



Ref No:

SRI KRISHNA INSTITUTE OF TECHNOLOGY, BANGALORE



COURSE PLAN

Academic Year 2019-20

Program:	B E – Information Science& Engineering
Semester :	5
Course Code:	17CS551
Course Title:	Object Oriented Modeling and Design
Credit / L-T-P:	3 / 3-0-0
Total Contact Hours:	40
Course Plan Author:	Dr. HEMALATHA K.L.

Academic Evaluation and Monitoring Cell

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Note : Remove "Table of Content" before including in CP Book
 Each Course Plan shall be printed and made into a book with cover page
 Blooms Level in all sections match with A.2, only if you plan to teach / learn at higher levels

A. COURSE INFORMATION

1. Course Overview

Degree:	B.E.	Program:	IS
Semester:	V	Academic Year:	2019-20
Course Title:	Object Oriented Modeling and Design	Course Code:	17CS551
Credit / L-T-P:	3 / 3-0-0	SEE Duration:	180 Minutes
Total Contact Hours:	40	SEE Marks:	100 Marks
CIA Marks:	40	Assignment	1 / Module
Course Plan Author:	Dr.Hemalatha K.L.	Sign ..	Dt:
Checked By:		Sign ..	Dt:
CO Targets	CIA Target : 75%	SEE Target:	85%

Note: Define CIA and SEE % targets based on previous performance.

2. Course Content

Content / Syllabus of the course as prescribed by University or designed by institute. Identify 2 concepts per module as in G.

Module	Content	Teaching Hours	Identified Module Concepts	Blooms Learning Levels
1	Introduction, Modelling Concepts and Class Modelling:What is Object orientation? What is OO development? OO Themes; evidence for usefulness of OO development; OO modelling history.evidence for usefulness of OO development; OO modelling history. Modelling as Design technique: Modelling; abstraction; The Three models. Class Modelling: Object and Class Concept; Link and associations concepts; Generalization and Inheritance;A sample class model; Navigation of class models; Advanced Class Modelling, Advanced object and class concepts; Association ends; N-ary associations; Aggregation; Abstract classes; Multiple inheritance; Metadata; Reification;Constraints; Derived Data; Packages.	08	OO Concepts, UML notations	L3,L4
2	UseCase Modelling and Detailed Requirements: Overview; Detailed object-oriented Requirements definitions; System Processes-A use case/Scenario view; Identifying Input and outputs-The System sequence diagram; Identifying Object Behaviour-The state chart Diagram; Integrated Object-oriented Models.	08	Usecase model OO model	L3, L4
3	process Overview, System Conception and Domain Analysis: Process Overview: Development stages; Development life Cycle; System Conception: Devising a system concept; elaborating a concept; preparing a problem statement. Domain Analysis: Overview of analysis; Domain Class model:Domain state model; Domain interaction model; Iterating the analysis.	08	Software Development stages Domain models	L3,L3
4	Use case Realization :The Design Discipline within up iterations:Object Oriented Design-The Bridge between Requirements and Implementation; Design Classes and Design within Class Diagrams; Interaction Diagrams-Realizing Use Case and defining methods; Designing with Communication Diagrams; Updating the Design Class Diagram; Package Diagrams-Structuring the Major Components; Implementation Issues for Three-Layer Design	08	Design of OO diagrams	L4
5	Design Patterns: Introduction; what is a design pattern?.	08	Design patterns,	L3, L4

	Describing design patterns, the catalog of design patterns, Organizing the catalog, How design patterns solve design problems, how to select a design patterns, how to use a design pattern; Creational patterns: prototype and singleton(only); structural patterns adaptor and proxy(only).		software architectural patterns	
-	Total	40	-	-

3. Course Material

Books & other material as recommended by university (A, B) and additional resources used by course teacher (C).

1. Understanding: Concept simulation / video ; one per concept ; to understand the concepts ; 15 – 30 minutes

2. Design: Simulation and design tools used – software tools used ; Free / open source

3. Research: Recent developments on the concepts – publications in journals; conferences etc.

Modul es	Details	Chapters in book	Availability
A	Text books (Title, Authors, Edition, Publisher, Year.)	-	-
1,3	Michael Blaha, James Rumbaugh: Object Oriented Modelling and Design with UML,2nd Edition, Pearson Education,2005		In Lib / In Dept
2,4	Satzinger, Jackson and Burd: Object-Oriented Analysis & Design with the Unified Process, Cengage Learning,2005.	6,8	
5	Erich Gamma, Richard Helm, Ralph Johnson and john Vlissides: Design Patterns –Elements of Reusable Object-Oriented Software, Pearson Education,2007.		
B	Reference books (Title, Authors, Edition, Publisher, Year.)	-	-
1,2,3,4	Grady Booch et.al.: Object-Oriented Analysis and Design with Applications,3rdEdition,Pearson Education,2007.		In Lib
5	Frank Buschmann, RegineMeunier, Hans Rohnert, Peter Sommerlad, Michel Stal:Pattern –Oriented Software Architecture. A system of Patterns , Volume 1, John Wiley and Sons.2007.	1,2	In Lib
1,2,3,4	Booch, Jacobson, Rambaugh : Object-Oriented Analysis and Design with Applications, 3 rd edition, pearson, Reprint 2013		
C	Concept Videos or Simulation for Understanding	-	-
C1	https://medium.com/omarelgabrys-blog/object-oriented-analysis-and-design-introduction-part-1-a93b0ca69d36		
C2	https://www.tutorialspoint.com/uml/uml_basic_notations.htm		
C3	http://stg-tud.github.io/eise/WS11-EiSE-07-Domain_Modeling.pdf		
C4	https://www.tutorialspoint.com/uml/uml_use_case_diagram.htm		
C5	https://www.tutorialspoint.com/object_oriented_analysis_design/ood_uml_behavioural_diagrams.htm		
C6	https://www.geeksforgeeks.org/unified-modeling-language-uml-introduction/		
C7	http://www.dre.vanderbilt.edu/~arvindk/public_html/ICS211/Softe_Patterns.htm		
D	Software Tools for Design		
1	https://en.wikipedia.org/wiki/List_of_Unified_Modeling_Language_tools		
E	Recent Developments for Research	-	-
1	https://ieeexplore.ieee.org/document/7474471		
F	Others (Web, Video, Simulation, Notes etc.)	-	-
1	https://pesitsouth.pes.edu/pdf/2019/July/CS/OOMD_QB.pdf		
2	http://vtuplanet.com/m/download.php?type=notes&dir=7th+Sem&file=Object+Oriented+Modeling+%26+Design+%28SJBIT%29+%5B10CS71%5D-NOTES.pdf		

4. Course Prerequisites

Refer to GL01. If prerequisites are not taught earlier, GAP in curriculum needs to be addressed. Include in Remarks and implement in B.5.

