**Aalto University**

# CS-C2130 / CS-C2140 / CS-E4910 Software Project 1 / 2 / 3

## Lecture 1: Introduction to the Course

Jari Vanhanen

15.9.2021

# Agenda

- **16:15-17:30** Introduction to the Course, Jari Vanhanen
  - motivation and practicalities
  - Scrum
  - support to the project
  - the project
  - forming the team and selecting a topic
  - evaluation principles

- **17:30-17:40** Accenture Quality Award / Nina Gromov

- **17:40-18:00** Scrum Masters introduce themselves

# Three courses, same project

- CS-C2130 & CS-C2140 Software Project 1 & 2
  - BSc level course
  - 5cr + 5cr
  - September – April
  - 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 April

- CS-E4910 Software Project 3
  - MSc level course in Software and Service Engineering major
  - 5-8cr

# 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?

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# A Typical SW Development Scenario in Industry

- External client and diverse end-users (understanding real needs)

- Large system (technical complexity, 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 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)**
  - various SW engineering courses (recommended)
    - SW Design and Modelling
    - SW Testing and Quality Assurance
    - SW Processes and Projects
    - Requirements Engineering
    - SW Architectures

# Educational Goals (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 use **new technologies**
  - programming languages, frameworks etc.

- Learning to **apply Scrum** and various work practices and tools
  - **try new practices and tools, and analyze experiences**
    - enlarge your software engineering toolkit
    - understand the limits of practices and tools

# Educational Goals (2/2)

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

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

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

# Educational Goals - Summary

- After this course you should
  - **understand the common challenges** involved in SW development
  - be a **better programmer**
  - be able to **apply Scrum** and suitable work practices and tools in your projects
  - 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!

# SCRUM

# 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 use Scrum

# SCRUM

a SW Project 3 student

SCRUM MASTER

Client

PRODUCT OWNER

TEAM

SW Project 1&2 students

ITEMS
1
2
3

PRODUCT BACKLOG

SPRINT PLANNING
PART 1 AND 2

WORK

SPRINT BACKLOG

DAILY SCRUM

PRODUCT BACKLOG REFINEMENT

ONE TO FOUR WEEKS
NO CHANGES TO GOAL
SPRINT

POTENTIALLY SHIPPABLE PRODUCT INCREMENT

SPRINT REVIEW

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 – Development Team

- **Students from SW Project 1 & 2 courses**

- *Self organizes* to do the work of delivering 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

**Help others**, ask if you could do something for them. But also **take responsibilities** and be ready also to get an idea yourself what the team could do next. Don't just wait others to babysit you. – Student N.N.

# Scrum Roles – Scrum Master

- **Students from SW Project 3 (5-8cr) course**
- Ensures 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 team learns to proceed the project on their own
  - give tips about methods and tools:
    - e.g. architecture, testing, user requirements, teamwork etc.
- Some work also as a development team member
  - taking course size >5 cr (max. 8 cr)

# SCRUM TRAINING

# Scrum Lectures

- We 22.9. Scrum Basics
  - Basics of Scrum and applying it in the course project

- We 6.10. Scrum Master's role in the Course project
  - for the scrum masters only

# Certified Scrum Master Training

- For the scrum masters only

- 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

- Th-Fr 30.9-1.10. 9:00 – 17:00 @ Zoom

- **Register ASAP on the "CS-2130"-Google Sheet**, DL 20.9.
  - you will get some materials by e-mail before the course

# Scrum Simulation



- For Scrum Masters and developers
- 3.5 hour Scrum simulation
  - designing a GUI prototype instead of coding
- 3 sessions 4-5 teams per session
  - 7.-18.10., exact dates and times will be published soon
- Preferably the whole team in the same session
  - the simulation is an important team building activity also
- **Register to a session on the "CS-2130"-Google Sheet**
  - register ASAP when the Scrum Master and ≥3 members agree on a suitable slot
  - try to fill the first sessions first
  - you can change your session as long as there are free slots
  - if you register alone, you will be assigned to some random team
- **Mandatory participation** OR an essay will be required

# Scrum Materials

- [Scrum Guide](Scrum Guide)
  - official definition of Scrum

- [Scrum Primer](Scrum Primer)
  - a more concrete presentation of Scrum

- CS-C2130 Project Manual
  - applying Scrum in the course project

# OTHER SUPPORT TO THE PROJECTS

# Coach (1/2)

- Course personnel

- 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 (in 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 by e-mail
  - evaluates the team
    - 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)
    - increases visibility to your work practices

- Every project will face problems
  - instead of hiding them, identify and solve them quickly
  - 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)

- 4-5 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 proposes 2 discussion topics for the EES (DL 1pm the day before the session)
    - practical problems and/or good solutions to a common problem
  - someone participates to the EES

- Agenda
  - free discussion on problems and good practices/tools
    - teacher prepares the agenda
    - proposed topics will be discussed in a small team with other interested people

1-2 of the EESs will be arranged in a slightly different format by Accenture

# Infrastructure

- HW & SW
  - Students' own devices
  - Aalto IT
  - open source
  - Clients' devices and licenses

