

CS-C2130 / CS-C2140 / CS-E4910

Software Project 1 / 2 / 3

Lecture 1: Introduction to the Course

Jari Vanhanen

Agenda

- **16:15-17:40** Introduction to the Course, Jari Vanhanen
 - **motivation**
 - Scrum
 - Scrum training
 - other support to the project
 - the project
 - forming the team and selecting a topic
 - evaluation principles
- **17:40-18:00** Scrum Masters introduce themselves
- **18:00**-> Scrum Masters and developers can have discussions

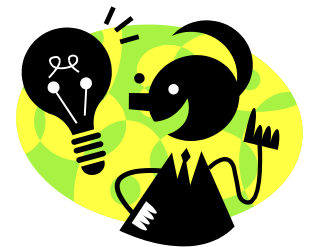
Three courses, same project

- **CS-C2130 & CS-C2140 Software Project 1 & 2**
 - BSc level course
 - 5cr + 5cr
 - September – May
 - Both courses must be taken during the same academic year
 - except, if a student is absent from the university during the spring
 - Evaluation and credits of both courses in May
- **CS-E4910 Software Project 3**
 - MSc level course
 - mandatory in Software and Service Engineering (SSE) major's SE track
 - 5-8cr
 - September – May

Course = A Large Project Work

- SW development projects for real clients
 - from the client's idea to incremental deliveries of production quality code
 - the results will be utilized by the clients
 - different domains
 - different programming languages and technologies

What are the differences between small programming assignments and real software projects?



A Typical SW Development Scenario in Industry

- External client and diverse end-users
- Large system
- Large team
- Every work hour costs money
- Bugs may cause serious consequences
- Developers change

What needs attention in large, real projects compared to small programming assignments?

A Typical SW Development Scenario in Industry

- External client and diverse end-users (understanding real needs)
- Large system (architecture, software design)
- Large team (communication, coordination, team spirit)
- Every work hour costs money (efficiency, prioritization)
- Bugs may cause serious consequences (quality, proof of quality)
- Developers change (maintainability, knowledge transfer)

Programming skill is not the only element of success.

Prerequisites

Enough programming experience to be able to learn more quickly ...

- SW Project 1 & 2
 - **1st year programming and databases courses / good programming skills (mandatory)**

- SW Project 3
 - **SW Project 1 & 2** or a similar project (mandatory)
 - **CS-C3150 Software Engineering (mandatory)**
 - SSE major's core SW engineering courses (recommended)
 - SW Design and Modelling
 - SW Testing and Quality Assurance
 - SW Processes and Projects
 - Requirements Engineering
 - SW Architectures

Learning Outcomes (1/2)

- Getting **hands-on experience** of a real SW development project
 - requirements engineering, design, programming, QA, project mgmt
 - seeing the common challenges related to these activities
- Learning to **apply Scrum** and various **work practices and tools**
 - try new work practices and tools, and analyze experiences
 - enlarge your software engineering toolkit
 - understand the limits of different practices and tools
- Learning to use **new technologies**
 - programming languages, frameworks etc.

Learning Outcomes (2/2)

- Learning various academic / soft skills
 - social skills
 - teamwork
 - searching for information
 - note-taking
 - decision making
 - presentation skills
 - time management
 - independent learning
 - networking
 - business thinking
 - ...

... and learning the **"I can do this"**-attitude

According to research, largest gaps in the expectations of IT companies and skills of the university graduates are related to soft skills.

Learning Outcomes - Summary

- After this course you should
 - **be able to work as a developer** (or a Scrum master) in a sw project
 - **understand the common challenges** involved in SW development
 - be able to **apply Scrum** and suitable work practices and tools in your projects
 - be a **better programmer**
 - have improved in many **academic/soft skills** applicable practically anywhere

Use this course as an opportunity for learning!

Think about your personal learning goals and make decisions (project topic, your responsibilities in the team etc.) that support them!