Students must have learnt the following Courses / Topics with described Content . . .

Modules	Course Code	Course Name	Topic / Description	Sem	Remarks	Blooms Level
nil						

5. Content for Placement, Profession, HE and GATE

The content is not included in this course, but required to meet industry & profession requirements and help students for Placement, GATE, Higher Education, Entrepreneurship, etc. Identifying Area / Content requires experts consultation in the area.

Topics included are like, a. Advanced Topics, b. Recent Developments, c. Certificate Courses, d. Course Projects, e. New Software Tools, f. GATE Topics, g. NPTEL Videos, h. Swayam videos etc.

Modules	Topic / Description	Area	Remarks	Blooms Level
1,2,3,4	UML tools	System design	Required for industry and professional	L3
5	Design Patterns	system design	Industry & profession requirements	L3

B. OBE PARAMETERS

1. Course Outcomes

Expected learning outcomes of the course, which will be mapped to POs. Identify a max of 2 Concepts per Module. Write 1 CO per Concept.

Modules	Course Code.#	Course Outcome At the end of the course, student should be able to . . .	Teach. Hours	Concept	Instr Method	Assessment Method	Blooms' Level
1	17CS551.1	Demonstrate the knowledge of OO concepts for solving system modeling and design problems.	04	OO concepts	Lecture	Q&A	L3 Apply
1	17CS551.2	Illustrate and implement OO models using appropriate UML notations	04	UML notations	Lecture	Assignment	L4 Analyze
2	17CS551.3	Apply the concepts of software development for domain models.	08	Domain models	Lecture	Q&A	L3 Apply
2	17CS551.4	Demonstrate the design and implementation of use case model using UML notations	04	UseCase model	Lecture	Q&A	L3 Apply
3	17CS551.5	Illustrate the behaviour of sequence diagram and statechart diagram for constructing OO models.	04	OO model	Lecture	Brainstorm Assignment	L4 Analyze
4	17CS551.6	Demonstrate the design of Object oriented diagrams by structuring the major components.	08	design of OO diagrams	Lecture	Assignment	L4 Analyze.
5	17CS551.7	Illustrate the concept of patterns for constructing software architectures	08	Software architectural patterns	Lecture	Assignment	L4 Analyze
-	-	Total	40	-	-	-	L3-L4

2. Course Applications

Write 1 or 2 applications per CO.

Students should be able to employ / apply the course learnings to . . .

Modules	Application Area Compiled from Module Applications.	CO	Level
1	Exhibit the ability to apply the knowledge of Object oriented concepts to system analysis and design.	CO1	L3
1	To identify the classes/objects and their properties, associations, generalization and inheritance in class model	CO2	L4
2	Demonstrate the knowledge of Software development stages and life cycles for developing softwares.	CO3	L4
3	Illustrate the design and implement of state and interaction models through domain analysis.	CO4	L3
3	Construct a usecase model for solving real time problems using UML notations	CO5	L3
4	Analyze and construct the Object oriented diagrams for solving real time problems .	CO6	L4
5	Analyze the different communication patterns through object oriented models.	CO7	L4

3. Mapping And Justification

CO – PO Mapping with mapping Level along with justification for each CO-PO pair.

To attain competency required (as defined in POs) in a specified area and the knowledge & ability required to accomplish it.

Mod ules	Mapping		Mapping Level	Justification for each CO-PO pair	Lev el
-	CO	PO	-	'Area': 'Competency' and 'Knowledge' for specified 'Accomplishment'	-
1	CO1	PO1	L3	Applying the knowledge of OO concepts help students to solve complex engineering problems.	L3
1	CO1	PO2	L3	Knowledge of OO concepts help the students to identify and analyze engineering problems.	L3
1	CO1	PO3	L3	The study of OO concepts help in design of complex engineering problems.	L3
1	CO1	PO4	L3	Knowledge of OO concepts helps to develop applications to solve complex engineering problems.	L3
1	CO1	PO5	L3	Apply appropriate tools to build the system for a given application.	L3
1	CO1	PO12	L3	Students gain the ability to engage in independent and lifelong learning in the broadset context of technology change.	L3
1	CO2	PO1	L4	Applying the knowledge of basics of OO help students to solve complex engineering problems.	L3
1	CO2	PO2	L4	Knowledge of basic of OO help the students to identify and analyze engineering problems.	L3
1	CO2	PO3	L4	The study of OO concepts help in design of complex engineering problems.	L3
1	CO2	PO4	L4	Knowledge of basics of OO helps to develop applications to solve complex engineering problems.	L3
1	CO2	PO5	L4	Apply appropriate tools to build the system for a given application.	L3
1	CO2	PO9	L4	Helps to do projects as an individual as well as in team for complex systems.	L3
1	CO2	PO10	L4	OO concepts helps in documenting the reports by making presentations.	
1	CO2	PO11	L4	The system which demand higher flexibility in development requires knowledge of OO concepts.	
1	CO2	PO12	L4	Identifying the OO design elements is a lifetime learning process.	L3
2	CO3	PO1	L3	Knowledge of software development stages is required in design and implementation of system.	L3

