INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad -500 043

INFORMATION TECHNOLOGY

COURSE DESCRIPTOR

Course Title	**OBJECT ORIENTED ANALYSIS AND DESIGN**				
Course Code	ACSB10				
Programme	B.Tech				
Semester	FIVE				
Course Type	Core				
Regulation	**IARE - R18**				
Course Structure	**Theory**			**Practical**	
	Lectures	**Tutorials**	**Credits**	**Laboratory**	**Credits**
	3	-	3	-	-
Chief Coordinator	Dr. C Raghavendra, Associate Professor				
Course Faculty	Dr. M Mohana Roopa, Professor Mr. G Chandra Sekhar, Assistant Professor Mr. R M Noorullah, Associate Professor Ms. N Shalini, Assistant Professor				

I. COURSE OVERVIEW:

The Unified Modeling Language is a graphical language for visualizing, specifying, constructing and documenting the artifacts of a software intensive system. The UML gives you a standard way to write systems blueprints covering conceptual things such as business processes and system functions as well as concrete things such as classes written in a specific programming language database schemas and reusable software components. Learn what the UML is what it is not and why the UML is relevant to the process of developing software intensive systems.

II. COURSE PRE-REQUISITES:

Level	Course Code	Semester	Prerequisites	Credits
UG	AITB01	III	Object Oriented Programming through Python	3

III. MARKS DISTRIBUTION:

Subject	SEE Examination	CIA Examination	Total Marks
Object Oriented Analysis and Design	70 Marks	30 Marks	100

IV. DELIVERY / INSTRUCTIONAL METHODOLOGIES:

✘	Chalk & Talk	✔	Quiz	✔	Assignments	✘	MOOCs
✔	LCD / PPT	✔	Seminars	✘	Mini Project	✔	Videos
✘	Open Ended Experiments						

V. EVALUATION METHODOLOGY:

The course will be evaluated for a total of 100 marks, with 30 marks for Continuous Internal Assessment (CIA) and 70 marks for Semester End Examination (SEE). Out of 30 marks allotted for CIA during the semester, marks are awarded by taking average of two CIA examinations or the marks scored in the make-up examination.

Semester End Examination (SEE): The SEE is conducted for 70 marks of 3 hours duration. The syllabus for the theory courses is divided into FIVE modules and each module carries equal weightage in terms of marks distribution. The question paper pattern is as follows. Two full questions with "either" or "choice" will be drawn from each module. Each question carries 14 marks. There could be a maximum of two sub divisions in a question.

The emphasis on the questions is broadly based on the following criteria:

50 %	To test the objectiveness of the concept.
50 %	To test the analytical skill of the concept OR to test the application skill of the concept.

Continuous Internal Assessment (CIA):

CIA is conducted for a total of 30 marks (Table 1), with 20 marks for Continuous Internal Examination (CIE), 05 marks for Quiz and 05 marks for Alternative Assessment Tool (AAT).

Table 1: Assessment pattern for CIA

Component	Theory			Total Marks
Type of Assessment	CIE Exam	Quiz	AAT	
CIA Marks	20	05	05	30

Continuous Internal Examination (CIE):

Two CIE exams shall be conducted at the end of the 8th and 16th week of the semester respectively. The CIE exam is conducted for 20 marks of 2 hours duration consisting of five descriptive type questions out of which four questions have to be answered where, each question carries 5 marks. Marks are awarded by taking average of marks scored in two CIE exams.

Quiz - Online Examination

Two Quiz exams shall be online examination consisting of 25 multiple choice questions and are to be answered by choosing the correct answer from a given set of choices (commonly four). Such a question paper shall be useful in testing of knowledge, skills, application, analysis, evaluation and understanding of the students. Marks shall be awarded considering the average of two quiz examinations for every course.

Alternative Assessment Tool (AAT)

This AAT enables faculty to design own assessment patterns during the CIA. The AAT converts the classroom into an effective learning centre. The AAT may include tutorial hours/classes, seminars, assignments, term paper, open ended experiments, METE (Modeling and Experimental Tools in Engineering), five minutes video, MOOCs etc. The AAT chosen for this course is given in table 3.

