



UiO : **Department of informatics**
University of Oslo

Smart processes and agile methods in software engineering (IN5140)

Information on Master Course Autumn 2025



Antonio Martini

Teachers from the Software Engineering Group



**Antonio
Martini**



**Yngve
Lindsjörn**



**Dag
Sjøberg**



**Marthe
Berntzen**



**Gunnar
Rye
Bergersen**



**Marius
Irgens**

**Additional guest lecturers
from industry!**

Antonio Martini



- Currently:
 - Professor at UiO
 - Teaching the course from 2017
- Previously
 - Worked as a Software Developer
 - PhD in Software Engineering (Chalmers)
 - Postdoc (Chalmers)
 - Independent Consultant
 - Principal, Strategic Researcher at CA Technologies
- Hobbies
 - Board games, strategy computer games, pool, etc.
 - Football, volleyball, beach volley, medieval fencing
 - Piano, Drumset, etc.
 - Travel!
 - ...and no time for them! 😊

Yngve Lindsjørn



- **Current position: Associate Professor at University of Oslo**
 - Agile and Lean Methods,
 - Teamwork in agile teams
- **Education:**
 - MSc, University of Oslo, 1987
- **Work experience**
 - University of Oslo (IFI) since 2010
 - OsloMet since 2012
 - Comptel (now Nokia), 2008-2010
 - Own company, Kompetanseweb, 2000–2008
 - Tieto Enator, 1997-2000
 - Norsk Regnesentral 1987–1997
- Leading a large research project (TeamIT) from 2009 to 2014

Dag Sjøberg



- **Currently**
 - Professor at University of Oslo
- **Work experience**
 - Oslo University Hospital
 - Statistics Norway (SSB)
 - Simula Research Lab
 - SINTEF
- **Process improvement research projects**
 - “Software Process Improvement for better Quality” (SPIQ)
 - “PROcess improvement For the IT industry” (PROFIT)
 - “International PROcess improvement For the IT industry” (Inter-PROFIT)
 - “Software Process Improvement based on Knowledge and Experience” (SPIKE)
 - “Evidence-based Improvement of Software Engineering” (EVISOFT)
 - “AGILE”
 - “Effective work within and coordination across ICT teams” (TeamIT)
 - “Understanding Emerging Practice in Software Development” (Emerge)

Marthe Berntzen



- Currently
 - Postdoctoral researcher in Software Engineering
 - Researcher and project manager at Knowit
 - Will be leading a 4-year research project on AI in software engineering
- Work experience
 - Ph.D in Software Engineering, IFI
 - BI Norwegian Business School
 - Netlight Consulting
- Research areas
 - Large-scale agile
 - Team- and inter-team coordination
 - Product management and product organization
 - AI in software engineering teamwork and processes
- I live on a small farm with my family, 12 chicken 🐔🐣 and 200k bees 🐝🐝🐝

Group Teachers

- Jayeong Song (Jay)
 - jayeongs@ifi.uio.no



- Sandrine Eunice Taoum
 - sandrint@ifi.uio.no



Organization

Schedule

- Course is offered
 - For Master students (IN5140)
 - For PhD students (IN9140)
- Lectures
 - Live physical (with few exceptions)
 - Recorded and available on the website
- Group sessions
 - Tasks to support the lectures
 - Work on the project
 - Especially recommended for the practical activity

Assessment

- Project (mandatory activities, not graded)
 - New project, more hands-on
 - Based on real projects used in practice
 - Groups of 3-5 students. Max 40 groups
 - Four mandatory activities:
 - Develop a product improvement plan
 - Reflect on the project and create a BPMN
 - Create a software process improvement plan
 - Present your work
- Written exam (graded)
 - 4 hours physical exam
- Final grade
 - Written exam 100%
 - Project – all the **four** deliverables for the mandatory activities need to be delivered **on time** and approved

More information

- Course page
 - <https://www.uio.no/studier/emner/matnat/ifi/IN5140/h24/>
- Questions (via mail)
 - ynglin@ifi.uio.no
 - antonima@ifi.uio.no
- First lecture
 - 22 August, 14.15

