

VII Semester

SOFTWARE ARCHITECTURE AND DESIGN PATTERNS			
Course Code	21CS741	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Course Learning Objectives			
CLO 1. Learn How to add functionality to designs while minimizing complexity. CLO 2. What code qualities are required to maintain to keep code flexible? CLO 3. To Understand the common design patterns. CLO 4. To explore the appropriate patterns for design problems			
Teaching-Learning Process (General Instructions)			
These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.			
<div><div>1.</div><div>Lecturer method (L) need not to be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes.</div></div> <div><div>2.</div><div>Use of Video/Animation to explain functioning of various concepts.</div></div> <div><div>3.</div><div>Encourage collaborative (Group Learning) Learning in the class.</div></div> <div><div>4.</div><div>Ask at least three HOT (Higher order Thinking) questions in the class, which promotes critical thinking.</div></div> <div><div>5.</div><div>Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analyze information rather than simply recall it.</div></div> <div><div>6.</div><div>Introduce Topics in manifold representations.</div></div> <div><div>7.</div><div>Show the different ways to solve the same problem with different circuits/logic and encourage the students to come up with their own creative ways to solve them.</div></div> <div><div>8.</div><div>Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.</div></div>			
Module-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. A Notation for Describing Object-Oriented Systems			
Textbook 1: Chapter 1 and 2.7			
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.			
Textbook 1: Chapter 6			
Teaching-Learning Process	Chalk and board, Active Learning, Problem based learning		
Module-2			
Design Pattern Catalog: Structural patterns, Adapter, bridge, composite, decorator, facade, flyweight, proxy.			
Textbook 2: chapter 4			
Teaching-Learning Process	Chalk and board, Active Learning, Demonstration		
Module-3			
BehavioralPatterns: Chain of Responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer. State. Template Method			

Textbook 2: chapter 5	
Teaching-Learning Process	Chalk and board, Problem based learning, Demonstration
Module-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.	
Textbook 1: Chapter 11	
Teaching-Learning Process	Chalk & board, Problem based learning
Module-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.	
Textbook 1: Chapter 12	
Teaching-Learning Process	Chalk and board
Course Outcomes At the end of the course the student will be able to: <ul style="list-style-type: none"> CO 1. Design and implement codes with higher performance and lower complexity CO 2. Be aware of code qualities needed to keep code flexible CO 3. Experience core design principles and be able to assess the quality of a design with respect to these principles. CO 4. Capable of applying these principles in the design of object oriented systems. CO 5. Demonstrate an understanding of a range of design patterns. Be capable of comprehending a design presented using this vocabulary. CO 6. Be able to select and apply suitable patterns in specific contexts 	
Assessment Details (both CIE and SEE) The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination (SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together Continuous Internal Evaluation: Three Unit Tests each of 20 Marks (duration 01 hour) <ol style="list-style-type: none"> 1. First test at the end of 5th week of the semester 2. Second test at the end of the 10th week of the semester 3. Third test at the end of the 15th week of the semester Two assignments each of 10 Marks <ol style="list-style-type: none"> 4. First assignment at the end of 4th week of the semester 5. Second assignment at the end of 9th week of the semester 6. At the end of the 13th week of the semester- Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for 20 Marks (duration 01 hours) The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be scaled down to 50 marks (to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course). CIE methods /question paper has to be designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.	

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours**)

1. The question paper will have ten questions. Each question is set for 20 marks. Marks scored shall be proportionally reduced to 50 marks
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module

Suggested Learning Resources:**Textbooks**

1. Brahma Dathan, Sarnath Rammath, Object-oriented analysis, design and implementation, Universities Press, 2013
2. Erich Gamma, Richard Helan, Ralph Johman, John Vlissides, Design Patterns, Pearson Publication, 2013.

Reference:

1. Frank Bachmann, Regine Meunier, Hans Rohnert "Pattern Oriented Software Architecture" –Volume 1, 1996.
2. William J Brown et al., "Anti-Patterns: Refactoring Software, Architectures and Projects in Crisis", John Wiley, 1998.

Weblinks and Video Lectures (e-Resources):**Activity Based Learning (Suggested Activities in Class)/ Practical Based learning**