Table 3: Assessment pattern for AAT

5 Minutes Video	Assignment	Tech-talk	Seminar	Open Ended Experiment
20%	30%	30%	10%	10%

VI. HOW PROGRAM OUTCOMES ARE ASSESSED:

Program Outcomes		Proficiency assessed by
PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	CIA/SEE/AAT
PO2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	CIA/SEE/AAT
PO3	**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 the public health and safety, and the cultural, societal, and environmental considerations.	CIA/SEE/AAT
PO 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.	CIA/SEE/AAT
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.	CIA/SEE/AAT

VII. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED:

Program Specific Outcomes		Proficiency assessed by
PSO 1	Design next-generation computer systems, networking devices, search engines, soft computing and intelligent systems, web browsers, and knowledge discovery tools.	CIA/SEE/AAT

Program Specific Outcomes		Proficiency assessed by
PSO 3	Practical experience in shipping real world software, using industry standard tools and collaboration techniques will equip to secure and succeed in first job upon graduation in IT industry.	CIA/SEE/AAT

VIII. COURSE OBJECTIVES:

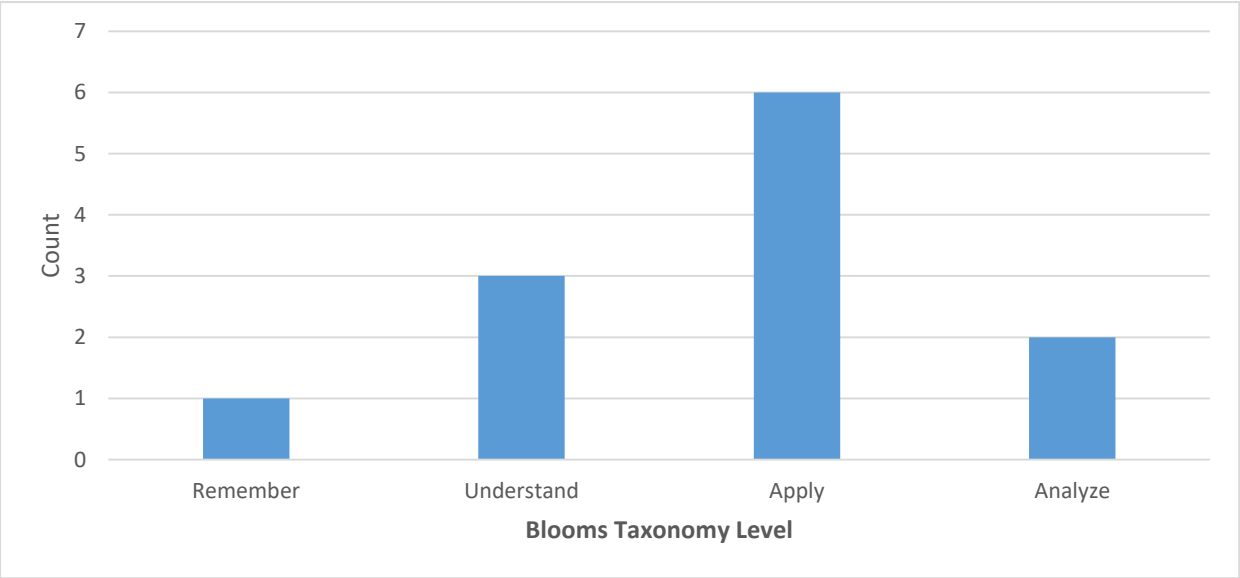
The course should enable the students will try to learn:	
I	The basic and advanced building blocks of Unified Modeling Language for analysis and design of software systems.
II	The Object-oriented approach for analysis and design of System/Subsystem/Functional units based on the given specifications through UML Diagrams
III	The implementation of design document of real time software applications using advanced CASE tools.

