BE-7-IS-SKIT-Ph5b1-F02-V2.2

Ref No:

< SRI KRISHNA INSTITUTE OF TECHNOLOGY BANGALORE>

COURSE PLAN

Academic Year 2019-2020

Program:	B E – Information Science & Engineering
Semester :	7
Course Code:	15IS72
Course Title:	Software Architecture and Design Patterns
Credit / L-T-P:	4 / 4-0-0
Total Contact Hours:	50
Course Plan Author:	Asha B R

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:	BE	Program:	IS
Semester:	7	Academic Year:	2019- 20
Course Title:	Software Architecture and Design Patterns	Course Code:	15IS72
Credit / L-T-P:	4 / 4-0-0	SEE Duration:	180 Minutes
Total Contact Hours:	50 Hours	SEE Marks:	80 Marks
CIA Marks:	20 Marks	Assignment	1 / Module
Course Plan Author:	Asha B R	Sign ..	Dt:
Checked By:		Sign ..	Dt:
CO Targets	80%	SEE Target:	87%

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	Module Content	Teaching Hours	Module Concepts	Blooms Level
1	**Introduction**: what is a design pattern? describing design patterns, the catalog of design pattern, organizing the catalog, how design patterns solve design problems, how to select a design pattern, how to use a design pattern. What is object-oriented development? , key concepts of object oriented design other related concepts, benefits and drawbacks of the paradigm.	10	Design Pattern Catalog, Object Oriented Software	L2 Understand
2	**Analysis a System**: overview of the analysis phase, stage 1: gathering the requirements functional requirements specification, defining conceptual classes and relationships, using the knowledge of the domain. Design and Implementation, discussions and further reading.	10	Requirements specification, Object oriented design	L2
3	**Design Pattern Catalog**: Structural patterns, Adapter, bridge, composite, decorator, facade, flyweight, proxy..	10	Structural class, object patterns	L3
4	**Interactive systems and the MVC architecture**: Introduction, The MVC architectural pattern, analyzing a simple drawing program, designing the system, designing of the subsystems, getting into implementation, implementing undo operation, drawing incomplete items, adding a new feature, pattern based solutions.	10	Software architectural pattern, model view controller	L2
5	**Designing with Distributed Objects:** Client server system, java remote method invocation, implementing an object oriented system on the web (discussions and further reading) a note on input and output, selection statements, loops arrays.	10	Distributed objects , data processing	L2
-				

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.

Module		Details	Available	Availability
		Text books		-
1, 2, 4, 5		.Object-oriented analysis, design and implementation, brahma dathan, sarnath rammath, universities press,2013	In Lib	In Lib & Dept
1, 3		Design patterns, erich gamma, Richard helan, Ralph johman , john vlissides, PEARSON Publication,2013.	In Lib	
		Reference books		-
1-3		Frank Bachmann, RegineMeunier, Hans Rohnert "Pattern Oriented Software Architecture" –Volume 1, 1996.	In lib	In Lib and Dept
1-3		William J Brown et al., "Anti-Patterns: Refactoring Software, Architectures and Projects in Crisis", John Wiley, 1998.	Not Available	
C		**Concept Videos or Simulation for Understanding**	-	-
	1	https://youtu.be/f5Rzr5mVNbY		
	2	https://youtu.be/VnVHgj6OPrQ		
	3	https://youtu.be/lPsSL6_7NBg		
	4	https://youtu.be/0UVfvJJRtSU		
	5	https://youtu.be/uTKKduHkAXo		
D		**Software Tools for Design**	-	-
	1	ArchReco: a software tool to assist software design		
E		**Recent Developments for Research**	-	-
	1	https://youtu.be/1xUz1fp23TQ		
F		**Others (Web, Video, Simulation, Notes etc.)**	-	-
	1	https://youtu.be/1xUz1fp23TQ		
	2	https://youtu.be/VG9VopzV_T0		

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
1	15CS42	Software Engineering	1-5/Knowledge of Software Design and Modelling.	4		L2
2	15CS551	OOMD	Knowledge of Object Oriented Modelling and Design	5		L2
-						
-						

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

	Use of Design patterns in development of different software apllications		Recent Developments required to be known for placements and Course projects.	L2

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	15IS72.1	Understand the catalog of Design pattern for designing Object Oriented Software	06	Design pattern catalog	Lecture	Q & A Unit test	L2 Understand
1	15IS72.2	Describe the object oriented software development from objects and object relationships	04	Object oriented Software Development	Lecture PPT	Q & A Unit test	L2 Understand
2	15IS72.3	Analyze requirements specification to build conceptual model	06	Requirements specification	Lecture	Assignment and Slip Test	L2 Understand
2	15IS72.4	Analyze object oriented design and implementation using sequence diagram	04	Object oriented design and implementation	Lecture / PPT	Slip test CIA	L2 Understand
3	15IS72.5	Understand the implementation of Ethernet using IEEE802 standards Apply and understand the structural class of the system	06	Structural class	Lecture	Oral quiz CIA	L3 Apply
3	15IS72.6	Understand the object patterns to create new functionality of the system	04	object patterns	Lecture	Slip test	L3 Apply
4	15IS72.7	Comprehend the Software Architectural pattern for analyzing interactive system	05	Software architectural pattern	Lecture	Slip test and assignment	L2 Understand
4	15IS72.8	Understand the Architecture of model view controller	05	model view controller	Lecture	Assignment and CIA	L2 Understand
5	15IS72.9	Evaluate distributed system of data processing through client server system and JAVA Remote Method invocation	05	Distributed objects	Lecture	Quiz CIA	L2 Understand
5	15IS72.10	Understand the services offered by world-wide web to access the data at remote site	05	Data processing	Lecture	Slip test Assignment	L2 Understand
-							