Where: Kristen Nygaards hus, store auditorium

	Lectures
Monday 18. August	Introduction: Antonio (Yngve)
Monday 25. August	Standard software process models. Frameworks for process improvement: Dag
Monday 1. September	Agile teams - roles, practices, challenges, and success factors: Marthe
Monday 8. September	Lean and Agile Software Engineering: Dag
Monday 15. September	Measurements used in process improvement: Dag
Monday 22. September	Empirical research methods in Software Engineering: Gunnar
Monday 29. September	Managing Technical Debt: Antonio
Monday 6. October	Software process modelling BPMN: Yngve
Monday 13. October	Large-Scale Agile and Agile Architecture: Antonio
Monday 20. October	Global and Distributed Software Development: Marthe
Monday 27. October	Software Visualization: Marius and Antonio
Monday 3. November	DevOps and Process in Practice
Monday 10. November	Project Presentations
Monday 17. November	Summary and hints exam: Flere

Where: Ole Johan Dahls hus, seminarrom Java

	Activities
	Groups Mandatory
	Kanban game Recommended
Project – AI feature brochure	It's very important to participate in this activity and be available (not necessarily physically) during this period Deliver Mandatory
Retrospectives and BPMN on project	Deliver Mandatory
Improved BPMN and SPI suggestions on project	Deliver Mandatory
Project Presentations	Project Presentations Mandatory
Exam recap	

What to expect from the course

What you get

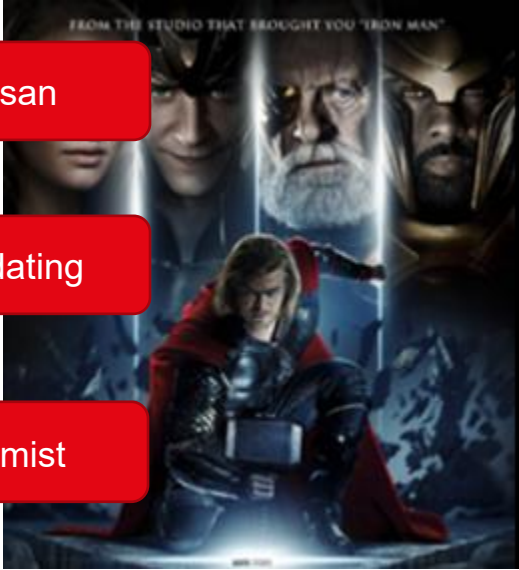
- You learn how to reason about which process is best in which situation
- You understand when a process needs to be improved
- You learn the theoretical background about processes and their assessment
- You learn about Agile and its pros and cons
- You learn from real world research studies based on rigorous approaches and evidence
- You learn from practical experiences in different industrial contexts
- **You try to improve your own project with all the above**

What you don't get

- You don't learn how to implement a specific process
- You don't apply a specific process during the project course

What to expect from the book (see preface)

From



Partisan

Intimidating

Extremist



Do Agile like
we say!