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Scrum

- Iterative and incremental agile software development framework for **managing** product development

**Does not cover design, implementation,
or concrete testing practices**

- Widely used in software industry
- On this course all projects will use Scrum

SCRUM

SW Project 3 students



Clients



DEVELOPERS



SW Project 1&2 students

PRODUCT BACKLOG REFINEMENT

DAILY SCRUM

ONE TO FOUR WEEKS
SPRINT
NO CHANGES TO GOAL

SPRINT REVIEW



PRODUCT BACKLOG



SPRINT PLANNING
PART 1 AND 2



SPRINT BACKLOG



POTENTIALLY SHIPPABLE
PRODUCT INCREMENT



RETROSPECTIVE

(cc) Odd-e Pte Ltd

Scrum Roles – Product Owner (PO)

- **Someone from the Client's organization**
- Responsible for
 - maximizing the value of the product and the work of the development team
 - managing the Product Backlog
- Participates to Sprint Planning and Sprint Reviews

Scrum Roles – Developers

- **Students from SW Project 1 & 2 courses**
- deliverer a potentially releasable increment of “*Done*” product at the end of *each Sprint*
- Responsible for
 - programming, testing, analysis, design and any other tasks required to successfully deliver the project
 - actively thinking “How can I best proceed the project now”, instead of waiting that someone tells what to do

Scrum Roles – Scrum Master

- **Students from SW Project 3 course**
- Ensure that the developers and the PO understand and use Scrum
- Responsible for
 - plan, teach and **ensure the application of Scrum**
 - prepare and lead the **Scrum events**
 - manage **team building**
 - recruitment, communication channels, team spirit
 - **initiate discussions on any problems**, if the team does not react to them
 - e.g. overseeing that the team learns to proceed the project on their own
 - **give tips** about methods and tools:
 - e.g. architecture, testing, user requirements, teamwork etc.
- Some may work also as a developer
 - if taking course size >5 cr (max. 8 cr)

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Lecture: Scrum Basics

- We 11.9. 16:15-18
- **Basics of Scrum and applying it in the course project**, Prof. Casper Lassenius & Jari Vanhanen
- **Accenture Quality Award**, Jarno Hilvenius/Accenture

Certified Scrum Master Training



- **For Scrum Masters only**
- Thu-Fri 12.-13.9. 8:00 – 16:00
 - in 126-Juho, Learning Centre, Otaniementie 9
 - 8:00 breakfast, 11:00 lunch
- Arranged by agile42 / Lasse Ziegler
- Interactive introduction to the principles and practices of Agile and the Scrum framework
- Qualifies you to receive the Scrum Alliance Certified Scrum Master certification

Dietary restrictions by e-mail to the teacher.

Lecture: Scrum Master's role

- **For Scrum Masters only**
- We 18.9. 16:15-18
- Scrum Master's role
 - in the course project and
 - in the Scrum simulation

Scrum Simulation (1/2)



- **For Scrum Masters and developers**
- You will **learn the different events and concepts of Scrum**
 - your team will build a product using LEGOs instead of coding
- Is also an important **team building activity**
- Has been used for years in the industry and at Aalto to teach Scrum
- The role of PO will be acted by the creators of the simulation and some other guests from the IT industry

Scrum Simulation (2/2)



- Intro + 3h simulation + discussion = ~4h
- Four sessions (23.9. – 2.10. Mon & Wed 16-20)
 - 4-5 teams per session
- The whole team in the same session
 - if you register alone, you will be assigned to some random team
- **Register ASAP when the SM and ≥ 3 devs agree on the session**
 - on the “CS-C2130”-Google Sheet
 - **try to fill the first sessions first**
 - you can change your session as long as there are free slots
- **Mandatory participation** or an essay will be required

Scrum Materials

- [Scrum Guide \(2020\)](#)
 - official definition of Scrum
- [Scrum Primer](#)
 - a more concrete presentation of Scrum
- CS-C2130 Project Manual
 - applying Scrum in the course project

These will be discussed on the "Scrum Basics"-lecture.

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Coach (1/2)

- Course personnel
 - have been Scrum masters in this course
- Coaches the team with Scrum and other work methods
 - non-technical focus
- Helps the teams identify potentially serious problems and may give suggestions
- Evaluates compliance with the required work methods (Scrum)
- Several meetings (f-2-f or Zoom)
 - Sprint 0 plan
 - Sprint 0 review
 - three project reviews
 - other meetings (a few times)
- Other forms of participation
 - continuously observes the project
 - answers questions
 - evaluates the team after the project reviews
 - points and feedback



Coach (2/2)

