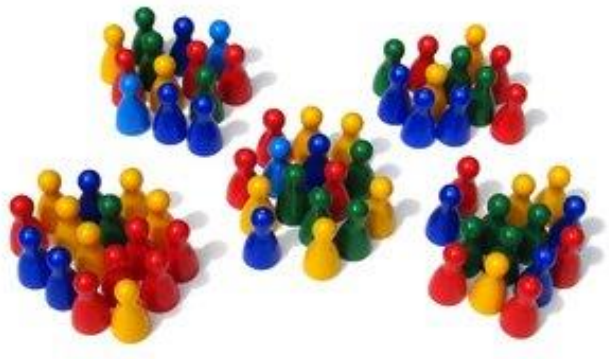
Running the Distributed Software Development course today – after 15 years!



The good ol' history slide...

- Back in 2003...
  - How do you make a **lecture** on a distance?
  - Can you make a **course** on a distance?
  - What about **studying** on a distance?
    - Without going there...
    - ... As money is always an issue

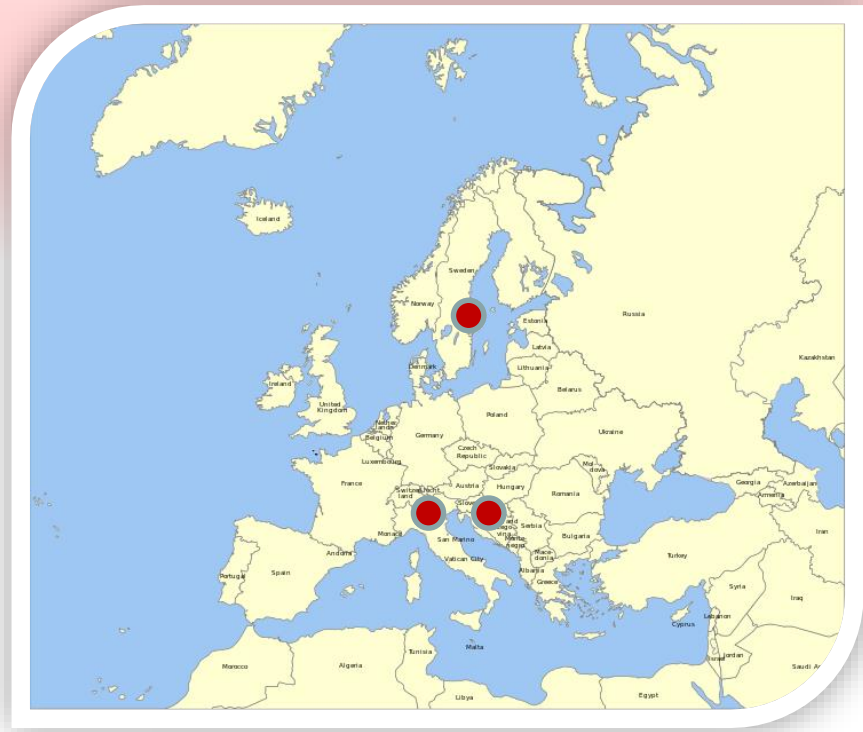
The basic idea...

Global Software Development / Engineering

Distributed Software Development course

Who are we?

3 universities



University of Zagreb
FER
Zagreb, Croatia

Mälardalen University
MDH
Västerås, Sweden

Politecnico di Milano
POLIMI
Milano, Italy

Distributed Software Development?