IX. COURSE OUTCOMES:

At the end of the course, the students are able to:

CO No	Course Outcomes	Knowledge Level (Bloom's Taxonomy)
CO 1	**List** the importance and use of basic principles in object oriented modeling for appropriate analysis and design of given scenarios.	Remember
CO 2	**Make use of** building blocks and different views for creating conceptual model architectural view of system in Unified Software Development Life cycle.	Apply
CO 3	**Demonstrate** static and dynamic aspects of the system through UML diagrams for specifying structure and interaction of objects during runtime.	Understand
CO 4	**Identify** basic building blocks for visualizing artifacts of an Object Oriented System.	Apply
CO 5	**Summarize** advanced building blocks in structural and behavioral modeling of a software system for visualizing web of relationships.	Understand
C0 6	**Classify** structural modeling of system for representing framework with UML diagrams.	Analyze
C0 7	**Illustrate** behavioral modeling of system for conveying dynamic concepts of the system.	Understand
C0 8	**Categorize** advanced behavioral modeling for visualizing flow control of objects and activities of specified case study like next gen POS system.	Analyze
C0 9	**Make use of** common modeling techniques in UML for modeling vocabulary of real time applications.	Apply
C0 10	**Develop** architectural model of a scenario for preparing blueprint of the entire system.	Apply
C0 11	**Model** software application like Unified Library with the help of UML diagrams for documenting static and dynamic aspects of a system.	Apply
C0 12	**Develop** a design document using UML for simple and complex scenarios of the specific case study.	Apply

COURSE KNOWLEDGE COMPETENCY LEVELS



X. MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAMOUTCOMES

Course Outcomes	Program Outcomes												Program Specific Outcomes		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1					√								√		
CO 2	√		√	√	√										√
CO 3		√		√	√										
CO 4	√		√	√	√								√		√
CO 5		√		√	√								√		√
CO 6				√									√		√
CO 7		√		√	√								√		√
CO 8				√									√		√
CO 9	√		√	√	√								√		√
CO 10	√		√	√	√								√		√
CO 11	√		√	√	√								√		√
CO 12	√		√	√	√								√		√

XI. JUSTIFICATIONS FOR CO-PO MAPPING:

Course Outcomes	POs / PSOs	Justification for mapping (Students will be able to)	No. of key competencies
CO 1	**PO 5**	Usage of **CASE tool** for modelling simple to complex engineering activities with understanding requirements and limitations of user.	**1**
	PSO 1	**Formulate** and **Evaluate engineering concepts** to Design next-generation computer systems for modelling simple to complex engineering activities with understanding requirements and limitations of user.	**2**
CO 2	**PO 1**	Apply **Engineering knowledge** and **modelling principles**, building blocks and architectural views of the system with support of UML.	**2**
	PO 3	**Design solutions** for simple and complex problems by **Defining** and **understanding** customer requirements, **identifying** various static and dynamic functions, **managing design process** and **evaluate the outcomes** as UML diagrams.	**6**
	PO 4	**Conduct investigation of complex problems** for visualizing artefacts by using basic and advanced building blocks with **knowledge of process**, **laboratory skills**, **understanding knowledge** and **ability to apply** a **systems approach** to engineering problems.	**5**
	PO 5	Usage of **CASE tool** for modelling simple to complex engineering activities with understanding requirements and limitations of user for architectural view of system.	**1**
	PSO 3	Make use of **computational and advanced CASE tools** for creating innovative career paths, to be an entrepreneur and desire for higher studies.	**2**
CO 3	**PO 2**	**Understand** the given problem and **system definition**, **problem formulation**, **collecting data**, **modelling**, **solution development** and **documentation** by using diagrams for static and dynamic aspects of the system.	**6**
	PO 4	**Conduct investigation of complex problems** for visualizing diagrams of static and dynamic aspects by using basic and advanced building blocks **knowledge of process**, **laboratory skills**, **understanding knowledge** and **ability to apply** a **systems approach** to engineering problems.	**5**
	PO 5	Usage of **CASE tool** for modelling simple to complex engineering activities with understanding requirements and limitations of user.	**1**
CO 4	**PO 1**	Apply **Engineering knowledge** and **modelling principles**, in identifying basic building blocks for visualizing artefacts of system.	**2**
	PO 3	**Design solutions** for simple and complex problems by **Defining problem, understand customer requirements, identifying** basic building blocks to draw UML diagrams.	**3**
	PO 4	Conduct investigation of complex problems for visualizing artefacts by using basic building blocks with **knowledge** and **system approach** of process.	**2**
	PO 5	Usage of CASE tool for modelling simple to complex engineering activities with understanding requirements and limitations of user.	**1**