- Help the coach help you!
 - visibility and status updates
 - prepare questions and send them to the coach before the meetings
 - invite the coach to some Scrum event(s)
 - getting feedback about them
 - increasing visibility to your work practices
- Every project will face problems
 - instead of trying to hide the problems, identify and try to solve them actively
 - ask help when needed
- Budgeted effort per team (~30h)
 - ~10h for meetings
 - ~4h for reading, grading and feedback after each project review (*3)
 - ~8h for observing the project, e-mails, preparing for meetings



Experience Exchange Sessions (EES)

- Four sessions during the project
 - varying themes related to what the teams have recently been working with
- Participants
 - 1-2 students per team, teacher and some guest expert(s)
- A team will earn 0.5p from each EES, if
 - team makes the pre-task
 - e.g. proposes 2 discussion topics (practical problems and/or good solutions to a common problem)
 - someone participates to the EES
- Agenda
 - typically some intro by the organizers
 - discussion about the theme together or in small groups

Infrastructure

- HW & SW
 - students' own devices
 - Aalto IT
 - open source
 - clients' devices and licenses
- Work room
 - Aalto Space app
 - client's office

Agenda

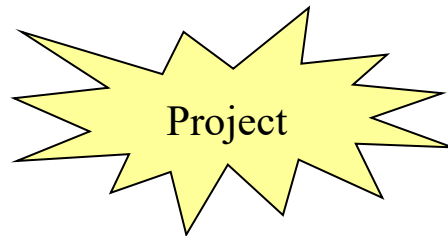
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Project Stakeholders and their Goals



Students

- learn about SW development and Scrum
- good grade
- a new entry to the CV
- network with other students and employers



Client organization

- get useful SW and new ideas
- network with students
- get experiences of new technologies etc.

Coach & Course

- provide a good learning environment, i.e. a realistic but safe sandbox
- ensure the fulfillment of learning goals
- help to notice *serious* problems before it is too late



Fixed Project Duration and Effort

- Duration
 - ~21 weeks
- Effort per person
 - 25*(credits-1) hours
 - e.g. 25*9 = 225 hours for the project
 - 225h / 21weeks = **11h / week**

14.10.2024	Projects begin
~25.11.2024	Project Review 1
~24.2.2025	Project Review 2
~5.5.2025	Project Review 3 (end of the project)

e.g. 2 team work sessions/wk
+ some independent work
= lots of work!

- All students are REALLY expected to invest this amount of effort
- This will be an exhaustive, but educational course
 - Course feedback: usefulness 4.76/5 (SWP1&2), 5/5 (SWP 3)
- In your feedback, real project is the most praised component of the course
 - real projects are possible thanks to the motivated students and great results each year

Flexible Project Scope

- Fixing the project effort means that the **scope must be flexible**
 - deliver the most important features first
 - usually POs have more ideas than can be implemented
 - adjust the scope with PO during the project based on progress
- Product Quality
 - aim for production level quality
 - exceptions allowed, if explicitly asked and understood by the PO
 - e.g., if some part of GUI is built only for internal testing, its usability does not matter (much)

Project Contract - Signing

- Standard contract prepared by Aalto
 - client (=Partner), students and Aalto sign it
 - slightly different version, if Aalto is the client
- Signing the standard contract
 - **ASAP when the project starts**
 - Use
 - the client's digital signing system, or
 - manual signing
 - Manual signing
 1. The client fills the basic information and their signature
 2. Team members sign
 3. Scrum master sends a scanned PDF copy to Jari to be signed
 4. Aalto signs and sends PDF copies to everyone

<https://mycourses.aalto.fi/mod/folder/view.php?id=1236717>

Project Contract – Main content

- Confidentiality / NDA
 - sec. 8 in the standard contract is enough for most clients
 - if a client wants an additional contract, discuss its content with them before choosing the topic
 - project documentation should always be public
 - except code and technical specs
- Intellectual property rights (IPR)
 - alternatives
 - client gets IPRs, or
 - open source
 - sec. 5.1. *“The Students shall not copy any third party’s work when producing any materials in connection with the Project in any manner, which infringes copyright. If the Students include third party material, which is protected by intellectual property rights owned by a third party in the Result, like use material licensed by an open source license, the Students are obliged to inform the Partner.”*
- Reference and communication
- Participation fee external clients
 - 3000e / 1500e
 - commitment
 - course costs

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Forming the Team (1/2)

- Course registration deadline was already
 - send e-mail to the teacher immediately,
 - if you cancel your registration
 - if you missed the deadline
- Student list published on the **“CS-C2130”-Google Sheet**
 - **add your personal preferences immediately**
 - work times, technologies, project topics, ...