2. Course Applications

Write 1 or 2 applications per CO.
Students should be able to employ / apply the course learnings to . . .

Mod	Application Area	CO	Level

15IS72/ A

ules	Compiled from Module Applications.		
1	Design Patterns provides industry standard approach to solve a recurring problem, so it saves time if we sensibly use the design pattern.	CO1	L2
1	Object oriented design used for Client-Server Systems,Object-Oriented Databases,Object Oriented Databases,Real-Time System Design,Simulation And Modelling System,Hypertext And Hypermedia,Neural Networking And Parallel Programming,Office Automation Systems.	CO2	L2
2	Can be used in Library and Bank systems	CO3	L2
2	A network interface controller (NIC) is computer hardware that provides a computer with the ability to access the transmission media, and has the ability to process low-level network information. For example, the NIC may have a connector for accepting a cable, or an aerial for wireless transmission and reception, and the associated circuitry.	CO4	L2
3	structural design patterns Applied to Adapter pipeline, multiple adapters for debugging purposes.	CO5	L3
3	Used in MVC architectures	CO6	L3
4	Used in client and server side programs	CO7	L2
4	Used majorly by Node developers and by C#, Ruby, PHP framework.	CO8	L2
5	Used in JAVA , Web and RMI applications	CO9	L2
5	Used in Cloud, web application	CO10	L2

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.

Modules	Mapping		Mapping Level	Justification for each CO-PO pair	Level
-	CO	PO	-	'Area': 'Competency' and 'Knowledge' for specified 'Accomplishment'	-
1	CO1	PO1	L2	Knowledge of catalog design pattern is required for designing object oriented software.	L2
1	CO1	PO2	L3	Analyzing the problems in object oriented software requires knowledge of design patterns.	L3
1	CO1	PO3	L2	No mapping. No design and development content.	L2
1	CO1	PO4	L2	No investigation and interpretation content. No mapping. Learning is at basic understanding level.	L2
1	CO1	PO5	L3	No tool content. No mapping. Learning is at basic understanding level	L3
1	CO1	PO6	L2	No engineer and society content. No mapping.	L2
1	CO1	PO7	L2	No environment and sustainability. No mapping	L2
1	CO1	PO8	L2	No ethics. No mapping	L2
1	CO1	PO9	L2	No individual and team work. No mapping.	L2
1	CO1	PO10	L2	No usage for communication. No mapping.	L2
1	CO1	PO11	L2	No project management and finance. No mapping	L2
1	CO1	PO12	L2	No life long learning. No mapping	L2
1	CO2	PO1	L3	Knowledge representation is basic understanding level. No mapping.	L3
1	CO2	PO2	L2	Analyzing the object oriented software development from the objects relationship.	L2
1	CO2	PO3	L2	No mapping. No design and development content.	L2
1	CO2	PO4	L2	No investigation and interpretation content. No mapping. Learning is at basic understanding level.	L2
1	CO2	PO5	L2	No tool content. No mapping. Learning is at basic understanding level	L2
1	CO2	PO6	L3	No engineer and society content. No mapping.	L3
1	CO2	PO7	L2	No environment and sustainability. No mapping	L2
2	CO3	PO1	L2	No ethics. No mapping	L2
2	CO3	PO2	L2	No individual and team work. No mapping.	L2