- We use

- to teach

- and to prepare students for

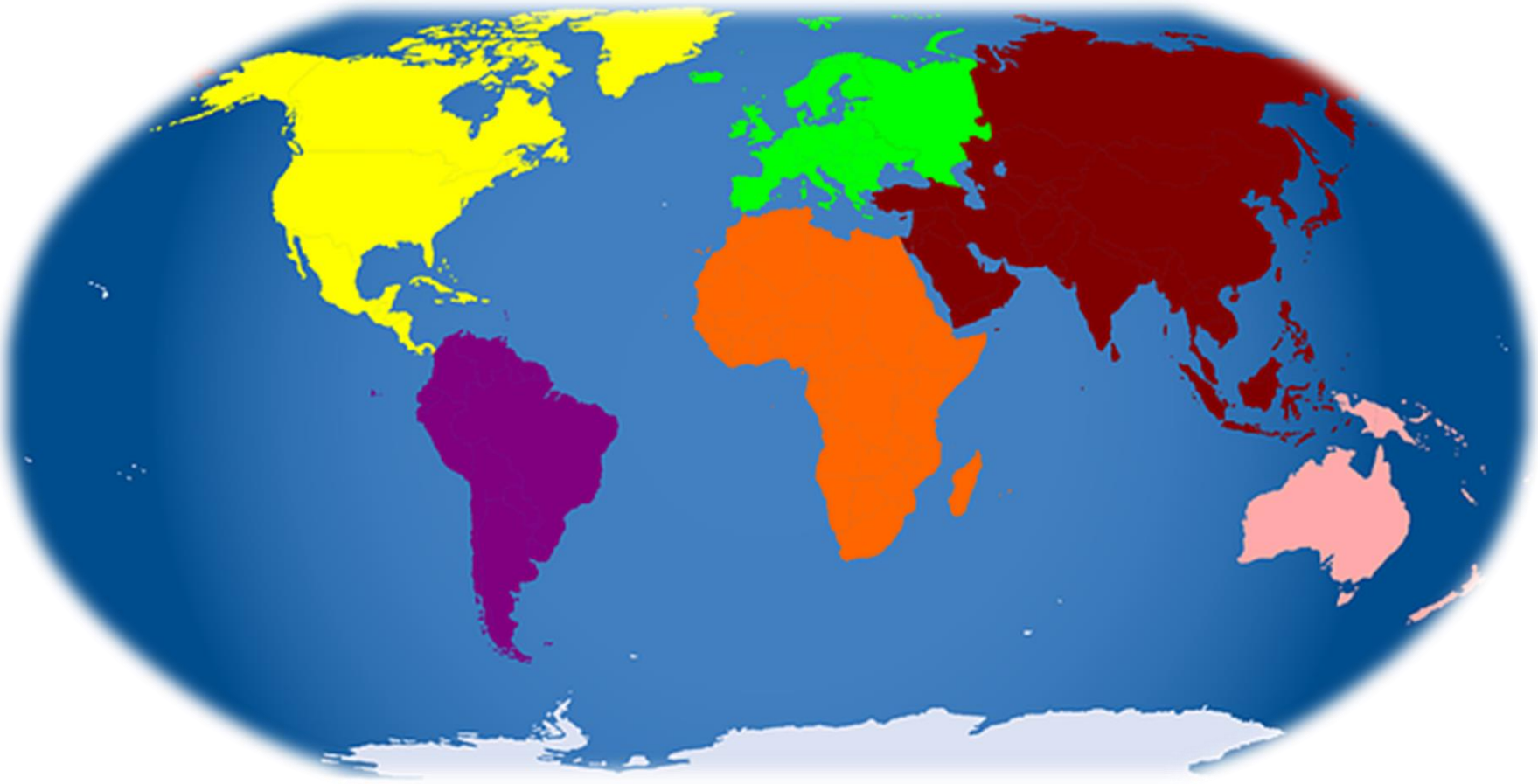

FRANCE
SPAIN
AUSTRALIA
ARGENTINA
NIGERIA
CANADA
IRAN
POLAND
THE NETHERLANDS
GREECE
NEPAL
UZBEKISTAN
SWEDEN
KAZAKHSTAN
AUSTRIA
ITALY
CZECH REPUBLIC
CHINA
PORTUGAL
MACEDONIA
BULGARIA
UKRAINE
LITHUANIA
BOSNIA AND HERZEGOVINA
VENEZUELA
INDIA
CROATIA
KENYA
SWITZERLAND
BANGLADESH
THAILAND
GERMANY
PAKISTAN

15 years

~45 countries

~500 students

We've got all the continents covered…



* … only this one missing

Course structure

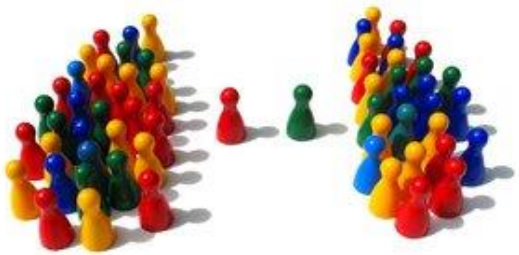
Joint lectures

Lectures from industry professionals

Distributed student projects

Educational goals - I

- obtaining basic **theoretical** knowledge on DSD
- gathering experience from **industry professionals**
- simulating the **real-world** environment
  - working in (big) teams **across locations**
  - working with **external customers**
  - working in **all project phases**