2	CO3	PO2	L3	Analyzing the suitable model for software development requires knowledge of software development stages.	L3
2	CO3	PO3	L3	To design a complex system, knowledge of software development is required	L3
2	CO3	PO4	L3	Knowledge of different system models is required to analyze a system design	L3
2	CO3	PO5	L3	Knowledge of software development is required to select appropriate model for the system design.	L3
2	CO3	PO9	L3	Knowledge of software development is required to give solution to complex engineering problems	
2	CO3	PO10	L3	Analyzing the software development stages is required to develop a system.	
2	CO3	PO11	L3	The software which demand higher flexibility in development requires knowledge of software development.	
2	CO3	PO12	L3	Knowledge of Complex software development is a life long learning process.	
3	CO4	PO1	L3	Knowledge of OO models is required for development of software application.	L3
3	CO4	PO2	L3	Analyzing the design for software development requires knowledge of OO models.	
3	CO4	PO3	L3	To design a solution for complex engineering problems, requires knowledge of OO models.	
3	CO4	PO4	L3	Knowledge of different system models is required to analyze a system design.	
3	CO4	PO5	L3	Knowledge of OO models is required for applying them for the system design.	
3	CO4	PO9	L3	Knowledge of OO models is required for working individually or in team for system design.	
3	CO4	PO10	L3	Knowledge of OO models is required for the documentation of system design.	
3	CO4	PO11	L3	The software which demand higher flexibility in development requires knowledge of OO models	
3	CO4	PO12	L3	Identifying the design refinements for a software development is a life long learning process.	
3	CO5	PO1	L3	Knowledge of usecase models is required for development of software application.	L3
3	CO5	PO2	L3	Analyzing the design for software development requires knowledge of usecase models	L3
3	CO5	PO3	L3	To design a solution for complex engineering problems, requires knowledge of usecase models.	L3
3	CO4	PO4	L4	Knowledge of usecase models is required to analyze a system design.	L4
3	CO5	PO5	L4	Knowledge of usecase models is required for applying them for the system design.	L4
3	CO5	PO9	L4	Knowledge of usecase models is required for working individually or in team for system design.	L4
3	CO5	PO10	L4	Knowledge of usecase models is required for the documentation of system design.	
3	CO5	PO11	L4	The software which demand higher flexibility in development requires knowledge of usecase models	
3	CO5	PO12	L4	Identifying the usecase design refinements for a software development is a life long learning process.	L4
4	CO6	PO1	L4	Knowledge of OO diagrams is required for development of software application.	L4
4	CO6	PO2	L4	Analyzing the design for software development requires knowledge of OO diagrams.	L4
4	CO6	PO3	L4	To design a solution for complex engineering problems, requires knowledge of OO diagrams.	L4
4	CO6	PO4	L4	Knowledge of OO diagrams is required to analyze a system design.	L4
4	CO6	PO5	L4	Knowledge of OO diagrams is required for applying them for the system	L4

				design.	
4	CO6	PO9	L4	Knowledge of OO diagrams is required for working individually or in team for system design.	L4
4	CO6	PO10	L2	Knowledge of OO diagrams is required for the documentation of system design.	L2
4	CO6	PO11	L2	The software which demand higher flexibility in development requires knowledge of OO diagrams	L2
4	CO6	PO12	L2	Identifying the OO diagrams for a software development is a life long learning process.	L2
5	CO7	PO1	L2	Knowledge of design patterns is required for development of software application	L2
5	CO7	PO2	L2	Analyzing the design for software application requires knowledge of design patterns.	L2
5	CO7	PO3	L2	designing a solution for complex engineering problems, requires knowledge of design patterns.	L2
5	CO7	PO4	L2	Knowledge of different design patterns is required to analyze a system design	L2
5	CO7	PO5	L2	Knowledge of design patterns is required for applying them for the system design.	L2
5	CO7	PO9	L2	Knowledge of design patterns is required for working individually or in team for system design.	L2
5	CO7	PO10	L2	Knowledge of design patterns is required for the documentation of system design.	L2
5	CO7	PO11	L2	The software which demand higher flexibility in development requires knowledge of design patterns	L2
5	CO7	PO12	L2	Identifying the design patterns for a software development is a life long learning process.	L2

4. Articulation Matrix

CO – PO Mapping with mapping level for each CO-PO pair, with course average attainment.

Mod ules	CO.#	Course Outcomes At the end of the course student should be able to ...	Program Outcomes															Lev el
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
1	17CS551 CO1	Demonstrate the knowledge of OO concepts for solving system modeling and design problems.	2.5	2.5	2.5	2.5	2.5	-	-	-	-	-	-	2.5	-	-	-	L3
1	17CS551 CO2	Illustrate and implement OO models using appropriate UML notations	2.5	2.5	2.5	2.5	2.5	-	-	-	2.5	2.5	2.5	2.5	-	-	-	L4
2	17CS551 CO3	Apply the concepts of software development for domain models.	2.5	2.5	2.5	2.5	2.5	-	-	-	2.5	2.5	2.5	2.5	-	-	-	L3
3	17CS551 CO4	Demonstrate the design and implementation of use case model using UML notations	2.5	2.5	2.5	2.5	2.5	-	-	-	2.5	2.5	2.5	2.5	-	-	-	L3
3	17CS551 CO5	Illustrate the behaviour of sequence diagram and statechart diagram for constructing OO models.	2.5	2.5	2.5	2.5	2.5	-	-	-	2.5	2.5	2.5	2.5	-	-	-	L4
4	17CS551 CO6	Demonstrate the design of Object oriented diagrams by structuring the major components.	2.5	2.5	2.5	2.5	2.5	-	-	-	2.5	2.5	2.5	2.5	-	-	-	L4
5	17CS551 CO7	Illustrate the concept of patterns for constructing software architectures	2.5	2.5	2.5	2.5	2.5	-	-	-	2.5	2.5	2.5	2.5	-	-	-	L4
-	17CS551	Average attainment (1, 2, or 3)	2.5	2.5	2.5	2.5	2.5	-	-	-	2.5	2.5	2.5	2.5	-	-	-	
-	PO, PSO	1.Engineering Knowledge; 2.Problem Analysis; 3.Design / Development of Solutions; 4.Conduct Investigations of Complex Problems; 5.Modern Tool Usage; 6.The Engineer																

		<i>and Society; 7.Environment and Sustainability; 8.Ethics; 9.Individual and Teamwork; 10.Communication; 11.Project Management and Finance; 12.Life-long Learning; S1.Software Engineering; S2.Data Base Management; S3.Web Design</i>
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5. Curricular Gap and Content

Topics & contents not covered (from A.4), but essential for the course to address POs and PSOs.

