

Design Patterns and Emerging Architecture

Course Background:

The proposed training program focuses on the application of design patterns from the Gang of Four, to satisfy nonfunctional requirements and to obtain a software architecture that can withstand software evolution in an emergent manner. The basic idea that permeates the course is that non-functional improvements are made by transforming and refactoring a software application using patterns. An important aspect is the shaping of component interfaces in a way that makes integration easier by guaranteeing backwards compatibility with existing client code. The program offers a healthy mix of theory and exercises. In the exercises the participants must select a pattern to improve an existing design on a particular non-functional aspect. Typical such aspects are scalability, reuse, extensibility and portability. The last half day of the course addresses various architectural patterns from Buschmann et al. and shows how these architectures can be realized using the GoF design patterns by making stepwise transformations.

Course Benefits:

After successful completion of the course, participants will:

- Have understanding of the architectural relevance of patterns.
- Have insight in the way patterns can be applied to take into account various kinds of non-functional requirements.
- Have knowledge on the GoF patterns.
- Have obtained some skills in recognizing situations where patterns can be applied.
- Knowledge of decision criteria in applying design patterns.
- Understand some of the pitfalls that pattern application may pose.
- Understand OO principles behind patterns: meta patterns and using object orientation to localize variability.
- Understand how to use scrum principles in combination with patterns as an architect, to develop software using emergent architecting and to support productivity, quality, continuous improvement, continuous integration and continuous deployment.
- Understand how to prevent and reduce technical debt in agile projects..

Who will benefit from this course?

- Software Developers
- Software Engineers
- Software Architects

Pre-requisites:

The participant should have insight in the background of object-oriented techniques, have a working knowledge of a common object oriented programming language (C++, Java, C#), have knowledge of syntax and semantics of most used UML modeling concepts.

Course Contents:

This course consists of 4 blocks of one day and covers all patterns as described in “Design Patterns” by Gamma et. al. with many exercises and case studies.

Significance of Patterns	Object Orientation
	Modularity
	Architecture
	Scrum
History of Patterns	
Patterns of the Gang of Four	Creational Patterns
	Structural Patterns
	Behavioral Patterns
Coverage Patterns	Explanation & Exercises, see coverage
Patterns of Douglass	Real-Time mechanistic design patterns
Architectural Patterns	What are architectural patterns
	Architectural patterns of the Gang of Five
	Conclusions

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Coverage:

Gang of Four Creational

Abstract Factory
Prototype
Factory Method
Singleton
Builder

Structural

Bridge
Composite
Proxy
Adapter
Decorator
Flyweight
Facade

Behavioral

Command
Observer
Strategy
Listener
Mediator
State
Template Method
Visitor
Interpreter
Iterator
Memento
Chain of Responsibility

Douglass

Control Loop
Polling State
Watchdog State

Course Format:

Teaching method: Lectures, practical exercises and guided discussions.
Teaching material: Copies of presentations, hand-outs of exercise solutions, text of cases and cd.
Recommended book: "Design patterns: elements of reusable object oriented software" Gamma, et.al.
Language: English or Dutch
Instructor: This course is delivered by a certified "Advanced UML Professional".

Additional Subjects:

This course can be easily combined with other elements from the course curriculum of Mithun Training & Consultancy. Additional exercises can be added, and your own project can be even used during the course. Please contact your account manager for more information about the possibilities we can offer.

Complementary Courses:

The course curriculum offered by Mithun:

Requirements Engineering basics	Requirements Management Foundations
	RM&E Aware for Managers
Requirements Engineering advanced	The Risk of Words – Writing and Documenting Requirements
	Interviewing Techniques & Guidelines
	Elicitation Workshop Techniques & Guidelines
Scrum	Applying Scrum
Object Oriented Analysis & Design	Object Oriented Analysis & Design using UML 2.x
	Design Patterns and Emerging Architecture
	Realizing Software Architectures with UML 2.x
	Specification of Component Interfaces
	API Design
Model Based Systems Engineering	Systems Modeling with SysML
	Introduction to SysML
Real-time & Embedded Analysis & Design	Real-time Software Design
	Advanced Real-Time Analysis & Design
OMG Programs	OMG Certified UMP Professional
	Preparation training OCRES Intermediate Certification

Terms and conditions:

The standard terms and conditions of Mithun Training & Consultancy are applicable. A copy will be sent on request.

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