	PSO 1	**Formulate** and **Evaluate engineering concepts** to Design next-generation computer systems in identifying basic building blocks for visualizing artefacts of system.	**2**
	PSO 3	Make use of **computational and advanced CASE tools** for creating innovative career paths, to be an entrepreneur and desire for higher studies.	**2**
CO 5	**PO 2**	**Understand** the given problem and **system definition**, **problem formulation**, **collecting data**, **modelling**, **solution development** and **documentation** for design solution by using advanced building blocks of UML.	**6**
	PO 4	**Conduct investigation of complex problems** for visualizing artefacts by using advanced building blocks with knowledge and system approach of process.	**2**
	PO 5	Usage of CASE tool for modelling simple to complex engineering activities with understanding requirements and limitations of user.	**1**
	PSO 1	**Formulate** and **Evaluate engineering concepts** to Design next-generation computer systems by using advanced building blocks of UML.	**2**
	PSO 3	Make use of **computational and advanced CASE tools** for creating innovative career paths, to be an entrepreneur and desire for higher studies.	**2**
CO 6	**PO 4**	**Conduct investigation of complex problems** for structural modelling with **knowledge and system approach** of process.	**2**
	PSO 1	**Formulate** and **Evaluate engineering concepts** to Design next-generation computer systems for structural modelling.	**2**
	PSO 3	Make use of **computational and advanced CASE tools** for creating innovative career paths, to be an entrepreneur and desire for higher studies.	**2**
CO 7	**PO 2**	**Understand** the given problem and **system definition**, **problem formulation**, **collecting data**, **modelling**, **solution development** and **documentation** for design solution by using diagrams of behavioural modelling.	**6**
	PO 4	**Conduct investigation of complex problems** for visualizing artefacts by using diagrams of behavioural modelling of system with **knowledge and system approach** of process.	**2**
	PO 5	Usage of **CASE tool** for modelling simple to complex engineering activities with understanding requirements and limitations of user.	**1**
	PSO 1	**Formulate** and **Evaluate engineering concepts** to Design next-generation computer systems by using diagrams of behavioural modelling.	**2**
	PSO 3	Make use of **computational and advanced CASE tools** for creating innovative career paths, to be an entrepreneur and desire for higher studies.	**2**
CO 8	**PO 4**	**Conduct investigation of complex problems** for visualizing artefacts by using diagrams of advanced behavioural modelling of system with **knowledge and system approach** of process.	**2**
	PSO 1	**Formulate** and **Evaluate engineering concepts** to Design next-generation computer systems for visualizing artefacts by using diagrams of advanced behavioural modelling of system.	**2**