Mod ules	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping
nil					

6. Content Beyond Syllabus

Topics & contents required (from A.5) not addressed, but help students for Placement, GATE, Higher Education, Entrepreneurship, etc.

Mod ules	Gap Topic	Area	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1,2,3,4	Understanding of UML notations using tools	UML	Hands on session	1 st week of November, 2019	Concerned faculty	-

C. COURSE ASSESSMENT

1. Course Coverage

Assessment of learning outcomes for Internal and end semester evaluation. Distinct assignment for each student. 1 Assignment per chapter per student. 1 seminar per test per student.

Mod ules	Title	Teach. Hours	No. of question in Exam						CO	Levels
			CIA-1	CIA-2	CIA-3	Asg	Extra Asg	SEE		
1	Introduction, Modelling Concepts and Class Modelling	08	2	-	-	1		2	CO1, CO2	L3,L4
2	UseCase Modelling and Detailed Requirements	08	2	-	-	1		2	CO3, CO4	L3,L4
3	Process Overview, System Conception and Domain Analysis:	08	-	2	-	1		2	CO5	L3
4	Use case Realization	08	-	2	-	1		2	CO6	L4
5	Design Patterns	08	-	-	4	1		2	CO7	L4
-	Total	40	4	4	4	5		10	-	-

2. Continuous Internal Assessment (CIA)

Assessment of learning outcomes for Internal exams. Blooms Level in last column shall match with A.2.

Mod ules	Evaluation	Weightage in Marks	CO	Levels
1, 3	CIA Exam – 1	30	CO1, CO2, CO5	L3,L4,L3
2	CIA Exam – 2	30	CO3,CO4	L3, L4,L4
4,5	CIA Exam – 3	30	CO6,CO7	L4
1, 2	Assignment - 1	05	CO1, CO2, CO5,	L3,L4,L3
3, 4	Assignment - 2	05	CO3, CO4	L3, L4,L4
5	Assignment - 3	05	CO6,CO7	L4

1, 2	Seminar - 1		-	-
3, 4	Seminar - 2		-	-
5	Seminar - 3		-	-
1, 2	Quiz - 1		-	-
3, 4	Quiz - 2		-	-
5	Quiz - 3		-	-
1 - 5	Other Activities – Mini Project	-	-	-
	Final CIA Marks	30	-	-

D1. TEACHING PLAN - 1

Module - 1

Title:	Introduction, Modelling Concepts and Class Modelling	Appr Time:	o8Hrs
a	Course Outcomes	-	Blooms Level
-	The student should be able to:	-	
1	Demonstrate the knowledge of OO concepts for solving system modeling and design problems.	CO1	L4
2	Illustrate and implement OO models using appropriate UML notations	CO2	L3
b	Course Schedule	-	-
Class No	Module Content Covered	CO	Level
1	What is Object orientation? What is OO development? OO Themes	CO1	L3
2	evidence for usefulness of OO development; OO modelling history. Modelling as Design technique:	CO1	L3
3	Modelling; abstraction; The Three models. Class Modelling: Object and Class Concept; Link and associations concepts;	CO1	L3
4	Generalization and Inheritance; A sample class model; Navigation of class models; Advanced Class Modelling,	CO1	L3
5	Advanced object and class concepts; Association ends;	CO2	L4
6	N-ary associations; Aggregation; Abstract classes;	CO2	L4
7	Multiple inheritance; Metadata; Reification;	CO2	L34
8	Constraints; Derived Data; Packages.	CO2	L4
c	Application Areas	CO	Level
1	Object oriented concepts to system analysis and design.	CO1	L3
2	identify the classes/objects and their properties, associations, generalization and inheritance in class model	CO2	L4
d	Review Questions	-	-
1	What is Object Orientation? Explain the different aspects of object oriented approach.	CO1	L3
2	Explain the major themes that are supported in Object Oriented Technology.	CO1	L3
3	Define the following terms, with examples: i)Classes and Objects ii)Values and Attributes iii)Operations and Methods iv)Multiplicity	CO2	L3
4	Explain the stages of OO methodology? What are the applications of OO development.	CO2	L4
5	Prepare a class model to describe undirected graph. An undirected graph consists of vertices and a set of edges. Edges connect pairs of vertices. Capture only structure of the graph.	CO2	L4
6	What are Association ends? Explain the properties of Association end	CO2	L4
7	Explain the various restructuring techniques used with respect to workarounds	CO2	L4

8	What is a constraint? Explain constraints on objects, generalization sets and links with examples	CO2	L4
9	Prepare classes that you would expect each of the following system to handle a list of : a)Program for laying out news paper b) Program to compute and store bowling scores c)telephone voice mail system with delivery options, messages forwarding, and group lists d) controller for video cassette recorder e) catalogue store order entry system	CO2	L4
10	Mention the advantages of sharing code in OO approach .	CO1	L3
11	List the purpose of class model, state model and interaction model.	CO1	L3
e	Experiences	-	-
1			
2			
3			
4			
5			

