & Board
3	Interfaces	1	Think pair share
4	Types and Roles, Packages	1	Chalk & Board
5	Class & Object Diagrams: Terms, concepts Terms	2	Power Point Presentation
6	Modeling Techniques for Class Diagrams	1	Put idea into picture
7	Modeling Techniques for object Diagrams	1	Put idea into picture
8	Design Class Diagram for Library Management System	1	Power Point Presentation
UNIT-3			

1	Basic Behavioral Modeling-I: Interactions	1	Chalk & Board
2	Interaction Diagrams	2	Chalk & Board
3	Basic Behavioral Modeling-II: Use cases	2	Animation video
4	Use Cases Diagrams	1	Using Tool
5	Activity Diagrams	1	Chalk & Board
6	Design Use cases, Use case diagrams	1	Cross word puzzles
7	Interaction diagram for library system.	1	Power Point Presentation
8	Activity diagram for library system	1	Jigsaw
UNIT-4			
1	Advanced Behavioral Modeling: Events and Signals	1	Chalk & Board
2	State Machines	1	Chalk & Board
3	Processes and Threads	1	Power Point Presentation
4	Time and Space	2	Chalk & Board
5	State Chart Diagrams	1	Using Tool
6	Design State machine for different objects in library system	1	Jigsaw
UNIT-5			
1	Architectural Modeling: Component	2	Chalk & Board
2	Deployment	1	Chalk & Board
3	Component Diagrams	1	Chalk & Board
4	Deployment Diagrams	1	Using Tool
5	Design and document of library system.	2	Jigsaw
Total contact classes for Syllabus coverage : 44			

Minutes of Course Review Meeting

Details of Meeting No -	
Date of Meeting	
Member's Present	
Signature of Member's	
Remarks	
Details of Meeting No -	
Date of Meeting	
Member's Present	
Signature of Member's	
Remarks	
Details of Meeting No -	
Date of Meeting	
Member's Present	
Signature of Member's	

Remarks	
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Unit Wise Questions (With different Levels of thinking – Blooms Taxonomy and Course Outcomes)

Unit – I	
1.	Differentiate traditional software approach & Object oriented approach.(L4, CO-1)
2.	Categorize the things in Building blocks of UML.(L4, CO-1)
3.	Describe the software development life cycle with neat diagram(L4, CO-1)
4.	Illustrate common mechanisms in uml with examples.(L4, CO-1)
Unit – II	
1.	Contrast Interface with Abstract class.(L4, CO-2)
2.	Differentiate class and template class with notations.(L4, CO-2).
3.	Design a class diagram for Library management system.(L4, CO-2)
4.	Identify the importance of class and class diagram?(L2, CO-2)
Unit – III	
1.	Identify the importance of use case and use case diagrams(L2, CO-3)
2.	Explain the importance of fork, join & branching(L2, CO-3)
3.	Illustrate an Activity diagram for online purchasing order?(L3, CO-3)
4.	Analyze swim lane in activity diagram with an example? (L4, CO-3)
Unit – IV	
1.	Explain the need of synchronization along with the three properties(L2, CO-4)
2.	Design the state diagram for software that controls the elevator in a building with five floors?(L5, CO-4)
3.	Explain the four kinds of events modeled by UML?(L1, CO-4)
4.	What is the purpose of stat chart diagram? How to draw stat chart diagram? Explain?(L1, CO-4)
Unit – V	
1.	Explain the common uses of component diagram?(L1, CO-5)
2.	List the standard stereotypes that apply to components(L1, CO-5)

3.	Demonstrate the contents, common properties and common uses of component diagrams?(L3, CO-5)
4.	Define node. Contrast node with components?(L4, CO-5)

Case Study (With Higher Levels of thinking – Blooms Taxonomy) for the academic year 2018-19

III B Tech I semester

(Covering Entire Syllabus)
<p>Design UML diagrams for Personal Healthcare system. (Level-4)</p> <p style="text-align: right;">Rubric -4 (Content Knowledge)</p>

Previous Question papers

Tutorial Sheet

Unit-I Topics Revised
Topic Name
Unit-I Topics Revised
Topic Name
Unit-III Topics Revised
Topic Name
Unit-IV Topics Revised
Topic Name
Unit-V Topics Revised

Topic Name

Course Assessment Report

Batch:

Academic Year/Sem:

Course Name:

Course Number:

Course Attainment (75% of Direct + 25% of Indirect) on a scale of 1 to 3.

Remarks and suggestions:

Direct Course Assessment Sheet (As per IonCudos)

a) Internal Examination

Course assessment sheet Ass1

Hall Ticket No	S1	S2	TOT
1			
2			
3			

Course assessment sheet Mid1

Hall Ticket No	S1	S2	S3	S4	S5	L1	L2	L3	L4	L5	TOT
1											
2											
3											

Course assessment sheet Ass2

Hall Ticket No	S1	S2	TOT
1			
2			
3			

Course assessment sheet Mid2

Hall Ticket No	S1	S2	S3	S4	S5	L1	L2	L3	L4	L5	TOT
1											
2											

3											
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b) External Examination

Hall Ticket No	Total Marks

CSP Rubric

CSP Rubric			
S.No.	Criteria	LEVEL (Level: 3-Excellent Level:2-Good Level: 1-Poor)	
1	Oral Communication	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	Writing Skills	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	Social and Ethical Awareness	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	Content Knowledge	3	Student uses appropriate methods, techniques to model and solve the problem accurately
		2	Student tries to model the problem but fails to solve the problem
		1	Student fails to model the problem and also fails to solve the problem
5	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	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

Indirect Course Assessment Sheet

Tools:

a) Case Study

S.No.	Hall Ticket Number	Rubric Assessment
1		
2		
3		

b) Course End Survey Report

Add-ons(Guest Lecture/Video Lecture/Certification/Training Program/Poster Presentation.... etc.)

Unit Wise PPT's & Lecture Notes

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