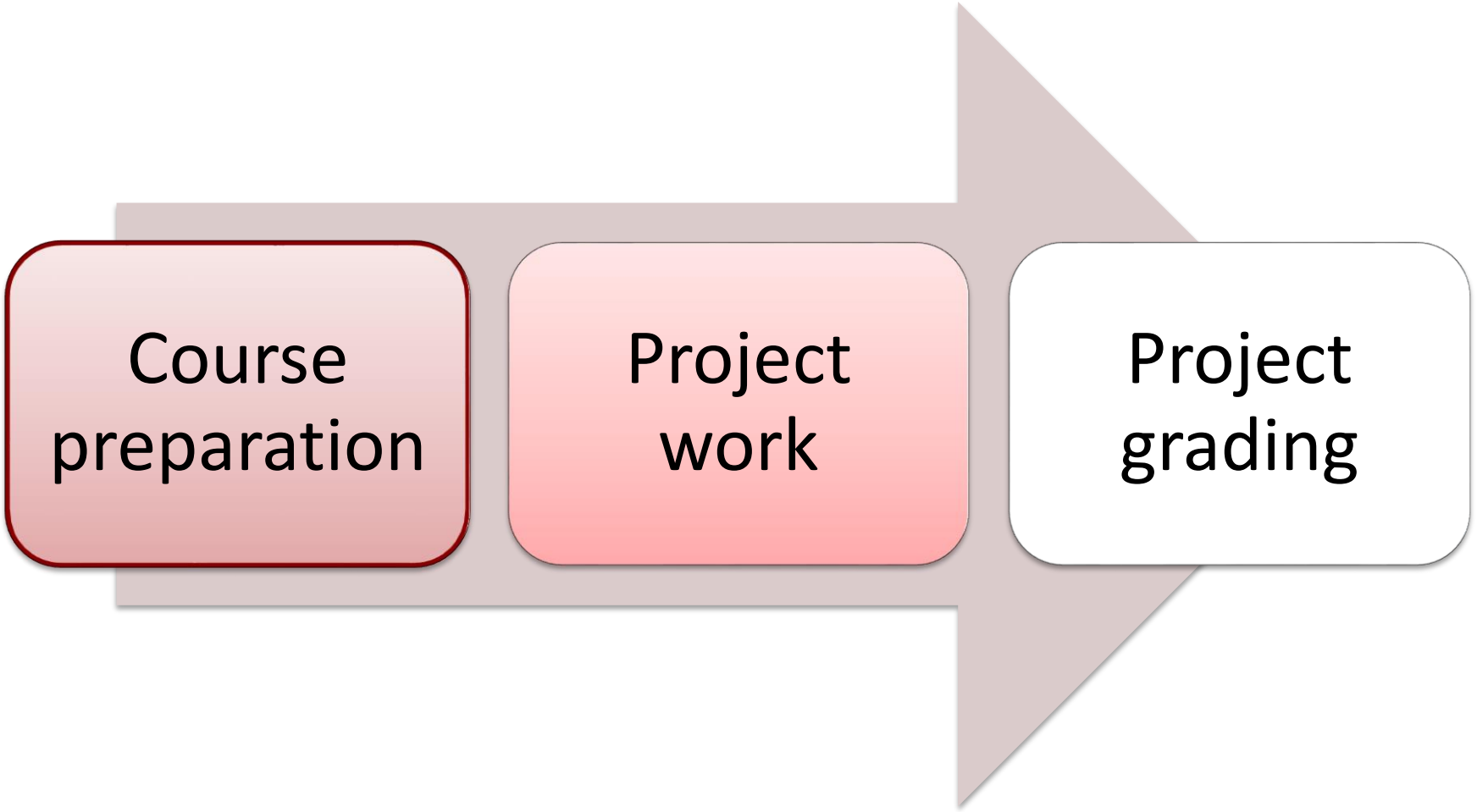
Educational goals - II

- improving **presentation skills**
- transferring knowledge **among the students**
- improving **collaboration skills** and responsibility
- learning about **other cultures**