2	CO3	PO3	L2	No usage for communication. No mapping.	L2
2	CO3	PO4	L2	No project management and finance. No mapping	L2
2	CO3	PO5	L2	No life long learning. No mapping	L2
2	CO3	PO6	L3	Knowledge about the steps for analyzing a system.	L3
2	CO3	PO7	L3	Analyzing a software to manage a small library system.	L3
2	CO4	PO1	L2	No mapping. No design and development content.	L2
2	CO4	PO2	L2	No investigation and interpretation content. No mapping. Learning is at basic understanding level.	L2
2	CO4	PO4	L2	No tool content. No mapping. Learning is at basic understanding level	L2
2	CO4	PO5	L2	No engineer and society content. No mapping.	L2
3	CO5	PO1	L2	No environment and sustainability. No mapping	L2
3	CO5	PO3	L2	No ethics. No mapping	L2
3	CO5	PO4	L2	No individual and team work. No mapping.	L2
3	CO5	PO5	L2	No usage for communication. No mapping.	L2
3	CO5	PO8	L2	No project management and finance. No mapping	L2
3	CO5	PO12	L2	No life long learning. No mapping	L2
3	CO6	PO1	L2	Knowledge about the design and implementation phase.	L2
3	CO6	PO2	L3	Analyze the library management system	L3
3	CO6	PO3	L2	Design and implementation for the library system.	L2
3	CO6	PO4	L2	No investigation and interpretation content. No mapping. Learning is at basic understanding level.	L2
3	CO6	PO5	L2	UML tool is employed for the sequence diagram.	L2
4	CO7	PO1	L2	No engineer and society content. No mapping.	L2
4	CO7	PO3	L2	No environment and sustainability. No mapping	L2
4	CO7	PO4	L2	No ethics. No mapping	L2
4	CO7	PO5	L2	No individual and team work. No mapping.	L2
4	CO7	PO10	L2	No usage for communication. No mapping.	L2
4	CO7	PO11	L2	No project management and finance. No mapping	L2
4	CO7	PO12	L2	No life long learning. No mapping	L2
4	CO8	PO1	L2	Knowledge about the design patterns	L2
4	CO8	PO2	L3	Analyze the problem. i.e; to which design pattern that problem belongs	L3
4	CO8	PO3	L2	Designing reusable object oriented software.	L2
4	CO8	PO4	L2	No investigation and interpretation content. No mapping. Learning is at basic understanding level.	L2
4	CO8	PO5	L2	No tool content. No mapping. Learning is at basic understanding level	L2
4	CO8	PO6	L2	No engineer and society content. No mapping.	L2
4	CO8	PO7	L2	No environment and sustainability. No mapping	L2
4	CO8	PO8	L2	No ethics. No mapping	L2
4	CO8	PO9	L2	No individual and team work. No mapping.	L2
4	CO8	PO10	L2	No usage for communication. No mapping.	L2
4	CO8	PO11	L2	No project management and finance. No mapping	L2
4	CO8	PO12	L2	No life long learning. No mapping	L2
5	CO9	PO1	L2	Knowledge about the MVC architecture.	L2
5	CO9	PO2	L3	Analyzing a problem of simple drawing program.	L3
5	CO9	PO3	L2	Design and implementation of the system by applying software architectural pattern.	L2
5	CO9	PO4	L2	No investigation and interpretation content. No mapping. Learning is at basic understanding level.	L2
5	CO9	PO5	L2	No tool content. No mapping. Learning is at basic understanding level	L2
5	CO9	PO6	L2	No engineer and society content. No mapping.	L2
5	CO9	PO3	L2	No environment and sustainability. No mapping	L2

5	CO9	PO8	L2	No ethics. No mapping	L2
5	CO9	PO9	L2	No individual and team work. No mapping.	L2
5	CO9	PO10	L2	No usage for communication. No mapping.	L2
5	CO9	PO11	L2	No project management and finance. No mapping	L2
5	CO9	PO12	L2	No life long learning. No mapping	L2
5	CO10	PO1	L2	Knowledge about the distributed, object-oriented application system	L2
5	CO10	PO2	L2	To analyze a problem in application system require knowledge of distributed , object-oriented system.	L2
5	CO10	PO3	L2	Design and implementation to build a system.	L2
5	CO10	PO4	L2	No investigation and interpretation content. No mapping. Learning is at basic understanding level.	L2
5	CO10	PO5	L2	No tool content. No mapping. Learning is at basic understanding level	L2
5	CO10	PO6	L2	No engineer and society content. No mapping.	L2
5	CO10	PO7	L2	No environment and sustainability. No mapping	L2
5	CO10	PO8	L2	No ethics. No mapping	L2
5	CO10	PO9	L2	No individual and team work. No mapping.	L2
5	CO10	PO10	L2	No usage for communication. No mapping.	L2
5	CO10	PO11	L2	No project management and finance. No mapping	L2
5	CO10	PO12	L2	No life long learning. No mapping	L2

4. Articulation Matrix

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

-	-	Course Outcomes		Program Outcomes															-
Modules	CO.#	At the end of the course student should be able to . . .	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	Level
1	15IS72.1	Understand the catalog of Design pattern for designing Object Oriented Software	1	2	1													L2 Understand
1	15IS72.2	Describe the object oriented software development from objects and object relationships	1	2	1													L2 Understand
2	15IS72.3	Analyze requirements specification to build conceptual model	1	2	2													L2 Understand
2	15IS72.4	Analyze object oriented design and implementation using sequence diagram	2	1														L2 Understand
3	15IS72.5	Understand the implementation of Ethernet using IEEE802 standards Apply and understand the structural class of the system	2	1	2		2											L3 Apply
3	15IS72.6	Understand the object patterns to create new functionality of the system	2	2	1		1											L3 Apply
4	15IS72.7	Comprehend the Software Architectural pattern for analyzing interactive system	1	2			1											L2 Underst

Modules	CO	Description	1	2	3	4	5	6	7	8	9	10	11	12	S1	S2	S3	Levels
																		and
4	15IS72.8	Understand the Architecture of model view controller	1	2			1											L2 Understand
5	15IS72.9	Evaluate distributed system of data processing through client server system and JAVA Remote Method invocation	1	1														L2 Understand
5	15IS72.10	Understand the services offered by world-wide web to access the data at remote site	1	2			1											L2 Understand
-	**CS501PC**	**Average attainment (1, 2, or 3)**																-
-	*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 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*																

5. Curricular Gap and Content

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

Modules	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1					
2					

6. Content Beyond Syllabus

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

Modules	Gap Topic	Area	Actions Planned	Schedule Planned	Resources Person	PO Mapping

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.