- Work room
  - Aalto Space app
  - Client's office

# THE PROJECT

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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
- get experiences of new technologies etc.
- network with students

**Project**

## Coach & Course

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

# Fixed Project Duration and Effort

- Duration
  - ~21 weeks

| | |
|---|---|
| 25.10.2021 | Projects begin |
| 29.11.2021 | Project Review 1 |
| 7.3.2022 | Project Review 2 |
| 25.4.2022 | Project Review 3 (end of the project) |

- Effort per person
  - 25*(credits-1) hours
    - e.g. 25*(10-1) = 225 hours for the project
  - 225h / 21weeks = **11h / week**

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

- All students are REALLY expected to invest this amount of effort
  - In student feedback, the real project is the most praised component of the course
    - real projects are possible only thanks to the motivated students and great results achieved each year

- This will be an exhaustive, but educational course
  - Course feedback: usefullness 4.67 / 5

# Project Scope

- Fixing the project effort means that the **scope must be flexible**
  - deliver the most important features first
  - usually product owners 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
  - selected 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)

# Forming the Team (1/2)

- Course registration deadline was on Monday
  - send e-mail to the teacher immediately,
    - if you cancel your registration
    - If you missed the deadline

- Student list published on **the "CS-2130"-Google Sheet** on Th 16.9.
  - **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

| B | C | D | E | F | G | H | I | J | K | L | M | N | O | P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 16 on weekdays (except tuesday after 18), weekends and some day times in the weekdays ok if necessary | fin, eng | 6, 9 | A second year computer science student with one summer of experience from HTML, CSS, PHP and JS. |
| | S20 | Ds | Example, Andy | andy.example | CS-C2130 & 40 | 10 | | L,T,V,Y | About 3,5 years of work experience (development) with Ruby on Rails, Python, HTML,CSS,JavaScript (AngularJS, jQuery, Backbone), Java, SQL, Git. | | flexible | fin, eng | | |
| | | S | Master, Mike | mike.master | CS-E4910 | 8 | | all fine | testing tools, CI tools, Agilefant backlog management tool, requirements analysis | | Monday and Thursday 8-18, We-Fr 16-22, Saturday 10-16 | eng | | We have already formed a subteam with NN1, NN2 and NN3. |
| | S20 | Dj | NN1 | | CS-C2130 & 40 | 10 | | | | | | | | Developers can choose the topic. I can be the Scrum Master for any team. |

# Forming the Team (2/2)

- Scrum Masters recruit team members (max. **4 developers**)
  - start recruiting immediately
  - Scrum Masters use the "CS-2130"-Google Sheet
    - to find developers
      - who have similar preferences with each other and/or with you
    - to **mark into the "Team"-column who have joined a team**
    - to inform what kind of preferences their partial team has
- Developers may also contact Scrum Masters, whose teams have space
- Developers may use the Google Sheet to mark Subteams of 2-4 developer who would like to work together

- Teacher assigns the remaining students to all the teams on **Fr 24.9.**
  - fill "Preferred Teams" column **by 24.9. 13:00**
  - Final team size: 6-7 developers

> … or you will be randomly assigned to some team

# Project Topics

| ID | Client organization | Contact person | Project Proposal |
|----|---------------------|----------------|------------------|
| A | Autogame Studio | Jesper Hjorth, Emilia Ruha | Automation tool for board game design |
| B | Awake.AI | Santeri Kääriäinen | Port Configurator - Geometry editor with integration to existing Awake API |
| C | Beamex | Kennet Riska, Sami Koskinen | Beamex Logical Sync — Automatic generation and signing of Digital Calibration Certificates |
| D | Bytecraft | Jaakko Hannikainen | Graph-based task management |
| E | CSIT Finland | Esa-Petri Tirkkonen | Secure Identity Manager - IDM |
| F | Dot. Legal Oy | Aku Nikkola | Legalese |
| G | Droppe | Henrik Helenius | Droppe Market Data Crawler |
| H | Elisa | Tero Soukko | Multiplatform video viewer |
| I | KONE | Vivian de Jong, Otto Heiska | Your daily update, just on scan away! |
| J | Maillefer Extrusion | Janne Harjuhahto | Industrial Machine Learning Model Validation |
| K | Maillefer Extrusion | Jussi Hanhirova | Portable user-interface for autonomous fiber optics production line |
| L | Motivated Partners | Tommi Aromäki | Motivus Nudge |
| M | Northern Sports Insight and Intelligence | Heidi Kivimaa | ACT Head Impact Tracker iOS Application |
| N | Savox | Joona Rissanen | VoIP interface for Intercom System |
| O | Sievo | Heta Pirttijärvi | Emissions Analytics |
| P | Smartum | Emilia Majuri | SmartumPay - Next Level |
| Q | Sulake | Antti Hamara | Experimental polygon-based room building prototype for Hotel Hideaway |
| R | Sulake | Tuuli Ranta | VFX tool for ART |
| S | Yobitti | Aleksi Markkanen | Truck Rest Stop Parking System |

# 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

> Scrum Master does not have to know the technologies or domain. She will be the Scrum expert.