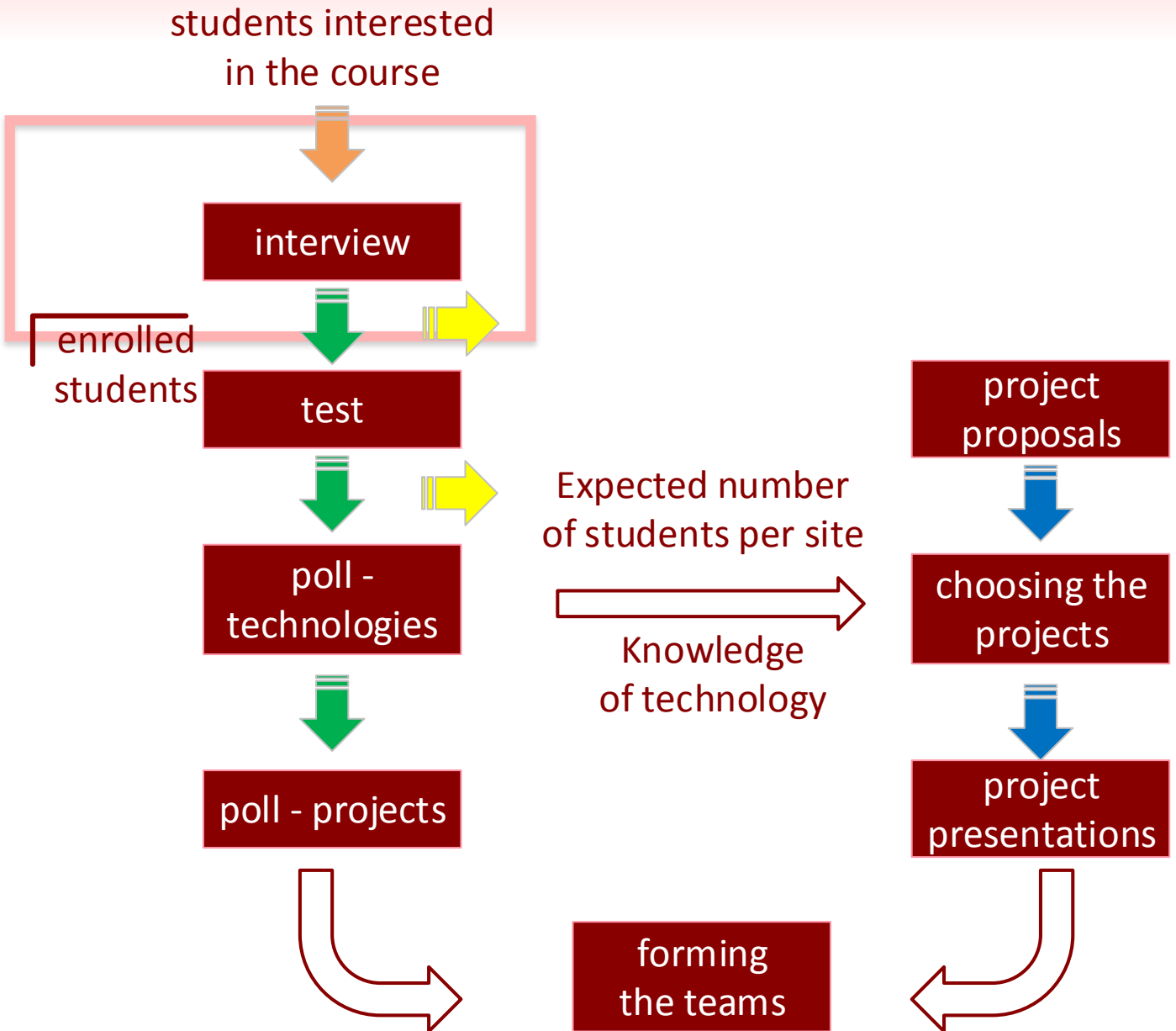
Educational goals - III

- developing **self-assessment** abilities
- learning to **peer-assess**

Course phases



Course preparation phase



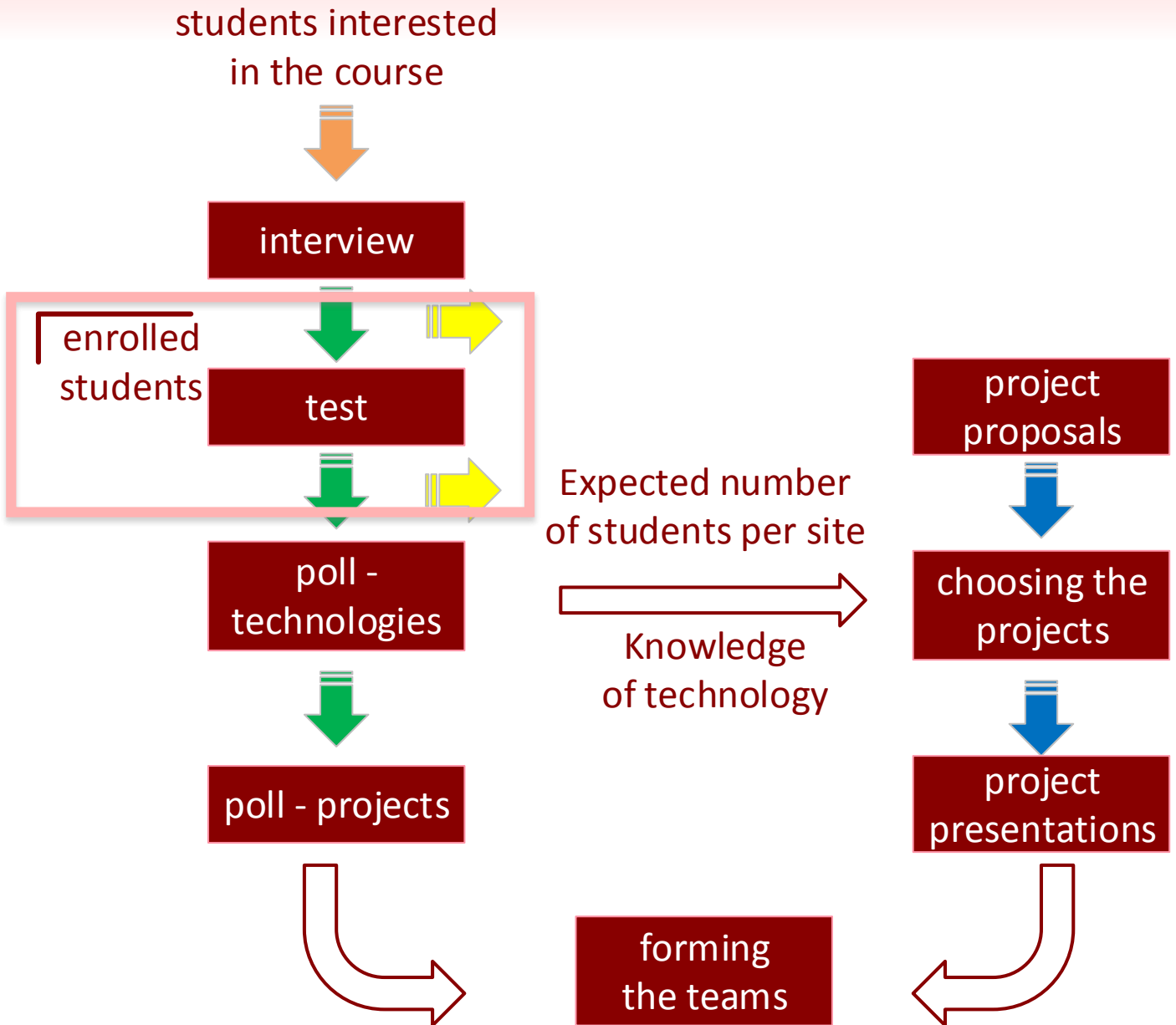
Which students do we want?

- **The best,** of course ☺
  - highly motivated
  - knowledge of English „good enough”
  - knowledge of technology „good enough”
- What do we offer?
  - blood, sweat & tears
  - ~200 working hours and lots of nerves should be invested (not only due to technology!)