To

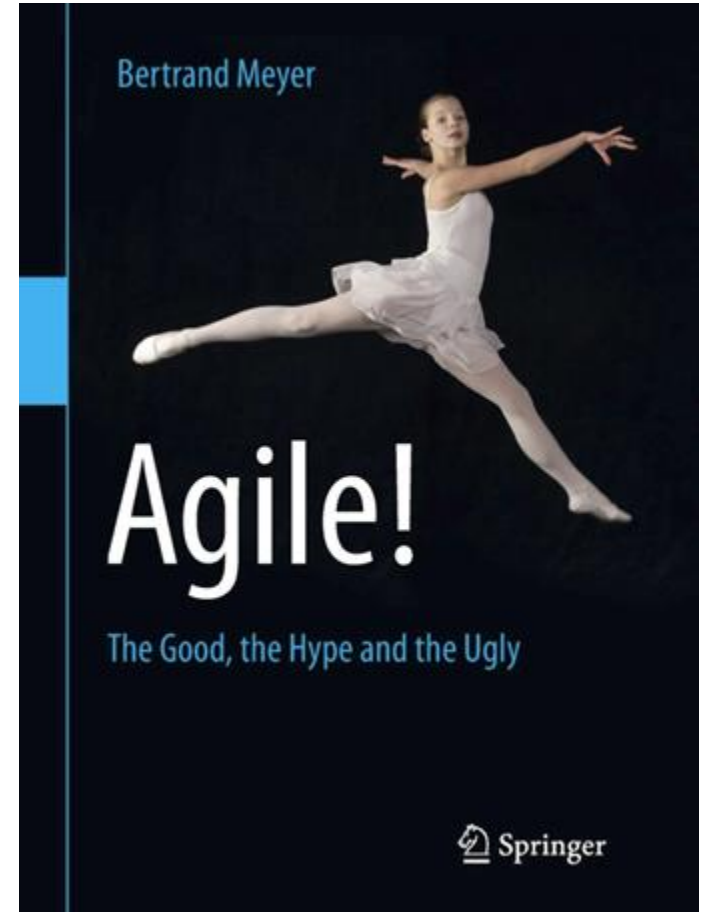


What works and
what doesn't?

- <https://www.springer.com/gp/book/9783319051543>

Agile book

Preface	vii
Contents	xv
1 Overview	1
2 Deconstructing agile texts	17
3 The enemy: Big Upfront Anything	31
4 Agile principles	49
5 Agile roles	79
6 Agile practices: managerial	89
7 Agile practices: technical	103
8 Agile artifacts	117
9 Agile methods	133
10 Dealing with agile teams	145
11 The Ugly, the Hype and the Good: an assessment of the agile approach	149



Book main points

- **Concise description of Agile**
- **Assessment of Agile**
- The good (including the “brilliant”):
 - principles and practices — some new, some not — that agile authors rightly present as helpful to software quality and productivity.
- The hype:
 - widely touted ideas that will make little difference, good or bad, to the resulting software.
- The ugly:
 - agile-recommended techniques that are just plain wrong, contradicting proven rules of good software engineering, jeopardizing the success of projects, and harming the quality of the resulting software.

Book, slides and group work

- Read the books, they are easy to read, interesting and explain further the lectures
 - Using arguments from the book helps getting better answers at the exam
- Participate to the lecture
 - The exam will cover any topic discussed in the lectures, including the guest lectures
- Participate in the group work, it will help you both for the written exam and for the activities
 - Especially for the first deliverable (the practical project) the participation is recommended
 - For the presentations (last activity), participation is mandatory during your own presentation and the rest of the same session

Project

Inspired by a real activity carried out at Volvo Cars

- We have run this activity for a few years as a one-session activity with very positive results

You will learn:

- The **practical challenges of coordinating** with other **groups** to deliver a product
- The need for **processes** and **roles**
- How to apply the **methods** and **knowledge** from the course to your own project

There will be **4 activities** and **4 deliveries (all mandatory)** in with the project

Activity: Product Improvement Plan

Planning Product Improvements

- As part of a multi-group project, students will work in 4 groups of groups (GoG) to enhance 4 existing software products with cutting-edge features. Each GoG will select one product from the provided list. The groups in such GoG will collaborate to create a comprehensive booklet detailing their proposed enhancements, technical requirements, team structure, mockup of features and implementation strategy.

Activity Goal:

Create a **product improvement plan** for an existing product.