See MyCourses Announcements

Optimal team composition:
 -common weekly work times
 -similar technology and topic prefs
 -at least one, who is familiar with the required main technologies

Team ID	Subteam ID	Role	Name	E-mail (@aalto.fi)	Course	Cr	Prefs	Preferred project IDs	Technologies that I know already	Technologies that I would like to learn	Possible weekly teamwork times	Work languages	Favorite team (IDs)	Other notes
		DJ	Example, Eric	eric.example	CS-C2130 & 40	10		C,H,L,M,T	Scala, SQL		The evenings after 18 on weekdays (except tuesday after 18), weekends and some day times in the weekdays as if necessary	fin, eng	6, 9	A second year computer science student with one summer of experience for HTML, CSS, PHP and JS
	S20	Ds	Example, Andy	andy.example	CS-C2130 & 40	10			L,T,W,Y About 3.5 years of work experience (development) with Ruby on Rails, Python, HTML, CSS, JavaScript AngularJS, Gulp, Babel, Jira, J2C, Git			fin, eng	He has already formed a subteam with NN1, NN2 and NN3	
		S	Master, Mike	mike.master	CS-E4210	8		all time	testing tools, CI tools, Agile/fant backlog management tool, requirements analysis		Monday and Thursday 8-18, We-Fri 10-22, Saturday 10-16	eng		Developers can choose the topic. I can be the Scrum Master for any team.
	S20	DJ	NN1	...	CS-C2130 & 40	10								

Forming the Team (2/2)

- Scrum Masters recruit team members (max. **4 developers**)
 - they use the “CS-C2130”-Google Sheet
 - to inform what kind of preferences they and their partial team has
 - to find developers who have similar prefs with each other and/or with the Scrum Master
 - to **mark who have joined their team**
- Developers may also use the Google Sheet to mark subteams of 2-4 developers who would like to work together
- Developers may also contact Scrum Masters
 - **especially any subteam without a SM should try to find one quickly**
- Teacher assigns the remaining students to all the teams on **~Fr 13.9.**
 - fill the “Preferred Teams” column **by 12.9.**
 - Final team size: SM + **about 7** developers

... or you will be randomly assigned to some team

Project Topics

ID	Project Proposal	Client
A	Bayesian Optimization for Material Properties	Aalto AP R2B
B	Customizable Dashboards for BIM Data	Aalto CE R2B
C	Find my kitten, AI!	Aalto CS
D	Tally Me Bananas, AI!	Aalto CS
E	Modern open-source rubric assessment tool with peer assessment features	Aalto CS
F	Cornea Sense	Aalto ELEC R2B
G	AR4U - Research to Business Project	Aalto NBE R2B
H	Aalto Arts	Aalto-Railio
I	Contacts	Aalto-Railio
J	E.T Drone Wars	Aalto-Railio
K	AI powered chatbot to guide customers and users twenty-four seven	Beamex
L	Utilize Machine Vision and AI to recognize analog readings from industrial gauges with a mobile device	Beamex
M	Onboarding Wall	Cadentia
N	Droppe Buyer Insights Engine	Droppe
O	Futuboard 2.0	Futurice & Aalto
P	AI-Powered Search	Hanki.app
Q	Hoxhunt HUD	Hoxhunt
R	Digitalization and Automation of Construction Field Reporting	Infrakit
S	LLM/ML Features for an Open-Source Voting Advice Application	OPENVAA
T	Game Build Management UI	Remedy
U	Reconciliation Automation	Sievo
V	SOS-Lapsikylän unelmista.fi -sivun kehitysprojekti	SOS-Lapsikylä
W	Urisens Care Monitoring System	Urisens
X	Web-tool for Salesforce queries and edits	Valo
Y	You Are Fired!	VTT

Project Topics – Which one to choose?

- What do the development team members want to learn?
 - technologies
 - problem domain
 - getting to know a certain client organization
- Too easy a topic?
 - boring
 - not optimal for learning new things
 - the topic might be more suitable for some less experienced team
- Too demanding a topic?
 - fulfilling the client's goals overrides all the other educational goals of the course
 - not learning how to deliver something considered operationally ready

Scrum Masters do not have to know the technologies or domain. They are the Scrum experts.