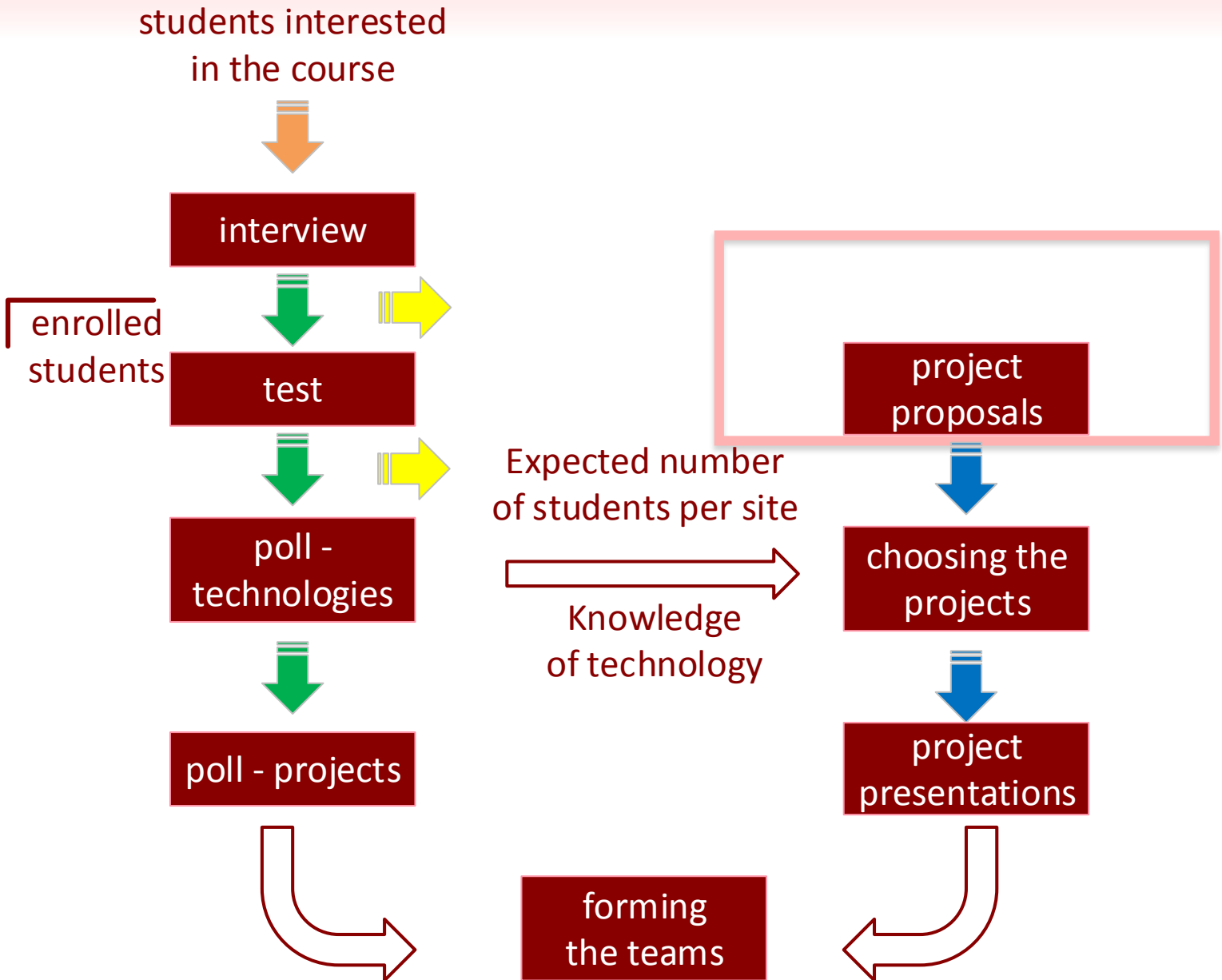
What do we sometimes get?

- I’m the best, the others should listen to me
- Noone ever failed this course
- So I did everything I was told, what’s the problem?
- I went skiing...
- It’s easier to do this by myself
- I don’t like the project I got
- The other site knows nothing!
- The other site is perky/cynical/evil
- I was just in charge of the documentation
- ...