Module – 2

Title:	Process Overview, System Conception and Domain Analysis:	Appr Time:	08Hrs
a	Course Outcomes	-	Blooms Level
-	The student should be able to:	-	
1	Illustrate the design and implement of state and interaction models through domain analysis.	CO3	L3
b	Course schedule	-	-
Class No	Module Content Covered	CO	Level
1	Process Overview: Development stages;	CO3	L3
2	Development life Cycle; System Conception:	CO3	L3
3	Devising a system concept; elaborating a concept;	CO3	L3
4	preparing a problem statement.	CO3	L3
5	Domain Analysis: Overview of analysis;	CO3	L3
6	Domain Class model:Domain state model;	CO3	L3
7	Domain interaction model;	CO3	L3
8	Iterating the analysis	CO3	L3
c	Application Areas	CO	Level
1	Use of domain models in real time system.	CO3	L3
2	Used in the design of real time applications using interaction model.	CO3	L3
d	Review Questions	-	-
1	Explain the stages of software development.	CO3	L3
2	Explain the waterfall approach for software development.	CO3	L3
3	Why iterative development is recommended for software development.	CO3	L3
4	Prepare a problem statement for ATM network.	CO3	L3
5	How to device a new system concept.	CO3	L3
6	What are the requirements of a good system concept?	CO3	L3
7	What is domain analysis concerned with.	CO3	L3
8	Give an overview of analysis.	CO3	L3
9	What are the steps to construct a domain class model.?	CO3	L3
10	How to identify classes?	CO3	L3
11	What are redundant, irrelevant and vague classes?	CO3	L3

e	Experiences	-	-
1			
2			
3			
4			
5			

E1. CIA EXAM – 1

a. Model Question Paper - 1

Crs Code:	17cs551	Sem:	5	Marks:	30	Time:	75 minutes	
Course:	Object Oriented Modeling and Design							
-	-	Note: Answer any 2 questions, each carry equal marks.				Marks	CO	Level
1	a	What is Object Orientation? Explain the different aspects of object oriented approach.				20	CO1	L4
	b	Explain the stages involved in OO methodology					CO1	
	c	Differentiate a)Values and Attributes b) Operations and methods					CO1	L3
2	a	With an UML diagram, explain aggregation and composition				20	CO2	L3
	b	Explain the purpose served by a model					CO2	
	c	What is a constraint? Explain constraints on objects, generalization sets and links with examples					CO2	L4
3	a	Explain the stages of software development.					CO3	L3
	b	What are redundant, irrelevant and vague classes?					CO3	L4
	c	What are the criteria to discard unnecessary associations?					CO3	
4	a	Prepare a problem statement for ATM network.					CO3	L3
	b	How to prepare a data dictionary.					CO3	L3

b. Assignment -1

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions								
Crs Code:	17cs551	Sem:	5	Marks:	10/ 10	Time:	90 – 120 minutes	
Course:	Object Oriented Modeling and Design							
Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.								
SNo	USN	Assignment Description				Marks	CO	Level
1		What is object orientation?				2	CO1	L3
2		What are the four aspects of object oriented approach?				4	CO1	L3
3		Explain the terms: Identity, classification, inheritance, polymorphism				8	CO1	L3
4		What is object oriented development?				5	CO1	L3
5		What are the advantages of object oriented development?				4	CO1	L3
6		Explain the stages of OO methodology?				5	CO1	L3
7		What are the two parts of analysis model?				2	CO1	L3
8		Define class diagram, state diagram, use case diagram				3	CO1	L3
9		Differentiate sequence and activity diagram				4	CO1	L3
10		How data and behaviour can be combined in OO approach				2	CO1	L3
11		Mention the advantages of sharing code in OO approach				3	CO1	L3
12		What does OO approach emphasis on?				4	CO1	L3
13		What is meant by a model?				2	CO1	L3
14		Discuss the purposes of developing model				4	CO1	L3
15		How are the three models related?				4	CO1	L3
16		What is meant by a class ?				2	CO1	L3
17		Differentiate class diagram and object diagrams with				4	CO1	L3

	examples .			
18	What is meant by attribute and value of an attribute?	2	CO1	L3
19	What is meant by a) method b) operation.	4	CO1	L3
20	Write the modelling notation for classes	2	CO1	L3
21	Differentiate links and associations	4	CO1	L3
22	Explain the three system models	4	CO1	L3
23	Define abstraction and encapsulation	4	CO1	L3
24	Differentiate aggregation and association.	4	CO1	L3
25	What is meant by propagation .Give examples?	4	CO2	L4
26	Explain the Types of multiple inheritance.	4	CO2	L4
27	How do you eliminate multiple inheritance	3	CO2	L4
28	What are abstract classes? Give examples.	4	CO2	L4
29	Explain the three types of constraints. Mention their uses.	6	CO2	L4
30	Give some tips for devising packages.	5	CO2	L4
31	What is a derived element? Specify their notation.	4	CO2	L4

D2. TEACHING PLAN - 2

Module – 3

Title:	UseCase Modelling and Detailed Requirements	Appr Time:	08 Hrs
a	Course Outcomes	-	Blooms Level
-	The student should be able to:	-	
1	Construct a usecase model for solving real time problems using UML notations	CO4	L3
2	Analyze and construct sequence model and state model for solving real time problems using UML notations.	CO5	L4
b	Course Schedule		
Class No	Module Content Covered	CO	Level
1	Overview; Detailed object-oriented Requirements definitions;	CO4	L3
2	System Processes-A use case/Scenario view;	CO4	L3
3	A use case/Scenario view;	CO4	L3
4	Identifying Input and outputs-The System sequence diagram;	CO5	L4
5	Identifying Input and outputs-The System sequence diagram;	CO5	L4
6	Identifying Object Behaviour-The state chart Diagram	CO5	L4
7	identifying Object Behaviour-The state chart Diagram	CO5	L4
8	Integrated Object-oriented Models.	CO5	L4
c	Application Areas	CO	Level
1	Used in solving real time problems using use case model.	CO4	L3
2	Used in solving real time problems using sequence model and statechart model.	CO5	L4
d	Review Questions	-	-
1	Define: actor. Give examples.	CO4	L3
2	Explain the relationship between class and state model.	CO4	L3
3	What are the two types of sequence models? Explain them.	CO4	L3
4	What are the issues to be considered in designing a sequence diagram?	CO4	L4
5	What is an activity diagram? Explain the activity diagram for stock trade processing.	CO5	L4
6	Write short notes on include relationship.	CO5	L4
7	Write short notes on extend relationship.	CO5	L3
8	What is the need for swim lanes in activity mdiagrams?	CO5	L3
e	Experiences	-	-

