

Introduction to Design Patterns and UML

- Objectives** The aim of the course is to give the participants a solid introduction to design patterns, practical experience with a selection of central patterns. Emphasis will be put on the concepts *role*, *responsibility* and *delegation* that are central, underlying, principles of patterns. Patterns will be described using UML 2.0 and central diagram types will be presented: Class diagrams, sequence diagrams, and deployment diagrams. In addition, CRC cards will be introduced for recording responsibilities.
- Prerequisites** Programming experience in a modern object-oriented programming language like Java, C# or C++. Exercises will be in C# so some proficiency in C# is an advantage. Access to computers for exercises (one machine for each 2-3 students) (C# compiler and environment + editor will be provided).
- Contents**
- Background of design patterns.
 - Central design patterns: Strategy, Observer, Mediator, Composite, Null Object, Decorator, Abstract Factory, Factory Method, State, Visitor (these are examples, exact contents to be decided)
 - Underlying principles of design patterns: Interfaces, delegation, commonality-variability analysis, roles, responsibility-driven design.
 - UML 2.0 Notation: Class diagram, interaction diagrams, package diagrams, and deployment diagrams. CRC cards. Fowler's perspectives on UML.
 - (Time permitting) Outlook: Design patterns in perspective – distributed computing, software architecture qualities, frameworks, test-driven development.
- Form** The course alternates between lectures and discussions of central concepts, hand-on exercises and reflections over these.
- Duration** 3 days.
- Literature** Design Patterns Explained 2nd ed.. Shalloway and Trott. Addison-Wesley 2005. UML Distilled 3rd ed. Martin Fowler. Addison-Wesley 2004.
- Lecturer** Henrik Bærbak Christensen, Associate Professor, Department of Computer Science. Henrik has been teaching patterns, reuse, and frameworks since 1999, mostly for part-time education students (professional developers). He has written and presented a number of research papers within the field of teaching, software architecture, and frameworks. He has been invited speaker at a number of occasions, and has made a number of mini-courses for TDC, Efteruddannelsescenteret for datamatikerlærer, and Alexandra Instituttet.