Project Topics – Selection Process

- Teams apply for topics
 - choose 3-5 favorite topics
 - include at least one that is among the less popular ones
 - show your tentatively prioritized choices to other teams on the Google Sheet
 - send a team “CV” to 3-5 clients **1.-6.10.**
 - popular clients may choose Top-4 based on CVs
- Have a 10-minute meeting with your favorite clients after the pitches on **9.10.**
 - reserve meetings on the Google Sheet
- After the meetings on **9.10.**
 - each client prioritizes the interested teams
 - each team (re)prioritizes the clients they met
 - on the Google Sheet
- Teacher makes the final pairings on **10.10.**

Do not contact the clients before 1.10.
Contact the teacher, if you want some clarification to a topic proposal.

Try to ensure that the client:

- is committed to the project
- understands the domain and has prepared the project well enough
- provides required infrastructure
- is confident that required SW/HW works
- doesn't expect skills that the team doesn't have/cannot acquire quickly
- doesn't require signing an additional contract that the team does not want to sign
- appreciates the educational context

If you are not sure, try another client.

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Evaluation Principles

- The students are evaluated as a team
 - team can propose individual changes of +/-1 grade
- Product Owner and Coach evaluate separately
- Results and Work practices are evaluated

Component	When	PO	Coach	TOTAL (max)
Work practices	After each project review	-	0-5p	15p
Project progress	After each project review	0-5p		15p
Final results	After the last project review	0-15p	0-15p	30p
EES participation	After each EES	-	0-0.5p	2p
TOTAL (max)				62p

Evaluation Principles:
<https://mycourses.aalto.fi/module/page/view.php?id=1200393>

In order to pass the course

1. **Participate to a team that gets enough points from the project**
(see Evaluation Principles)
2. **Spend (credits - 1) * 25h to the project work** (i.e. **225h** for 5+5cr)
3. Participate to a **Scrum Simulation** session
-(or write a compensatory essay)
4. Write **4 learning diary entries** during the project
-(or write a compensatory essay after the course)

Learning diary

- Each student must write 4 entries to a learning diary
- After the Scrum Simulation (1 entry)
 - What you learned about Scrum
 - Feedback to the organizers about the simulation
- Just before each Project Review (3 entries)
 - 1) three educational observations related to the use of Scrum or other work methods
 - 2) a summary of your main contributions to the project since the previous entry

Submitted individually
to MyCourses.

Student Feedback

There was lots of hand on attitude in this course. It was nice to "study"/"work" as a "worklife" environment. I really enjoy during this course and learned a lot about technologies and also work practice and teamwork. It is important that team communication works well.

Project taught the importance of good teamwork. **It's more important to have right attitude than a great skillset** (of course it helps).

Materials Related to this Lecture

- Course Overview
- Coaching
- Scrum Simulations
- EESs
- Project proposals
- Project contract
- Evaluation principles

All materials are available in MyCourses.

Read them carefully, if you missed this lecture.

Next Steps

- Add your preferences to the Student list ASAP
 - work times, project topics, technologies
 - link was posted today to MyCourses Announcements
- Start forming the teams! Developers can
 - wait that a Scrum Master contacts them
 - contact some other developer(s) and then use the Sub-team column to show to the Scrum Masters who would like to work together
 - contact a Scrum Master as a sub-team or alone

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Introduction of the Scrum Masters

Team	Scrum Master	Pre-agreed topic
1	Aguado Redondo, Marc	I – Contacts
2	Arponen, Oskari	
3	Hartikainen, Onni	
4	Häkkinen, Joel	H - Aalto Arts
5	Karlsson, Robin	
6	Laine, Mikael	U – Sievo
7	Lehto, Juha	P - Hanki.app
8	Letchu, Sani	
9	Moroz, Roman	
10	Mäkiluoma, Henna	
11	Nguyen, Khac	
12	Nyblom, Kaisla & Porttilahti, Milla	
13	Pajumaa, Maija	
14	Roznovják, Martin	
15	Suomalainen, Onni	
16	Tran, Trong	J - E.T Drone Wars
17	Tran, Tuan	
18	Willberg, Tuomas	
19	Xu, Bowen	

- SW engineering background (school & work, if any)
- Preferences, e.g. work times, topics
- Anything else...

... in max. 60 seconds