Modules	Title	Teach. Hours	CIA-1	CIA-2	CIA-3	Asg	Extra Asg	SEE	CO	Levels
1	Introduction	10	2	-	-	1	1	2	CO1, CO2	L2
2	Analysis a System	10	-	2	-	1	1	2	CO3, CO4	L2
3	Design Pattern Catalog	10	2	-	-	1	1	2	CO5,CO6	L3
4	Interactive systems and the MVC architecture	10	-	2	-	1	1	2	CO7,CO8	L2
5	Designing with Distributed objects	10	-	-	4	1	1	2	CO9,CO10	L2
-	**Total**	**50**	**4**	**4**	**4**	**5**	**5**	**10**	-	-

2. Continuous Internal Assessment (CIA)

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

Modules	Evaluation	Weightage in Marks	CO	Levels
1, 2	CIA Exam – 1	15	CO1, CO2, CO5,CO6	L2,L3

3, 4	CIA Exam – 2	15	CO3, C04,CO7,CO8	L2,L2
5	CIA Exam – 3	15	CO9,CO10	L2
1, 2	Assignment - 1	05	CO1, CO2, CO5,CO6	L2,L3
3, 4	Assignment - 2	05	CO3, C04,CO7,CO8	L2,L2
5	Assignment - 3	05	CO9,CO10	L2
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	**20**	**-**	**-**

D1. TEACHING PLAN - 1

Module - 1

Title:	Introduction		Appr Time:	10 Hrs
a	***Course Outcomes***		**CO**	**Blooms**
-	At the end of the topic the student should be able to . . .		-	**Level**
1	Understand the catalog of Design pattern for designing Object Oriented Software		CO1	L2
2	Describe the object oriented software development from objects and object relationships		CO2	L2
b	***Course Schedule***		-	-
Class No	**Portion covered per hour**		**-**	**-**
1	What is a design pattern		CO1	L2
2	Describing design patterns		CO1	L2
3	Catalog of design pattern		CO1	L2
4	Organizing the catalog		CO1	L2
5	How design patterns solve design problems		CO1	L2
6	How to select a design pattern		CO1	L2
7	How to use a design pattern		CO1	L2
8	What is object-oriented development		CO2	L2
9	Key concepts of object oriented design		CO2	L2
10	Other related concepts, Benefits and drawbacks of the paradigm		CO2	L2
c	**Application Areas**		**-**	**-**
-	Students should be able employ / apply the Module learnings to . . .		-	-
1	Design Patterns provides industry standard approach to solve a recurring problem, so it saves time if we sensibly use the design pattern.		CO1	L2

2	Object oriented design used for Client-Server Systems,Object-Oriented Databases,Object Oriented Databases,Real-Time System Design,Simulation And Modelling System,Hypertext And Hypermedia,Neural Networking And Parallel Programming,Office Automation Systems.	CO2	L2
d	**Review Questions**	-	-
-	The attainment of the module learning assessed through following questions	-	-
1	What is a design pattern. Explain four essential elements for a pattern.	CO1	L2
2	Explain the design patterns in Smalltalk MVC	CO1	L2
3	Describe how patterns are designed	CO1	L2
4	How design problems can be solved. Briefly explain.	CO1	L2
5	What are the steps to select a design pattern.	CO1	L2
6	How to use a design pattern.	CO1	L2
7	What is an object oriented development.	CO2	L2
8	What are the benefits of learning object oriented design	CO2	L2
9	List the key concepts of object oriented design. Explain.	CO2	L2
e	**Experiences**	-	-
1			
2			

Module – 3

Title:	Design pattern catalog	Appr Time:	13 Hrs
a	*Course Outcomes*	**CO**	**Blooms**
-	At the end of the topic the student should be able to . . .	-	**Level**
1	Apply and understand the structural class of the system	CO5	L3
2	Understand the object patterns to create new functionality of the system	CO6	L3
b	*Course Schedule*	-	-
Class No	**Portion covered per hour**	**-**	**-**
11	Introduction to Structural design patterns	CO5	L3
12	Structural patterns	CO5	L3
13	Adapter	CO5	L3
14	bridge	CO5	L3
15	composite	CO6	L3
16	decorator	CO6	L3
17	facade	CO6	L3
18	flyweight	CO6	L3
19	proxy	CO6	L3
20	Revision on code of all patterns	CO6	L3
c	**Application Areas**	**CO**	**Level**
-	Students should be able employ / apply the Module learnings to . . .	-	-
1	structural design patterns Applied to Adapter pipeline, multiple adapters for debugging purposes.	CO8	L2
2	Used in MVC architectures	CO9	L2
d	**Review Questions**	-	-
-	The attainment of the module learning assessed through following questions	-	-
1	Explain the structural patterns.	CO5	L3
2	Explain about the wrapper.	CO5	L3
3	Explain about the bridge.	CO5	L3
4	Explain the class diagram for proxy.	CO5	L3
5	Write the implementation steps for composite.	CO5	L3

