SOFTWARE ARCHITECTURE AND DESIGN PATTERNS

UNIT I

Envisioning Architecture The Architecture Business Cycle, What is Software Architecture, Architectural patterns, reference models, reference architectures, architectural structures and views.

Creating an Architecture : Quality Attributes, Achieving qualities, Architectural styles and patterns, designing the Architecture, Documenting software architectures, Reconstructing Software Architecture.

UNIT II

Analyzing Architectures : Architecture Evaluation, Architecture design decision making, ATAM, CBAM.

UNIT III

Moving from one system to many : Software Product Lines, Building systems from off the shelfcomponents, Software architecture in future.

UNIT IV

Patterns : Pattern Description, Organizing catalogs, role in solving design problems, Selectionand usage.

Creational and Structural patterns : Abstract factory, builder, factory method, prototype, singleton, adapter, bridge, composite, façade, flyweight, Proxy.

UNIT V

Behavioral patterns : Chain of responsibility, command, Interpreter, iterator, mediator,memento, observer, state, strategy, template method, visitor.

Case Studies : A-7E – A case study in utilizing architectural structures, The World Wide Web - a case study in interoperability, Air Traffic Control – a case study in designing for high availability,Celsius Tech – a case study in product line development

TEXT BOOKS:

1. Software Architecture in Practice, second edition, Len Bass,Paul Clements&Rick Kazman, Pearson Education,2003.
2. Design Patterns, Erich Gamma, Pearson Education,1995.

REFERENCE BOOKS:

1. Beyond Software architecture, Luke Hohmann, Addison wesley, 2003.
2. Software architecture, David M. Dikel, David Kane and James R. Wilson, Prentice Hall,PTR,2001
3. Pattern Oriented Software Architecture,F.Buschmann&others,John Wiley&Sons.
4. Head First Design patterns, Eric Freeman & Elisabeth Freeman, O'REILLY, 2007.
5. Design Patterns in Java, Steven John Metsker & William C. Wake, Pearson education, 2006
6. J2EE Patterns, Deepak Alur, John Crupi & Dan Malks, Pearson education, 2003.
7. Design Patterns in C#, Steven John metsker, Pearson education, 2004.

ANDHRA UNIVERSITY
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MODEL PAPER

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Answer any FIVE questions. All Answers Carry Equal Marks

1.a) What is an architectural pattern ? Explain the importance of it.
b) Differentiate between architectural pattern and reference architecture.
[10+10]

2.a) What is software architecture? Briefly discuss about different architectural styles with neat sketches.
b) Describe about Architectural Evaluation.
[10+10]

3.a) What is meant by CBAM? Discuss its significance and context for the CBAM.
b) Explain the process flow diagram for the CBAM. And explain first four steps in it.[10+10]

4.a) Define software product line and its importance
b) What is meant by off the shelf components? Explain how the systems can built with them.
[10+10]

5.a) Explain the implementation of the Factory method and adapter pattern.
b) Discuss the implementation consequences, applicability and source code forprototype and

6. What are the various Behavioral patterns? Write the structure, implementation and sample code for any three of them. [20]

7. Discuss the following case studies with respect to software architectures:
a) A-7E
b) Air Traffic control
[10+10]

8. Write short notes on the following.
a) Chain of responsibility
b) Command
c) Observer.
[7+7+6]