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Module – 4

Title:	Use case Realization	Appr Time:	o8hrs
a	Course Outcomes	-	Blooms Level
-	The student should be able to:	-	
1	Demonstrate the design of Object oriented diagrams by structuring the major components.	CO6	L4
b	Course Schedule		
Class No	Module Content Covered	CO	Level
1	The Design Discipline within up iterations:Object Oriented Design	CO6	L4
2	The Bridge between Requirements and Implementation; Design Classes and Design within Class Diagrams;	CO6	L4
3	Interaction Diagrams-Realizing Use Case and defining methods;	CO6	L4
4	Designing with Communication Diagrams;	CO6	L4
5	Updating the Design Class Diagram; Package Diagrams-	CO6	L4
6	Structuring the Major Components	CO6	L4
7	Implementation Issues for Three-Layer Design.	CO6	L4
8	Implementation Issues for Three-Layer Design.	CO6	L4
c	Application Areas	CO	Level
1	Used in solving problems based on design of class diagrams and communication diagrams.	CO6	L4
d	Review Questions	-	-
1	Which three models are used in Object oriented design. Explain them.	CO6	L4
2	List the elements included in a method signature. Give example	CO6	L4
3	What is meant by navigation visibility? How is it shown in UML? How is it implemented in programming code.	CO6	L4
4	What are some of the problems that occur when classes have low cohesion?	CO6	L4
5	What notations are used to indicate stereotype. Show and example of stereotype class.	CO6	L4
6	What does coupling mean? Why is too much coupling considered bad?	CO6	L4
7	What is the difference between internet based system and network based system.	CO6	L4
8	What is the purpose of a package diagram? What notations are used? Give examples.	CO6	L4
9	Describe the major difference between sequence diagram and communication diagram.	CO6	L4
10	Describe the notation used for communication diagram.	CO6	L4
11	What is the objective of use case controller class?	CO6	L4
12	What is three layer design? What are the most common layers found in three layer design?	CO6	L4
13	What is meant by object responsibility? Why is it an important concept in design?	CO6	L4
14	What is the objective of use case controller class?	CO6	L4
15	How is dependency indicated on a package diagram? What does it mean?	CO6	L4
e	Experiences	-	-
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E2. CIA EXAM – 2

a. Model Question Paper - 2

Crs Code:	17cs551	Sem:	5	Marks:	30	Time:	75 minutes	
Course:	Object Oriented Modeling and Design							
-	-	Note: Answer any 2 questions, each carry equal marks.				Marks	CO	Level
1	a	What is UseCase and Actor? Explain UseCase diagram of the order-entry sub system for RMO; showing a system boundary.				7	CO4	L3
	b	With a neat sketch explain the activity diagram of the telephone order scenario.				5	CO4	L3
	c	Explain SSD of the simplified telephone order scenario for the create New Order UseCase.				3	CO4	L3
2	a	Explain the concurrent paths for a printer in the ON state.				4	CO5	L4
	b	List the steps for developing state charts.				6	CO5	L4
	c	Explain the complete state chart (final state chart) for Order Item.				5	CO5	L4
3	a	What is stereotype? Describe the standards stereotypes found in design models.				5	CO6	L4
	b	Write short notes on : i) Encapsulation and Information Hiding ii) Navigation Visibility iii) Cohesion and Separation of Responsibilities.				6	CO6	L4
	c	Explain RMO domain model class diagram				4	CO6	L4
4	a	With an example explain designing of classes.				6	CO6	L4
	b	Discuss the symbols used in communication diagrams.				4	CO6	L4
	c	Explain the RMO sub system packages.				5	CO6	L4

b. Assignment – 2

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions								
Crs Code:	17cs551	Sem:	5	Marks:	10/ 10	Time:	90 – 120 minutes	
Course:	Object Oriented Modeling and Design							
Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.								
SNo	USN	Assignment Description				Marks	CO	Level
1		What is an activity diagram? Explain the activity diagram for stock trade processing.					CO4	L3
2		How branches are indicated in activity diagram.					CO4	L3
3		How initiation and termination points are indicated in activity diagram.					CO4	L3
4		Explain how the execution of activity diagrams are indicated.					CO4	L3
5		Write short notes on include relationship.					CO5	L4
6		Write short notes on extend relationship.					CO5	L4
7		What is the need for swim lanes in activity diagrams?					CO5	L4
8		Explain the use case and sequence model with example.					CO5	L4
9		Explain the nested states and nested state diagrams with example.					CO5	L4
10		List the elements included in a method signature. Give example					CO6	L4

11		What is the purpose of a package diagram? What notations are used? Give examples.		CO6	L4
12		Describe the major difference between sequence diagram and communication diagram.		CO6	L4
13		Describe the notation used for communication diagram.		CO6	L4
14		What is the objective of use case controller class?		CO6	L4
15		12. What is three layer design? What are the most common layers found in three layer design?		CO6	L4
16		12. What is three layer design? What are the most common layers found in three layer design?		CO6	L4
17		What is meant by object responsibility? Why is it an important concept in design?		CO6	L4
18		How is dependency indicated on a package diagram? What does it mean?		CO6	L4

D3. TEACHING PLAN - 3

Module – 5

Title:	Design Patterns	Appr Time:	08 Hrs
a	Course Outcomes	-	Blooms Level
-	The student should be able to:	-	Level
1	Illustrate the concept of patterns for constructing software architectures	CO7	L4
b	Course Schedule		
Class No	Module Content Covered	CO	Level
1	Introduction; what is a design pattern?;	CO7	L4
2	Describing design patterns, the catalog of design patterns,	CO7	L4
3	Organizing the catalog, How design patterns solve design problems,	CO7	L4
4	how to select a design patterns,	CO7	L4
5	how to use a design pattern;	CO7	L4
6	Creational patterns:	CO7	L4
7	prototype and singleton(only);	CO7	L4
8	structural patterns adaptor and proxy(only).	CO7	L4
c	Application Areas	CO	Level
1	Used to develop pattern diagrams for real time applications.	CO7	L4
2	Used in designing models.	CO7	L4
d	Review Questions	-	-
1	What are design pattern? List down four essential elements of patterns.	CO7	L4
2	What are all the criteria's used to classify design pattern?	CO7	L4
3	Name two classifications of design patterns based on purpose of design pattern?	CO7	L4
4	What is encapsulation?	CO7	L4
5	Write notes on Object, methods, Requests.	CO7	L4
6	What are the main advantages and disadvantages of delegation?	CO7	L4