6	Explain the structure for decorator.	CO6	L3
7	Write the implementation steps for proxy.	CO6	L3
8	What are the benefits for the façade pattern.	CO6	L3
9	What is the applicability from the flyweight.	CO6	L3

E1. CIA EXAM – 1

a. Model Question Paper - 1

Course Code:	15IS72	Sem:	7th	Marks:	30	Time:	75 minutes			
Course:	Software architecture and design patterns									
-	-	**Note: Answer any 3 questions, each carry equal marks.**					**Marks**	**CO**	**Level**	
1	a	How design patterns solve design problems? Explain.					6	CO1	L2	
	b	What are the key concepts of object oriented design?					5	CO2	L2	
	c	What the advantages and disadvantages of object oriented?					4	CO2	L2	
		OR								
2	a	How do we describe design patterns?					6	CO1	L2	
	b	What are the causes of redesign along with the design patterns?					7	CO1	L2	
	c	What is cohesion and coupling?					2	CO2	L2	
3	a	Explain the adapter design patterns?					10	CO5	L3	
	b	Explain the structure and participants of proxy design pattern?					5	CO5	L3	
		OR								
4	a	List and explain the implementation for composite design pattern?					7	CO5	L3	
	b	What is a flyweight design pattern? Explain briefly.					8	CO5	L3	

b. Assignment -1

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

Model Assignment Questions									
Crs Code:	15IS72	Sem:	7th	Marks:	10	Time:	90 – 120 minutes		
Course:	Software architecture and design patterns								
Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.									
SNo	**USN**	**Assignment Description**					**Marks**	**CO**	**Level**
1		Describe how patterns are designed.					5	CO1	L2
2		What is a design pattern. Explain four essential elements for a pattern.					5	CO1	L2
3		What is an object oriented development.					5	CO2	L2
4		How design problems can be solved. Briefly explain.					5	CO1	L2
5		Explain the design patterns in Smalltalk MVC.					5	CO1	L2
6		List the key concepts of object oriented design. Explain.					5	CO2	L2
7		What are the benefits of learning design patterns.					5	CO2	L2
8		How does object oriented model support the notion of ADT's and encapsulation.					5	CO2	L2
9		Consider an application that you are familiar with, such as a university system. Divide the entities of this application into groups, thus identifying the classes.					5	CO2	L2
10		Write the implementation steps for proxy.					5	CO5	L3
11		Write the implementation steps for adapter					5	CO5	L3
12		Write the implementation steps for bridge.					5	CO5	L3
13		Write the implementation steps for composite.					5	CO5	L3

14		Write the implementation steps for facade.	5	CO5	L3
15		Explain about the bridge.	5	CO6	L3
16		Explain about the proxy.	5	CO6	L3
8		Explain about the facade.	5	CO6	L3
9		Explain about the flyweight.	5	CO6	L3
10		Explain about the decorator.	5	CO6	L3

D2. TEACHING PLAN - 2

Module – 2

Title:	Analysis a system		Appr Time:	12 Hrs
a	*Course Outcomes*	**CO**	**Blooms**	
-	At the end of the topic the student should be able to . . .	-	**Level**	
1	Analyze requirements specification to build conceptual model	CO3	L2	
2	Analyze object oriented design and implementation using sequence diagram	CO4	L2	
b	*Course Schedule*			
Class No	**Portion covered per hour**	**-**	**-**	
21	Introduction to steps in object oriented design	CO3	L2	
22	Overview of the analysis phase	CO3	L2	
23	Gathering the requirements functional requirements specification	CO4	L2	
24	Analysis of Library Software example	CO4	L2	
25	Defining conceptual classes and relationships	CO4	L2	
26	conceptual classes and relationships continued			
27	Use case diagrams for Business process			
28	Using the knowledge of the domain			
29	Design and implementation			
30	Revision on the processes			
c	**Application Areas**	**-**	**-**	
-	Students should be able employ / apply the Module learnings to . . .	-	-	
1	Can be used in Library and Bank systems	CO3	L2	
2	A network interface controller (NIC) is computer hardware that provides a computer with the ability to access the transmission media, and has the ability to process low-level network information. For example, the NIC may have a connector for accepting a cable, or an aerial for wireless transmission and reception, and the associated circuitry.	CO4	L2	
d	**Review Questions**	**-**	**-**	
-	The attainment of the module learning assessed through following questions	-	-	
1	What is an analysis phase. Explain briefly.	CO3	L2	
2	How requirements are gathered in the new system. Explain with an example.	CO3	L2	
3	How do business rules relate to use cases.	CO3	L2	
4	With the help of diagram, explain the use case diagram for the library system.	CO3	L2	
5	What are the steps involved in the analysis phase. Explain them.	CO4	L2	
6	List out the rules for the library system.	CO4	L2	
7	What are the guidelines to remember when writing use cases.	CO4	L2	
8	How to find the right classes.	CO4	L2	
9	What are the steps involved in the design process. Explain them briefly with an example.	CO4	L2	
10	What is cohesion and coupling.	CO4	L2	