- Too easy a topic?
    - boring
    - not optimal for learning new things
    - no "bonus" points in the evaluation
    - the topic might be more suitable for some less experienced team

- Too demanding a topic?
    - fulfilling client's goals overrides other educational goals of the course
    - not learning how to deliver something considered operationally ready

# Project Topics – Legal Issues

- Standard contract by Aalto
  - Intellectual property rights (**IPR**)
    - Client gets IPRs, or
    - open source

  - Confidentiality
    - Sec. 8 in the standard contract is enough for most clients
    - project documentation should always be public
      - except code and technical specs

- Signing the standard contract
  - **ASAP when the project starts**
  - First, the client fills the basic information and their signature
  - Next the team members sign
  - Finally, Aalto signs
    - send a scanned PDF copy to Jari, if the company does not use a digital signing system

- Participation fee for companies
  - 3 000e
  - commitment
  - course costs

# Project Topics – Selection Process

- Teams apply for topics
  - choose 2-5 favorite topics
  - make your tentatively prioritized choices visible to other teams on the Google Sheet
  - send a team CV to 2-5 clients **14.-18.10.**

- Have a 10-minute meeting with all your favorite clients after the pitches on 20.10.

- Immediately after the meetings on 20.10.
  - each client prioritizes the interested teams
  - each team (re)prioritizes the clients they met
    - on the Google Sheet

- Based on the prioritizations, Jari makes the final pairings on 21.10.

Ensure that the client:

- is committed to the project
- understands the domain and has prepared the project well enough
- provides needed infrastructure
- is confident that possibly required SW/HW works
- doesn't expect skills that the team doesn't have/cannot acquire quickly
- appreciates the educational context

If you are not sure, try another client.

Do not contact the clients before 14.10. Contact Jari, if you want something to be clarified in some topic proposal.

# 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/mod/page/view.php?id=760514

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15.9.2021

# Learning diary

- Each student must write four entries to a learning diary

- After the Scrum Simulation
  - What you learned about Scrum
  - Feedback to the organizers about the simulation

- Just before each Project Review
  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
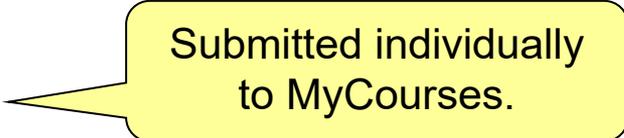
Submitted individually to MyCourses.

# 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) * 25 hours to the project work (i.e. 225h for 5+5cr)

3. Participate to a Scrum Simulation session
   -(or write a compensatory essay)

4. Write four learning diary entries during the project
   -(or write a compensatory essay after the course)

# Student Feedback

Ennen kurssin käyntiä olisin jopa ollut epäileväinen, että **riittävätkö koodaustaitoni** tällaiseen projektiin. Projektin aikana olen tajunnut, kuinka ohjelmointitaito ei sinänsä ole kiinni siitä, kuinka paljon tiedät käytettävästä ohjelmointikielestä, vaan enemminkin yleisestä ohjelmointitiedosta ja loogisesta älykkyydestä.

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

Tuntien täyttyessä ja lyhyen projektin loppuessa elämään syntyi hetkeksi aukko - mitä tehdä nyt kaikella tällä ajalla? Onneksi kovin kauaa tästä ei tarvinut kärsiä, kun osa-aikaiset **työt jo kutsuivat ja johon hakiessa projektista oli selvä etu** - oli jotain mistä kertoa!

# Materials Related to this Lecture

- Student's Manual (Read carefully if you missed the lecture)

- Evaluation principles

- Project proposals

- Project Contract
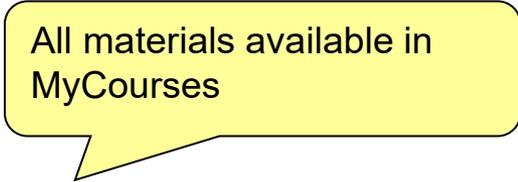
All materials available in MyCourses

# Next Steps

- Link to the "CS-C2130" Google Sheet is sent to MyCourses Announcements on Th 16.9.
    - add your preferences to the Student list ASAP
        - work times, work language, project topics, technologies
    - other sub sheets will be used during the course
        - save the link


- 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 themselves

# Introduction of the Scrum Masters

| Team | Scrum Master |
|---|---|
| 1 | Alisher Aliev |
| 2 | Jere Hirviniemi |
| 3 | Jaakko Mäkinen |
| 4 | Teemu Mäkinen |
| 5 | Tero Mäkinen & Rune Niska |
| | |
| 6 | Iiro Naumanen |
| 7 | Alisa Piippo |
| 8 | Tom Railio and Mikhail Raskhodchikov |
| | |
| 9 | Aleksi Siitari |
| 10 | Styliani Tsovou |
| 11 | Niklas Valuri |
| 12 | Wilhelm von Bergmann |
| 13 | Zifan Xiao |

- SW engineering background (school & work, if any)

- Preferences, e.g. work times, topics

- Course size: 5-8cr?
  - Interest in taking also (a small) role in sw development work?

- Anything else…

… **in max. 60 seconds**