7	What are the disadvantages of class inheritance?	CO7	L4
8	Write notes on Creational design patterns. Give examples.	CO7	L4
9	What are design pattern? List down four essential elements of patterns.	CO7	L4
10	What are all the criteria's used to classify design pattern?	CO7	L4
e	Experiences	-	-
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E3. CIA EXAM – 3

a. Model Question Paper - 3

Crs Code:	17cs551	Sem:	5	Marks:	30	Time:	75minutes	
Course:	Object Oriented Modeling and Design							
-	-	Note: Answer any 2 questions, each carry equal marks.				Marks	CO	Level
1	a	Describe the elements of design pattern.				20	CO7	L4
	b	Explain how to select design pattern.					CO7	L4
	c	Describe how to use design pattern.					CO7	L4
2	a	Explain the adaptor in structural pattern.				20	CO7	L4
	b	Write short notes on prototype pattern.					CO7	L4
3	a	Explain the proxy pattern with a neat diagram.				20	CO7	L4
	b	Write short notes on Singleton pattern.					CO7	L4
4	a	Write notes on Creational design patterns. Give examples.				20	CO7	L4
	b	What is Factory method? What are the main disadvantages of factory method?					CO7	L4
	c	How composite design pattern be considered as structural design pattern?					CO7	L4

b. Assignment – 3

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions								
Crs Code:	17cs551	Sem:	5	Marks:	10/ 10	Time:	90 – 120 minutes	
Course:	Object Oriented Modeling and Design							
Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.								
SNo	USN	Assignment Description				Marks	CO	Level
1		Write notes on Singleton.				5	CO7	L4
2		What is Factory method? What are the main disadvantages of factory method?				6	CO7	L4
3		What is prototype Method? What are all the situation in which prototype method is being used?				8	CO7	L4
4		What are all the benefits of singleton method?				4	CO7	L4
5		Write notes on Structural design patterns.				8	CO7	L4
6		How composite design pattern be considered as structural design pattern?				4	CO7	L4
7		How proxy pattern be considered as structural design pattern?				5	CO7	L4
8		Explain the adaptor in structural pattern.				8	CO7	L4
9		Write short notes on prototype pattern.				5	CO7	L4
10		Explain the proxy pattern with a neat diagram.				8	CO7	L4
11		Write short notes on Singleton pattern.				5	CO7	L4

F. EXAM PREPARATION

1. University Model Question Paper

Course:	Object Oriented Modeling and Design				Month / Year	May /2019		
Crs Code:	17cs551	Sem:	5	Marks:	100	Time:	180 minutes	
-	Note	Answer any FIVE full questions. All questions carry equal marks.				Marks	CO	Level
1	a	Explain the three models of object orientation.				6	CO1	L3
	b	Describe the generalization and inheritance with an example.				4	CO1	L3
	c	Explain Object Orientation Themes.				10	CO1	L3
-	a	Explain N-ary association with an example.				6	CO2	L4
	b	Explain kinds of multiple inheritances.				8	CO2	L4
	c	Explain Aggregation.				6	CO2	L4
2	a	What is UseCase and Actor? Explain UseCase diagram of the order-entry sub system for cp RMO; showing a system boundary.				6	CO4	L3
	b	With a neat sketch explain the activity diagram of the telephone order scenario.				8	CO4	L3
	c	Explain SSD of the simplified telephone order scenario for the create New Order UseCase.				6	CO4	L3
-	a	Explain the concurrent paths for a printer in the ON state.				5	CO5	L4
	b	List the steps for developing state charts. •				8	CO5	L4
	c	Explain the complete state chart (final state chart) for Order Item.				7	CO5	L4
3	a	Describe the software development stages.				10	CO3	L3
	b	Explain development life cycle of software.				10	CO3	L3
-	a	Explain the steps used to construct a domain class model.				10	CO3	L3
	b	Explain domain state model.				10	CO3	L3
4	a	What is stereotype? Describe the standards stereotypes found in design models.				7	CO6	L4
	b	Write short notes on : i) Encapsulation and Information Hiding ii) Navigation Visibility iii) Cohesion and Separation of Responsibilities.				9	CO6	L4
	c	Explain RMO domain model class diagram.				4	CO6	L4
-	a	With an example explain designing of classes.				8	CO6	L4
	b	Discuss the symbols used in communication diagrams.				5	CO6	L4
	c	Explain the RMO sub system packages.				7	CO6	L4
5	a	Describe the elements of design pattern.				6	CO7	L4
	b	Explain how to select design pattern.				7	CO7	L4
	c	Describe how to use design pattern.				7	CO7	L4
	a	Write short notes on prototype pattern				5	CO7	L4
	b	Explain the adaptor in structural pattern.				15	CO7	L4

2. SEE Important Questions

Course:	Object Oriented Modeling and Design				Month / Year	Aug /2019		
Crs Code:	17cs551	Sem:	5	Marks:	100	Time:	180 minutes	
	Note	Answer any FIVE full questions. All questions carry equal marks.				-	-	