Module – 4

Title:	Interactive systems and the MVC architecture	Appr Time:	10 Hrs
a	*Course Outcomes*	**CO**	**Blooms**
-	At the end of the topic the student should be able to . . .	-	**Level**
1	Comprehend the Software Architectural pattern for analyzing interactive system	CO7	L2
2	Understand the Architecture of model view controller	CO8	L2
b	*Course Schedule*		
Class No	**Portion covered per hour**	**-**	**-**
31	Introduction	CO7	L2
32	The MVC architectural pattern	CO7	L2
33	Analyzing a simple drawing program	CO7	L2
34	Designing the system	CO7	L2
35	Designing of the subsystems	CO8	L2
36	Getting into implementation	CO8	L2
37	Implementing undo operation	CO8	L2
38	Drawing incomplete items	CO8	L2
39	Adding a new feature	CO8	L2
40	Pattern based solutions	CO8	L2
e	**Experiences**		
1			
2			
3			
c	**Application Areas**	**CO**	**Level**
1	Used in client and server side programs	CO7	L2
2	Used majorly by Node developers and by C#, Ruby, PHP framework.	CO8	L2
d	**Review Questions**	-	-
1	Explain the MVC architecture.	CO7	L2
2	What are the benefits of the MVC pattern.	CO7	L2
3	What is the process for controller.	CO7	L2
4	What are the responsibilities between the view and the controller.	CO7	L2
5	Explain the steps to design a sub system.	CO7	L2
6	Write the steps to design the controller subsystem.	CO8	L2
7	What is the undo operation.	CO8	L2
8	Explain the pattern based solutions.	CO8	L2
9	List and explain the examples of architectural pattern.	CO8	L2
10	What are the methods for the undo operations.	CO8	L2

E2. CIA EXAM – 2

a. Model Question Paper - 2

Course Code:	15IS72	Sem:	7th	Marks:	30	Time:	75 minutes			
Course:	Software architecture and design patterns									
-	**-**	**Note: Answer any 2 questions, each carry equal marks.**						**Marks**	**CO**	**Level**
1	a	Explain the business process of the library system?						6	CO3	L4
	b	Explain the knowledge of the domain for the application system?						3	CO3	L4
	c	Explain use case diagram for register new member, book checkout and place a hold?						6	CO3	L4

			OR			
2	a	What are the steps involved in determination of the conceptual classes and the establishment of their relationships?	4	CO3	L4
	b	Explain the steps which are created during the design process?	7	CO4	L4
	c	What are the questions arised during the design process?	4	CO4	L4
3	a	With a neat diagram, explain the MVC architecture pattern?	7	CO6	L2
	b	Explain all the use-case diagrams for simple drawing program?	8	CO6	L2
		OR			
4	a	What are the issues and solutions for implementing Undo operation?	8	CO6	L2
	b	Explain about the pattern based solutions with an example?	7	CO6	L2

b. Assignment – 2

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

Model Assignment Questions								
Crs Code:	15IS72	Sem:	7th	Marks:	5	Time:	90 – 120 minutes	
Course:	Software architecture and design patterns							

Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.

SNo	USN	Assignment Description	Marks	CO	Level
1		How requirements are gathered in the new system. Explain with an example.	5	CO3	L4
2		Write use case for adding new books	5	CO4	L4
3		Write use case for book checkouts	5	CO4	L4
4		Write use case for book checkout revised	5	CO4	L4
5		Write use case for return books	5	CO4	L4
6		Write use case for removing books	5	CO4	L4
7		What are the guidelines to remember when writing use cases.	5	CO4	L4
8		What is the process for controller.	5	CO6	L2
9		List and explain the examples of architectural pattern.	5	CO6	L2
10		Write the steps to design the controller subsystem.	5	CO6	L2
11		Explain the MVC architecture.	5	CO6	L2
12		Explain the steps to design a sub system.	5	CO6	L2
13		Explain the pattern based solutions.	5	CO6	L2

D3. TEACHING PLAN - 3

Module – 5

Title:	Designing with distributed objects		Appr Time:	10 Hrs
a	**Course Outcomes**		**CO**	**Blooms**
-	At the end of the topic the student should be able to . . .		-	**Level**
1	Evaluate distributed system of data processing through client server system and JAVA Remote Method invocation		CO9	L2
2	Understand the services offered by world-wide web to access the data at remote site		CO10	L2
b	**Course Schedule**		**-**	**-**
Class No	**Portion covered per hour**		**-**	**-**
41	Introduction to Designing with distributed objects		CO9	L2