Coordinate across groups to deliver a booklet

Example



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AI-powered Organization

Smart file tagging and organization



Advanced Version Control

Git-like branching for your documents



AR File Visualization

Interact with files in 3D space



Smart Search

Natural language processing for easier file finding



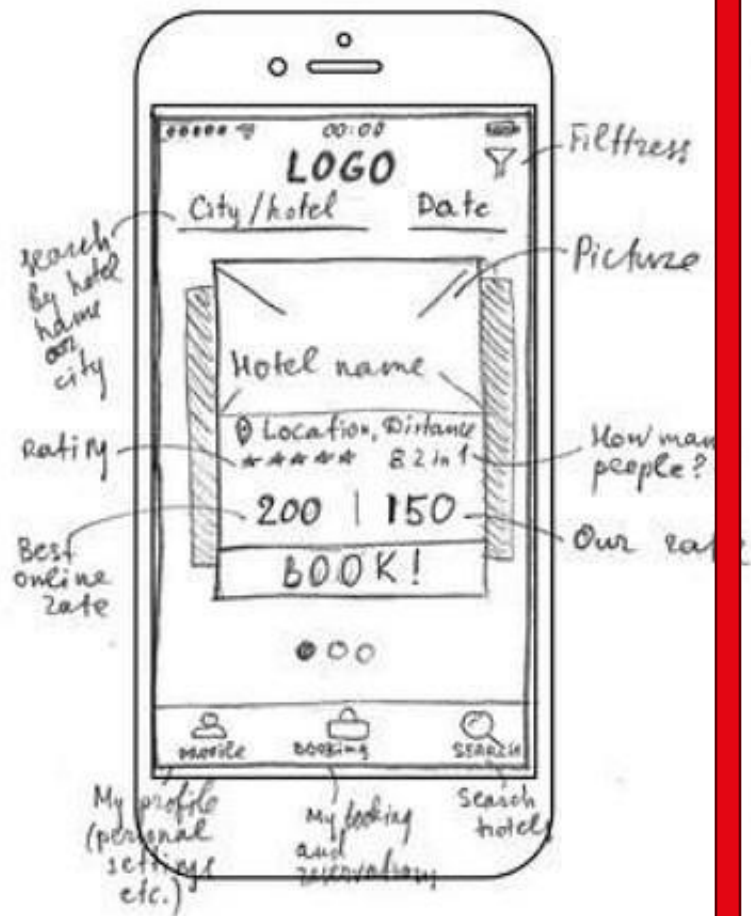
Blockchain Verification

Secure file tracking and authentication



Real-time Translation

Collaborate across language barriers



Wireframe

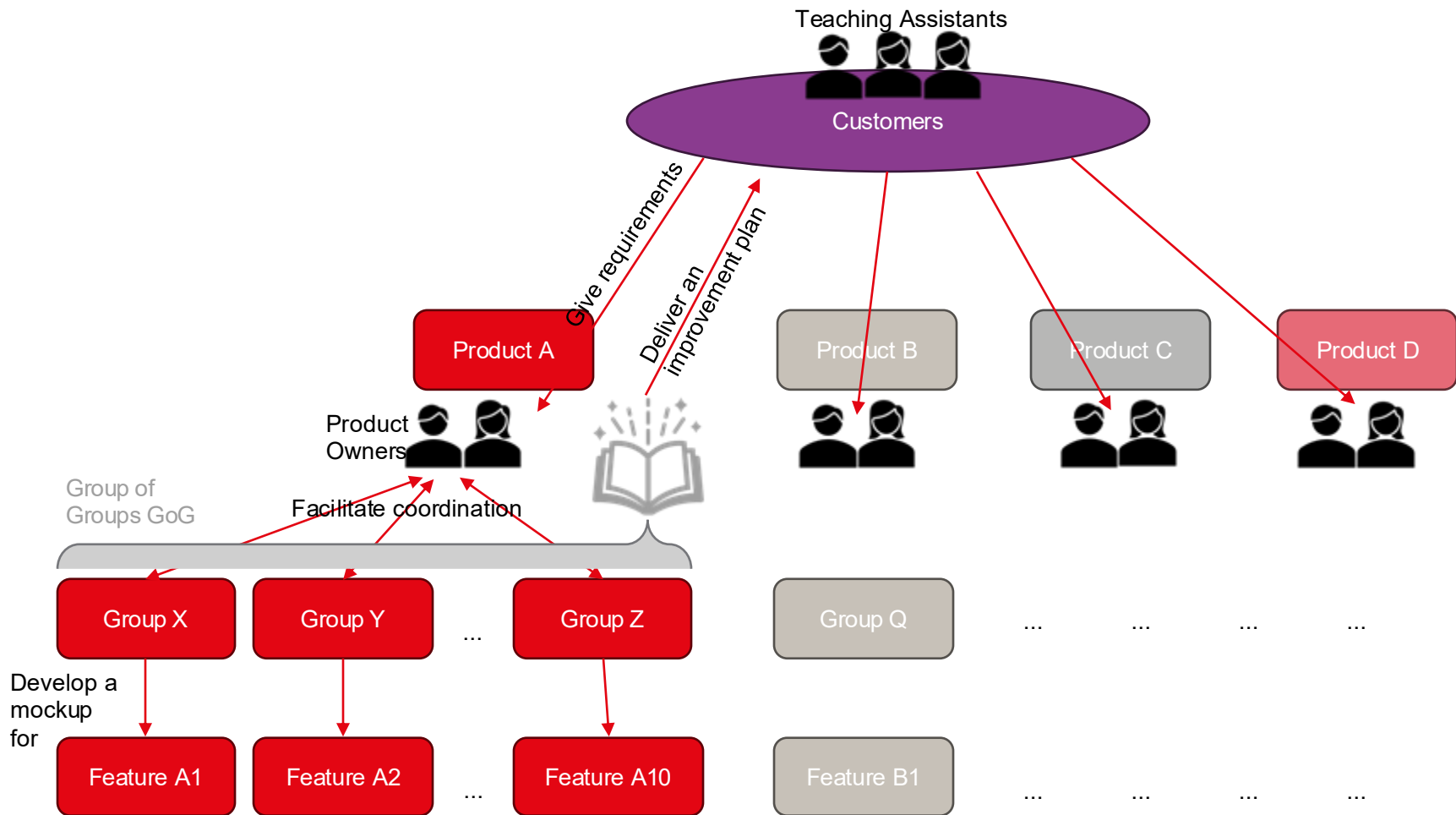


Mockup



Prototype

A static version of how the feature would look like if implemented, not interactive. I can be several screenshots



Deliverables

1. A **booklet** detailing the enhanced product should contain:
 - First **catchy page** with product-related information (pictures, phrases, etc.)
 - Page with selected features and their **prioritization** in an ordered list
 - Page describing the needed **technology stacks** to improve the product
 - Page containing the **estimated number of employees** and their **roles** needed for the product improvement
 - At least one page for **each feature** with a UI/UX **mockup** showing the envisioned feature in use
 - Each group should develop a **distinct feature**
 - Page with a **Gantt chart** of the proposed plan to develop the features
2. Each group delivers a page with the **list of the students participating** in the project and **their contribution** to the process or the development of the booklet. This page will need to be delivered on Devlry.

Creating the groups

- Team size should be **3-5 people**. During the first group session or in any case by 31st of August 23:59. Use this form to create or be assigned to groups <https://nettskjema.no/a/536725>. The groups will be created in Devilry and each group will receive an ID by the Teaching Assistants (TAs).
- This is **mandatory**. If you don't have a group by 31st of august, you cannot participate in the project and therefore you fail automatically and cannot sit at the exam
- You can choose to be part of a group defined by you or to be put by the TAs in a random group
- Join the course Teams using Code: **opj73sx**
- **Pro Tip**: try out the group dynamics during the second week activity, Kanban Game.

Choosing a feature

- Each group will be assigned a Product (they will be part of a GoG) and a feature.
- The groups **attending** the group sessions (it's enough that one person is participating) will be able to **choose** the feature; otherwise, the features will be assigned by the TAs. This will be done during the lab **on 19th and 21st of August**.
- It is possible to **define your own feature** but only if you (one of your group) **participate** in the group session and ask the TAs for approval
- Each group **needs to join the Teams channel related to the product they are improving**. All the important information for the project will be given through this channel by TAs and Product Owners. **Failing to use this channel would most likely lead to failure of the project**
- Groups can also create their own channel in Teams related to the group (not mandatory, any tool can be used).