Module	Qno.	Important Question	Marks	CO	Year
1	1	What is Object Orientation? Explain the aspects of Object orientation.	16	CO1	2012
	2	Describe the generalization and inheritance with an example.		CO1	2018
	3	Explain the three models of object orientation.		CO1	2018
	4	Explain N-ary association with an example.		CO2	2018
	5	Explain kinds of multiple inheritances.		CO2	2018
2	1	What is UseCase and Actor? Explain UseCase diagram of the order-entry sub system for cp RMO; showing a system boundary.	16	CO4	2018
	2	List the steps for developing state charts.		CO4	2018
	3	Explain SSD of the simplified telephone order scenario for the create New Order UseCase.		CO5	2018
	4	Explain the complete state chart (final state chart) for Order Item.		CO5	2018
	5	Explain the concurrent paths for a printer in the ON state.		CO5	2018
3	1	List and explain any four criteria for consideration in keeping right classes	16	CO3	2015
	2	List and explain different stages in software development process.		CO3	2014
	3	Draw domain state model for account wrt ATM example		CO3	2015
	4	Explain the steps used to construct a domain class model.		CO3	2015
	5	Explain development life cycle of software.		CO3	2015
4	1	What is stereotype? Describe the standards stereotypes found in design models.	16	CO6	2018
	2	Explain RMO domain model class diagram.		CO6	2018
	3	With an example explain designing of classes.		CO6	2018
	4	Explain the RMO sub system packages.		CO6	2018
	5	Write short notes on : i) Encapsulation and Information Hiding ii) Navigation Visibility iii) Cohesion and Separation of Responsibilities.		CO6	2018
5	1	What is a pattern? Explain briefly properties of patterns for software architecture	16	CO7	2014
	2	Explain how to select design pattern.		CO7	2018
	3	Explain Singleton design pattern.		CO7	2014
	4	Describe the elements of design pattern.		CO7	2018
	5	Explain the adaptor in structural pattern.		CO7	2018

G. Content to Course Outcomes

1. TLPA Parameters

Table 1: TLPA – Example Course

Module-#	Course Content or Syllabus (Split module content into 2 parts which have similar concepts)	Content Teaching Hours	Blooms' Learning Levels for Content	Final Bloom's Level	Identified Action Verbs for Learning	Instruction Methods for Learning	Assessment Methods to Measure Learning
A	B	C	D	E	F	G	H
1	Introduction, Modelling Concepts and Class Modelling: What is Object orientation? What is OO development? OO Themes; evidence for usefulness of OO development; OO modelling history.evidence for usefulness of OO development; OO modelling history. Modelling as Design technique: Modelling;	4	L3 Apply	L3 Apply	Understand	Lecture	Assignment, Q&A

	abstraction; The Three models. Class Modelling; Object and Class Concept; Link and associations concepts; Generalization and Inheritance; A sample class model; Navigation of class models;						
1	Advanced Class Modelling, Advanced object and class concepts; Association ends; N-ary associations; Aggregation; Abstract classes; Multiple inheritance; Metadata; Reification; Constraints; Derived Data; Packages.	4	L4 Analyze	L4 Analyze	-Identify -	Lecture	Assignment
2	UseCase Modelling and Detailed Requirements: Overview; Detailed object-oriented Requirements definitions; System Processes-A use case/Scenario view; Identifying Input and outputs-The System sequence diagram; Identifying Object Behaviour-The state chart Diagram; Integrated Object-oriented Models.	8	L3 Apply L4 Analyze	L4 Analyze	-Interpret -	Description	Q & A
3	process Overview, System Conception and Domain Analysis: Process Overview; Development stages; Development life Cycle; System Conception: Devising a system concept; elaborating a concept; preparing a problem statement.	3	L3 Apply	L3 Apply	-Illustrate -	Examine	Focused on analyzing /compare
3	Domain Analysis: Overview of analysis; Domain Class model: Domain state model; Domain interaction model; Iterating the analysis..	5	L3 Apply	L3 Apply	-Examine -	Description	Q & A
4	Use case Realization :The Design Discipline within up iterations:Object Oriented Design-The Bridge between Requirements and Implementation; Design Classes and Design within Class Diagrams; Interaction Diagrams-Realizing Use Case and defining methods; Designing with Communication Diagrams; Updating the Design Class Diagram; Package Diagrams-Structuring the Major Components; Implementation Issues for Three-Layer Design	8	L4 Analyze	L4 Analyze	-Analyze -	Explanation	Slip test
5	Design Patterns: Introduction; what is a design pattern?, Describing design patterns, the catalog of design patterns, Organizing the catalog, How design patterns solve design problems, how to select a design patterns, how to use a design pattern; Creational patterns: prototype and singleton(only); structural patterns adaptor and proxy(only).	8	L3 Apply L4 Analyze	L4 Analyze	-Explain -	Description	Q & A

2. Concepts and Outcomes:

Table 2: Concept to Outcome – Example Course

Module #	Learning or Outcome from study of the Content or Syllabus	Identified Concepts from Content	Final Concept	Concept Justification (What all Learning Happened from the study of Content / Syllabus. A short	CO Components (1.Action Verb, 2.Knowledge, 3.Condition /	Course Outcome Student Should be able to ...
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				word for learning or outcome)	Methodology, 4.Benchmark)	
<i>A</i>	<i>I</i>	<i>J</i>	<i>K</i>	<i>L</i>	<i>M</i>	<i>N</i>
1	OO Concepts,		Basics of OO concepts	OO concepts	-Understand -basics of OO modeling -OO concepts	To understand the basics of OO modeling by knowing the OO concepts.
1	UML notations		UML Notations for OO concepts	To write UML notations	-Write. -UML notations -OO concepts	To write UML notations knowing the OO concepts.
2	Usecase model		Usecase models	detailed concepts of usecase model	-Understand - usecase models -uml notations	To understand usecase models by knowing uml notations.
3	Software development stages		Software development stages	Software development stages	-Understand -software development stages -software engineering	To understand the software development stages by knowing software engineering process.
3	Domain models		Domain models	Domain models	-Understand -domain models -models	To understand the domain models by knwoing the concepts of models.
4	Design of OO diagrams		Design diagrams	OO design diagrams	-Design -OO diagrams -knowing UML notations	To design the OO diagrams by knowng UML notations.
5	Understanding of various Design patterns		Architectural patterns	design patterns	-Understand -design patterns -basics of pattern	To Understand the design patterns knowing the basics of pattern.