	PSO 3	Make use of **computational and advanced CASE tools** for creating innovative career paths, to be an entrepreneur and desire for higher studies.	**2**
CO 9	**PO 1**	Apply **Engineering knowledge** and **modelling principles**, for modelling vocabulary of system by using different common modelling techniques of concepts and diagrams used in UML.	**2**
	PO 3	**Design solutions** for simple and complex problems by **understanding** customer requirements, **identifying** various concepts and common modelling techniques of nine diagrams, **managing** design process and **evaluate** the outcomes as UML diagrams.	**4**
	PO 4	**Conduct investigation of complex problems** for modelling vocabulary of real-time systems by using concepts and common modelling techniques with **knowledge** and **system approach** of process.	**2**
	PO 5	Usage of **CASE tool** for modelling simple to complex engineering activities with understanding requirements and limitations of user.	**1**
	PSO 1	**Formulate** and **Evaluate engineering concepts** to Design next-generation computer systems for modelling vocabulary of system by using different common modelling techniques of concepts and diagrams used in UML.	**2**
	PSO 3	Make use of **computational and advanced CASE tools** for creating innovative career paths, to be an entrepreneur and desire for higher studies.	**2**
CO 10	**PO 1**	Apply **Engineering knowledge** and **modelling principles** for preparing blue prints of the system by using architectural modelling diagrams.	**2**
	PO 3	**Design solutions** for simple and complex problems by **understanding** customer requirements, **identifying** various diagrams to prepare blue prints, **managing** design process and **evaluate** the outcomes as UML diagrams.	**4**
	PO 4	**Conduct investigation of complex problems** for preparing blue print of entire system by architectural modelling diagrams with **knowledge** and **system approach** of process.	**2**
	PO 5	Usage of CASE tool for modelling simple to complex engineering activities with understanding requirements and limitations of user.	**1**
	PSO 1	**Formulate** and **Evaluate engineering concepts** to Design next-generation computer systems for preparing blue prints of the system by using architectural modelling diagrams.	**2**
	PSO 3	Make use of **computational and advanced CASE tools** for creating innovative career paths, to be an entrepreneur and desire for higher studies.	**2**
CO 11	**PO 1**	Apply Engineering **knowledge** and **modelling principles**, for documenting static and dynamic aspects of Library Information Management system.	**2**
	PO 3	**Design solutions** for Library Information Management system by **understanding** customer requirements, **identifying** various static and dynamic functions, **managing** design process and **evaluate** the outcomes as UML diagrams.	**4**

	PO 4	Conduct investigation of Library Information Management System for documenting by using basic and advanced building blocks with **knowledge** and **system approach** of process.	**2**
	PO 5	Usage of **CASE tool** for modelling simple to complex engineering activities with understanding requirements and limitations of user.	**1**
	PSO 1	**Formulate** and **Evaluate engineering concepts** to Design next-generation computer systems for documenting static and dynamic aspects of Library Information Management system.	**2**
	PSO 3	Make use of **computational and advanced CASE tools** for creating innovative career paths, to be an entrepreneur and desire for higher studies.	**2**
CO 12	**PO 1**	Apply **Engineering knowledge** and **modelling principles**, for designing simple and complex scenarios of various case studies.	**2**
	PO 3	**Design solutions** for simple and complex scenarios of various case studies by **understanding** customer requirements, **identifying** various static and dynamic functions, **managing** design process and **evaluate** the outcomes as UML diagrams.	**4**
	PO 4	**Conduct investigation** of simple and complex scenarios of various case studies for visualizing artefacts by using basic and advanced building blocks with **knowledge** and **system approach** of process.	**2**
	PO 5	Usage of **CASE tool** for modelling simple to complex engineering activities with understanding requirements and limitations of user.	**1**
	PSO 1	**Formulate** and **Evaluate engineering concepts** to Design next-generation computer systems for designing simple and complex scenarios of various case studies.	**2**
	PSO 3	Make use of **computational and advanced CASE tools** for creating innovative career paths, to be an entrepreneur and desire for higher studies.	**2**

XII. MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcomes	**Program Outcomes / Number of Vital Features**												**PSOs / No. of Vital Features**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
	3	**10**	**10**	**11**	**1**	**5**	**3**	**3**	**12**	**5**	**12**	**12**	**6**	**2**	**2**
CO 1					1								2		
CO 2	2		6	5	1										2
CO 3		6		5	1										
CO 4	2		3	2	1								2		2
CO 5		6		2	1								2		2
CO 6				2									2		2

CO 7		6		2	1							2		2
CO 8				2								2		2
CO 9	2		4	2	1							2		2
CO 10	2		4	2	1							2		2
CO 11	2		4	2	1							2		2
CO 12	2		4	2	1							2		2

