

Objectives:

1. Define what is a design pattern.
2. Understand how design patterns solve design problems.
3. Study different design patterns.
4. Learn what is expected by the design pattern.

Learning outcomes:

1. Define what is a design pattern.
2. Understand how design patterns solve design problems.
3. Learn creational design patterns.
4. Learn structural design patterns.
5. Learn behavioral design patterns
6. Learn what is expected by the design pattern

Unit I

The Object-Oriented Paradigm: Overview, Before the Object-Oriented Paradigm: Functional Decomposition, The Problem of Requirements, Dealing with Changes: Using Functional decomposition, Dealing with Changing Requirements, The Object-Oriented Paradigm, Object-Oriented Programming in Action, Special Object Methods.

The UML - The Unified Modeling Language: Overview, What is the UML, Why use the UML, The Class Diagram and Interaction Diagrams.

Unit II

A Problem That Cries Out for Flexible Code: Overview, Extracting Information from a CAD/CAM System, Understand the Vocabulary, Describe the Problem, The Essential Challenges and Approaches.

A Standard Object-Oriented Solution: Overview, Solving with Special Cases.

Unit III

An Introduction to Design Patterns: Overview, Design Patterns Arose from Architecture and Anthropology, Moving from Architectural to Software Design Patterns, Why Study Design Patterns, Other Advantages of Studying Design Patterns, The Catalog of Design Patterns.

A Case Study: Designing a Document Editor. Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Windows Systems, User Operations, Spelling Checking and Hyphenation.

Unit IV

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype and Singleton.

Unit V

Structural Patterns-1: Adapter, Bridge and Composite.

Unit VI

Structural Patterns-2: Decorator, Façade, Flyweight and Proxy.

Unit VII

Behavioral Patterns-1: Chain of Responsibility, Command, Interpreter, Iterator.

Unit VIII

Behavioral Patterns-2: Mediator, Memento, Observer, State and Strategy.

Learning Resources

Text Books:

1. Design Patterns Explained: A New perspective on Object-Oriented Design, Alan Shalloway, James R.Trott, 2/e, Pearson.
2. Design Patterns: Elements of Reusable Object-Oriented Software, Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides, 5/e, Pearson.

Reference Books:

1. Head First Design Patterns, By Eric Freeman, Elisabeth Robson, Bert Bates and Kathy Sierra, O'Reilly Media.
2. Java Enterprise Design Patterns, Mark Grand, Volume3, Wilm Dram Tech.
3. Programming in the Language with Design Patterns, By Eddie.E Burris.
4. Pattern Matching, Design Patterns Applied, John Vlissides, Software Pattern Series.
5. Analysis Patterns, Reusable Object Models, Martin Fowler, Addison-Wesley