42	Client server system	CO9	L2
43	Client server system extention	CO9	L2
44	Java remote method invocation	CO9	L2
45	Implementing an object oriented system on the web	CO9	L2
46	Note on input	CO10	L2
47	Note on output	CO10	L2
48	Note on selection statements	CO10	L2
49	Note on loops arrays	CO10	L2
50	Revision of the above topics	CO10	L2
c	**Application Areas**	**CO**	**Level**
1	Used in JAVA , Web and RMI applications	CO9	L2
2	Used in Cloud, web application	CO10	L2
d	**Review Questions**	-	-
-	The attainment of the module learning assessed through following questions	-	-
1	With the help of a diagram, explain the client/ server systems.	CO9	L2
2	Compare the GET and POST methods.	CO9	L2
3	How to implement an object oriented system on the web.	CO9	L2
4	Write the sequence diagram for removing books.	CO9	L2
5	Write a note on loops.	CO10	L2
6	Write a short note on arrays.	CO10	L2
7	Explain about the selection statements.	CO10	L2
8	Explain the Java RMI.	CO10	L2
9	What are the steps to design a system on the web.	CO10	L2
e	**Experiences**	-	-
1			
2			

E3. CIA EXAM – 3

a. Model Question Paper - 3

Course Code:	15IS72	Sem:		7th	Marks:		30	Time:		75 minutes		
Course:	Software architecture and design patterns											
-	-	**Note: Answer any 2 questions, each carry equal marks.**								**Marks**	**CO**	**Level**
1	a	Explain about the undoing an operation by the status of the stacks and the collection in the model?								7	CO9	L2
	b	How to draw an incomplete items?								4	CO10	L2
	c	Explain about how to add new feature?								4	CO10	L2
		OR										
2	a	Explain about the sequence diagram for adding a line?								7	CO9	L2
	b	Explain the tree structure which is formed by compound items?								8	CO10	L2
3	a	Explain the basic architecture of client server system?								6	CO9	L2
	b	How to deploy the library system on the World Wide Web?								9	CO10	L2
		OR										
4	a	Explain about the simplified sequence diagram for removing a book?								6	CO9	L2
	b	Explain about Java Remote Method invocation or Java RMI?								9	CO10	L2

b. Assignment – 3

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

Model Assignment Questions									
Course Code:	15IS72	Sem:		7th	Marks:		5	Time:	90 – 120 minutes
Course:	Software architecture and design patterns								

Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.

SNo	USN	Assignment Description	Marks	CO	Level
1		What are the advantages of JSP compared to Java servlets	5	CO9	L2
2		With the help of a diagram, explain the client/ server systems.	5	CO9	L2
3		Compare the GET and POST methods.	5	CO9	L2
4		How servlets and HTML cooperate to serve web pages.	5	CO9	L2
5		Explain about the java remote method invocation.	5	CO10	L2
6		What are the steps to design a system on the web.	5	CO10	L2
7		How to implement an object oriented system on the web.	5	CO10	L2
8		Write a short note on arrays.	5	CO10	L2
9		Write a note on loops.	5	CO10	L2

F. EXAM PREPARATION

1. University Model Question Paper

Course:		Software architecture and design patterns				Month / Year	Jan /2019		
Crs Code:		15IS72	Sem:	7th	Marks:	80	Time:	180 minutes	
-	Note	Answer all FIVE full questions. All questions carry equal marks.					Marks	CO	Level
1	a	Explain the design patterns in Smalltalk MVC						CO1	L2
	b	List the key concepts of object oriented design. Explain.						CO2	L2
		OR							
-	a	Describe how patterns are designed						CO1	L2
	b	What are the benefits of learning object oriented design						CO2	L2
2	a	With the help of a neat diagram, explain the use case diagram for the library system.						CO3	L2
	b	How to find the right classes.						CO4	L2
		OR							
	a	What are the steps involved in the design process. Explain them						CO4	L2
3	a	Explain the structure for decorator.						CO5	L3
		OR							
	b	What is the applicability from the flyweight.						CO6	L3
4	a	Explain the MVC architecture						CO7	L2
		OR							
	a	What are the responsibilities between the view and the controller						CO8	L2
	b	Explain pattern based solutions						CO8	L2
5	a	Write the structure of servlets in the web based library systems						CO9	L2
	b	With the help of a diagram, explain the client/ server systems.						CO10	L2
		OR							
	a	Explain the HTML file fragments.						CO10	L2

2. SEE Important Questions

Course:	Software architecture and design patterns					Month / Year	May /2018	
Crs Code:	15IS72	Sem:	7th	Marks:	100	Time:		180 minutes
	Note	Answer all FIVE full questions. All questions carry equal marks.					-	-
Mod ule	Qno.	Important Question				Marks	CO	Year
1	a	What is a design pattern. Explain four essential elements for a pattern.				4	CO1	2016
	b	How to use a design pattern.				6	CO1	
	c	How does object oriented model support the notion of ADT's and encapsulation.				6	CO2	
	d	What are the benefits of learning design patterns.					CO2	
2	a	What are the steps involved in the analysis phase. Explain them.					CO3	
	b	What are the steps involved in the design process. Explain them briefly with an example.				8	CO3	2018
	c	With the help of diagram, explain the use case diagram for the library system.				8	CO4	
3	a	Explain about the wrapper.					CO5	
	b	Explain about the decorator.					CO6	
	c	Explain about the facade.				8	CO5	
	d	Explain flyweight				8	CO6	
4	a	Explain the MVC architecture.					CO7	
	b	Write the steps to design the controller subsystem.					CO8	
5	a	With the help of a diagram, explain the client/ server systems.				6	CO9	2016
	b	What are the steps to design a system on the web.				6	CO10	
	c	Explain the Java RMI.				4	CO10	
	d	Write a note on loops, selection statements and loops arrays						