Product Owners

- Two students per product will be selected as **Product Owners (POs)** during the group sessions on the **19th and 21st of August** to be responsible for helping **coordinate** across the groups in the same GoG and to **communicate** with the TAs to discuss the requirements. Such roles **will not contribute to the single group's work directly for the first assignment**.
 - The **TAs** act as the **customers**.
 - Groups cannot directly ask the TAs but need to **talk to the POs** if they need clarifications on the product improvement or the booklet.
 - The POs are the only ones who can communicate with the customers (TAs).
 - POs' main task is to **coordinate** the groups to ensure that the **requirements are correctly implemented** in the final booklet.
 - POs need to make sure that the **various parts of the booklets are delivered** in time by the deadline.
 - It's the **group responsibility** to **communicate** with the POs and make sure that their mockup is delivered in the brochure.
- As soon as the POs are appointed, they will receive the **requirements** by the TAs and such requirements have to be forwarded by the POs to the groups in each GoG.

First delivery: the booklet

- The booklets should be delivered by the POs by the **5th of October 23.59** in devilry. This delivery is **mandatory** for all groups.
The additional page with the students' contributions needs to be delivered by each group (by any person in the group) by the **5th of October 23.59** on Devilry.
- If a group misses its assigned feature in the booklet or the contribution page in devilry, or the contribution is not appropriate, the group will fail the assignment and the whole project, and the participating students will not be able to sit for the final exam.
- If a PO doesn't deliver the booklet in time (whatever it contains) they will fail the assignment and the whole project, and the participating students will not be able to sit for the final exam.
- After the first assignment the POs will join their own group of POs and will carry out the other assignments with such group.

Pro tips

- We **recommend** to assign some roles in the groups, for example:
 - Project Manager: coordinate with the other groups and the Pos
 - UX designer: to design the feature mockup
 - Remaining roles can be assigned by the group ...

Second Delivery: Reflection

- **Reflect** on your process used during the project
- Write a **short report with the lessons learned**
- Create a **BPMN diagram** of the process used in the project by your group with respect to the other groups
 - BPMN will be introduced during the lecture when the reflection activity starts
- Deliver both the documents in Devilry. This is a group-specific activity
- More details will be shared before the activity

Third Delivery: Improvement

- Based on the knowledge acquired in the **lectures** and the **reflections in the previous delivery**, deliver:
 - a **Software Process Improvement (SPI) Plan** for the project where you suggest what to improve next time you would run the same process
 - An improved **BPMN diagram**
- Deliver both the documents in Devilry. This is a group-specific activity
- More details will be shared before the activity

Fourth Delivery: Presentation

- Based on the project, the reflections and the SPI plan, all the groups will hold a 10 minutes (depending on the number of groups in the course) **presentation with the other groups present**
 - All the group members need to participate in this activity and contribute to the presentation
 - There will be 3 sessions, which will be possible for the groups to choose for their presentation: the lecture slot on the **10. of November 12.00-14.00** and the group sessions during the same week, **11. of November 8.00-10.00** and **13. of November 12.00-14.00**. A spreadsheet will be made available for signing up. First-come-first-serve approach.
- More details will be shared before the activity

Exam

- Part automated answers (e.g. Multiple choices)
- Part textual answers
- The questions in the exam can cover **all topics** in the course lectures

Final written exam

Time: December 1 at 9:00 AM (4 hours) .

Place: Silurveien 2 Sal 4D

Examination system:

Inspira – see guides for digital exams

A photograph of a crowd of people at a social event, possibly a concert or party. The scene is dimly lit with a strong purple or magenta light source, creating a vibrant but somewhat blurry atmosphere. In the foreground, a man with a short haircut is seen from the side, wearing a colorful, patterned shirt. Behind him, a woman with long blonde hair has her eyes closed. Other people are visible in the background, some looking towards the camera and others looking away. The overall mood is festive and social.

2010

**Welcome to
IN5140!**