Graphic Era
HILL UNIVERSITY
Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)
University under section 2(f) of UGC Act, 1956

End Term (Even) Semester Examination June 2025

Roll no............................

Name of the Course and semester: M.TECH – CSE – II SEMESTER
Name of the Paper: SOFTWARE DESIGN AND ARCHITECTURE
Paper Code   MCS 252

Time: 3 hour   Maximum Marks: 100

Note:
- (i) All the questions are compulsory.
- (ii) Answer any two sub questions from a, b and c in each main question.
- (iii) Total marks for each question is 20 (twenty).
- (iv) Each sub-question carries 10 marks.

Q.1	(10X2=20 Marks)	
a.	Examine the role that UML diagrams have in object-oriented design. Explain the function and application of use case, sequence, and class diagrams in the software development lifecycle.	CO 1
b.	Discuss the primary design objectives in software architecture and design. How do these objectives influence the architectural decisions in large-scale software systems?	
c.	Explain the purpose and significance of sequence and collaboration diagrams in software architecture and design. How do they differ, and when should each be used? Give example and diagram for each.	
Q.2	(10X2=20 Marks)	
a.	Discuss the role of iterative refinement in improving system behavior and performance. How does repeated analysis, design, and testing contribute to system reliability and maintainability?	CO 2
b.	Critically analyze the role of UX design in software development. How does a user-centered design approach improve the usability, accessibility, and overall success of a software system? Support your answer with real-world examples.	
c.	What are the key characteristics that differentiate mobile software from traditional desktop or web applications? Discuss with suitable examples. Discuss the importance of responsive and adaptive design in mobile applications.	
Q.3	(10X2=20 Marks)	
a.	What are design patterns in software architecture? Explain their significance and how they help solve recurring design problems.	CO 3
b.	Who are the Gang of Four, and what is the significance of their work in the context of software design patterns? Discuss their contribution to object-oriented design.	
c.	What are the recent trends in software design, and how do they differ from traditional design methodologies? How is artificial intelligence (AI) influencing	

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	software design?	
Q.4	(10X2=20 Marks)	
a.	Explain the benefits of using pattern-based design in large-scale software development. How does it promote maintainability, reusability, and scalability?	CO 4
b.	Write short note on the following 　　1. Structural Design Patterns 　　2. Behavioral Design Patterns	
c.	Discuss how design patterns are applied during object-oriented analysis and design (OOAD) to refine class structures and interactions.	
Q.5	(10X2=20 Marks)	
a.	What is software architecture, and how does it differ from software design? Discuss the responsibilities of a software architect. What skills are essential for effective architectural decision-making?	CO 5
b.	Explain the following in detail 　　1. Service Oriented Architecture 　　2. MVC Architecture 　　3. RESTFul services and API.	
c.	Discuss the principles of normalization. How does normalization help in achieving data integrity and efficiency in a database system?	