G. Content to Course Outcomes

1. TLPA Parameters

Table 1: TLPA – Example Course

Modul e-#		Course Content or Syllabus (Split module content into 2 parts which have similar concepts)	Content Teaching Hours	Blooms' Learning Levels for Content	Final Blooms' 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**: what is a design pattern? describing design patterns, the catalog of design pattern, organizing the catalog, how design patterns solve design problems, how to select a design pattern, how to use a design pattern.	06	L2	L2	1.Understand 2. Design pattern catalog	Chalk & Board	Questionnaire and Assignment

1		What is object-oriented development? , key concepts of object oriented design other related concepts, benefits and drawbacks of the paradigm.	04	L2	L2	1. Describe 2. Object oriented Software Development	Chalk & Board	CIA
2		**Analysis a System**: overview of the analysis phase, stage 1: gathering the requirements functional requirements specification reading.	06	L2	L2	1. Analyze 2. Requirements specification	Chalk & Board	CIA
2		Defining conceptual classes and relationships, using the knowledge of the domain. Design and Implementation, discussions and further	04	L2	L2	1.Analyze 2. Object oriented design	Chalk & Board	CIA and Assignment
3		**Design Pattern Catalog**: Structural patterns, Adapter, bridge, composite	06	L3	L3	1. Understand 2.Structural class	Chalk & Board	CIA and Assignment
3		Decorator, facade, flyweight, proxy..	04	L3	L3	1.Understand 2. object patterns	Chalk & Board	CIA & Assignment
4		**Interactive systems and the MVC architecture**: Introduction, The MVC architectural pattern, analyzing a simple drawing program, designing the system, designing of the subsystems	05	L2 Understand	L2	1. Comprehend Software architectural pattern	Chalk & Board	CIA and Assignment
4		Getting into implementation, implementing undo operation, drawing incomplete items, adding a new feature, pattern based solutions.	05	L2	L2	1. Understand 2. model view controller	Chalk & Board	CIA and Assignment
5		**Designing with Distributed Objects:** Client server system, java remote method invocation	05	L2	L2	1.Evaluate 2.Distributed objects	Chalk & Board	CIA and Assignment
5		Implementing an object oriented system on the web (discussions and further reading) a note on input and output, selection statements, loops arrays.	05	L2	L2	1. Understand 2.Data processing	Chalk & Board	CIA and Assignment

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 / | CO Components (1.Action Verb, 2.Knowledge, 3.Condition / Methodology, | Course Outcome

Student Should be able to ... |
|---|---|---|---|---|---|---|

BE-7-IS-SKIT-Ph5b1-F02-V2.2

				Syllabus. A short word for learning or outcome)	4.Benchmark)	
A	I	J	K	L	M	N
1	Know all the different types of design pattern catalog	Design pattern catalog	Design pattern catalog	Study of Design pattern catalog	1.Understand 2. Design pattern catalog	Understand the catalog of Design pattern for designing Object Oriented Software
1	Explain and understand the Object oriented Software Development	Object oriented Software Development	Object oriented Software Development	Understanding of Object oriented Software	1. Describe 2. Object oriented Software Development	Describe the object oriented software development from objects and object relationships
2	Apply the knowledge of Requirements specification to design the system	Requirements specification	Requirements specification	Analysis of Requirements of system	1. Analyze 2. Requirements specification	Analyze requirements specification to build conceptual model
2	Implementation and analysis of Object oriented design	Object oriented design and implementation	Object oriented design and implementation	Implementation of Object oriented design	1.Analyze 2. Object oriented design	Analyze object oriented design and implementation using sequence diagram
3	Understand the Study of Structural class	Structural class	Structural class	Study of Structural class	1. Understand 2.Structural class	Understand the implementation of Ethernet using IEEE802 standards Apply and understand the structural class of the system
3	Analyze the Characteristics of object patterns	object patterns	object patterns	Characteristics object patterns	1.Understand 2. object patterns	Understand the object patterns to create new functionality of the system
4	Understand the Software architectural pattern	Software architectural pattern	Software architectural pattern	Study of Software architectural pattern	1. Comprehend Software architectural pattern	Comprehend the Software Architectural pattern for analyzing interactive system
4	Study of Components of model view controller architecture	model view controller	model view controller	Components of model view controller architecture	1. Understand 2. model view controller	Understand the Architecture of model view controller
5	Evaluation of Distributed objects	Distributed objects	Distributed objects	Evaluate the Distributed objects in system	1.Evaluate 2.Distributed objects	Evaluate distributed system of data processing through client server system and JAVA Remote Method invocation
5	Understand the Services	Data processing	Data processing	Services of Data processing units	1. Understand 2.Data processing	Understand the services offered by

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of Data processing units	g				world-wide web to access the data at remote site