XIII. PERCENTAGE FOR KEY COMPETENCIES FOR CO-PO MAPPING:

Course Outcomes	**Program Outcomes/ Number of key competencies**												**PSOs / No. of key competencies**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
	3	**10**	**10**	**11**	**1**	**5**	**3**	**3**	**12**	**5**	**12**	**12**	**6**	**2**	**2**
CO 1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0	0.0
CO 2	66.6	0.0	60.0	45.5	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
CO 3	0.0	60.0	0.0	45.5	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CO 4	66.6	0.0	30.0	18.2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0	100.0
CO 5	0.0	60.0	0.0	18.2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0	100.0
CO 6	0.0	0.0	0.0	18.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0	100.0
CO 7	0.0	60.0	0.0	18.2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0	100.0
CO 8	0.0	0.0	0.0	18.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0	100.0
CO 9	66.6	0.0	40.0	18.2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0	100.0
CO 10	66.6	0.0	40.0	18.2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0	100.0
CO 11	66.6	0.0	40.0	18.2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0	100.0
CO 12	66.6	0.0	40.0	18.2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0	100.0

XIV. COURSE ARTICULATION MATRIX (CO-PO/PSO MAPPING)

COs and POs and COs and PSOs on the scale of 0 to 3, **0** being **no correlation**, **1** being the **low correlation**, **2** being **medium correlation** and **3** being **high correlation**.

0 – **0**≤ $\boldsymbol{C}$≤ 5%–No correlation;	**2** – 40 % <$\boldsymbol{C}$< 60%–Moderate.
1 – 5 <$\boldsymbol{C}$<40%– Low/ Slight;	**3** – 60% ≤ $\boldsymbol{C}$< 100% – Substantial /High

Course Outcomes	Program Outcomes												Program Specific Outcomes		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	-	-	-	-	3	-	-	-	-	-	-	-	1	-	
CO 2	3	-	3	2	3	-	-	-	-	-	-	-	-	-	3
CO 3	-	3	-	2	3	-	-	-	-	-	-	-	-	-	
CO 4	3	-	1	1	3	-	-	-	-	-	-	-	1	-	3
CO 5	-	3	-	1	3	-	-	-	-	-	-	-	1	-	3
CO 6	-	-	-	1	-	-	-	-	-	-	-	-	1	-	3
CO 7	-	3	-	1	3	-	-	-	-	-	-	-	1	-	3
CO 8	-	-	-	1	-	-	-	-	-	-	-	-	1	-	3
CO 9	3	-	2	1	3	-	-	-	-	-	-	-	1	-	3
CO 10	3	-	2	1	3	-	-	-	-	-	-	-	1	-	3
CO 11	3	-	2	1	3	-	-	-	-	-	-	-	1	-	3
CO 12	3	-	2	1	3	-	-	-	-	-	-	-	1	-	3
TOTAL	18	9	12	13	30								10		30
AVERAGE	**3.0**	**3.0**	**2.0**	**1.1**	**3.0**								**1.0**		**3.0**

3 = High; 2 = Medium; 1 = Low

XV. ASSESSMENT METHODOLOGIES–DIRECT

CIE Exams	PO 1,PO 2, PO 3,PO 4, PO 5,PSO 1, PSO 3	SEE Exams	PO 1,PO 2, PO 3,PO 4 PO 5,PSO 1, PSO 3	Assignments	PO 1,PO 2, PO 3,PO 4 PO 5,PSO 1, PSO 3	Seminars	PO 1,PO 2, PO 3,PO 4, PO 5,PSO 1, PSO 3
Laboratory Practices	-	Student Viva	-	Mini Project	-	Certification	-
Term Paper	PO 5,PSO 1 PSO 3	5 Minutes Video	PO 5	Tech talk	PO 10	Open Ended Experiments	PO 12

XVI. ASSESSMENT METHODOLOGIES–INDIRECT

✔	Early Semester Feedback	✔	End Semester OBE Feedback
✘	Assessment of Mini Projects by Experts		

XVII. SYLLABUS

MODULE-I	INTRODUCTION TO UML
Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, architecture, software development life cycle; Classes, relationships, common mechanisms and diagrams.	
MODULE-II	**ADVANCED BEHAVIORAL MODELING**
Advanced classes, advanced relationships, interfaces, types and roles, packages, terms, concepts; Class and Object Diagrams: Terms, concepts, common modeling techniques for class and object diagrams.	
MODULE-III	**ARCHITECTURAL MODELING**
Basic Behavioral Modeling - I: Interactions, Interaction diagrams. Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity Diagrams.	
MODULE-IV	**ADVANCED BEHAVIORAL MODELING**
Events and signals, state machines, processes and threads, time and space, state chart and state chart diagrams. Case study: The next gen POS system.	
MODULE-V	**ARCHITECTURAL MODELING**
Component, Component diagrams, Deployment, Deployment diagrams; Case Study: The Unified Library Application.	
Text Books:	
1. Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modeling Language User Guide", Pearson Education, 2nd Edition, 2004. 2. Craig Larman, "Applying UML and Patterns: An Introduction to Object Oriented Analysis and Design and Iterative Development", Pearson Education, 3rd Edition, 2005.	
Reference Books:	
1. MeilirPage-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education, 1st Edition, 2006. 2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, "UML 2 Toolkit", WILEY-Dreamtech India Pvt. Ltd., Pearson Education, 3rd Edition, 2005.	
Web References:	
1. https://www.tutorialspoint.com/uml/uml_overview.html 2. https://www.utdallas.edu/~chung/OOAD/M03_1_StructuralDiagrams.ppt 3. https://onedrive.live.com/download?cid=99CBBF765926367	
E-Text Books:	
1. https://www.utdallas.edu/UML2.0/Rumbaugh 2. https://www.utdallas.edu/~chung/SP/applying-uml-and-patterns.pdf	

XVIII. COURSE PLAN:

The course plan is meant as a guideline. Probably there may be changes.

Lecture No	Topics to be covered	Course Outcomes	Reference
1	Introduction to UML	CO 1	T1:1.1

Lecture No	Topics to be covered	Course Outcomes	Reference
2	Importance of modeling, and principles of modeling	CO 1	T1:1.2
3	Object Oriented Modeling,	CO 2	T1:1.3-1.4
4	Conceptual model of the UML	CO 2	T1:2.3
5	Architecture of UML	CO 2	T1:2.4
6	Software Development Life Cycle – Unified Model	CO 2	T1:2.5
7-8	Classes	CO 3,CO 4	T1:4.1
9-10	Relationships	CO 3,CO 4	T1:5.1
11	Common mechanisms	CO 3,CO 4	T1:6.1
12-13	Diagrams	CO 3,CO 4	T1:7.1.1
14	Advanced Classes and Advanced Relationships	CO 5	T1:8.1.1
15	Interfaces, types and roles,	CO 5	T1:11.4
16	Packages, terms, concepts	CO 5	T1:12.5
17-18	Class Diagrams- Terms, concepts and common modeling techniques	CO 6,CO 9	T1:13.1
19-20	Object Diagrams: Terms, concepts and common modeling techniques	CO 6,CO 9	T1:13.3
21	Interactions: Interactions, concepts and common modeling techniques	CO 7, CO 9	T1:14.1
22-23	Interaction Diagrams: Terms, concepts, uses and common modeling techniques	CO7, CO 9	T1:14.3
24-25	Use cases: Use case diagrams Terms, concepts, uses and common modeling techniques	CO 7,CO 9	T1:16.1
26-27	Activity Diagrams: Terms, concepts, uses and common modeling techniques	CO 7,CO 9	T1:16.4
28	Events and signals, State machines	CO 8	T1:20.5
29	Processes and threads, Time and space	CO 8	T1:21.4
30-31	State Chart : Terms, concepts, uses and common modeling techniques	CO 8, CO 9	T1:22.1
32-33	State chart diagrams : Terms, concepts, uses and common modeling techniques	CO 8, CO 9	T1:22.4
34	Case study: The next gen POS system	CO 12	T1:22.7
35	Component : Terms and concepts	CO 10	T1:29.1
36-37	Component diagrams : Terms, concepts, uses and common modeling techniques	CO 9,CO10	T1:29.3
38	Deployment: Terms and concepts	CO 10	T1:30.1
39-40	Deployment diagrams : Terms, concepts, uses and common modeling techniques	CO 9,CO 10	T1:30.7

Lecture No	Topics to be covered	Course Outcomes	Reference
41-43	Case Study: The Unified Library Application.	CO 11	T1:30.9
44-45	Case Study: Real-Time applications	CO 12	T1:30.9

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