Course preparation phase



Course preparation phase



Project customers

- Internal
  - teaching staff
- **External**
  - universities
    - merger-scenario (University of Paderborn)
    - other research groups / services
  - industry - companies
  - student contests (SCORE)

Real customers...

- ... deserve a separate slide
  - with all the **good** ☺ and **bad** ☹ sides
  - „So, this is how a real life looks like!”

Actually, our DSD-customers are great ☺

Some results – SCORE contest...

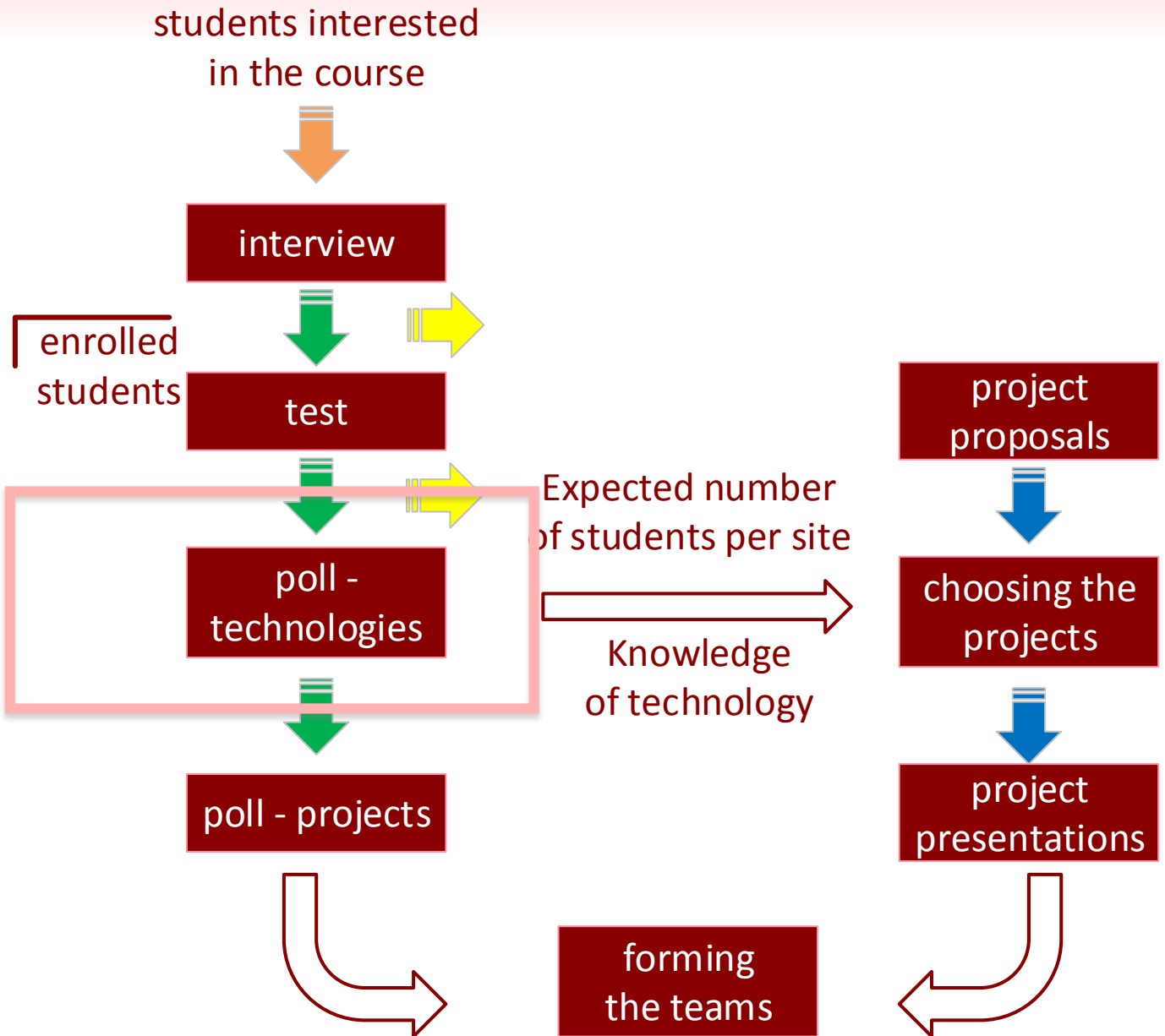
- **not** for self-praise ☹

but to emphasise the **motivation influence** ☺

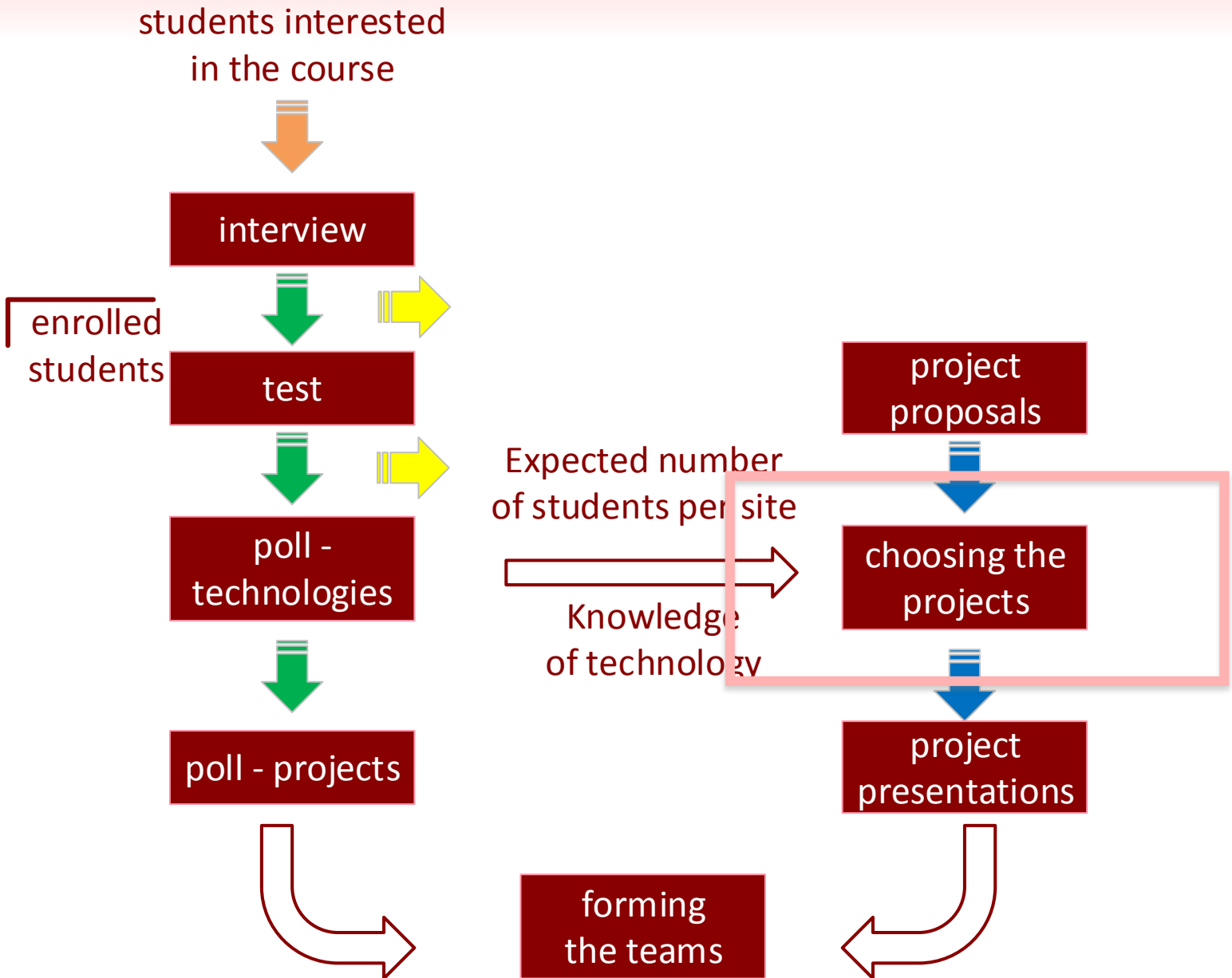
Project characteristics

- **Development** / Research
- **Free choice of technology** / technology defined / tools defined
- Stability of requirements
- Customer availability, technology knowledge, English knowledge

Course preparation phase

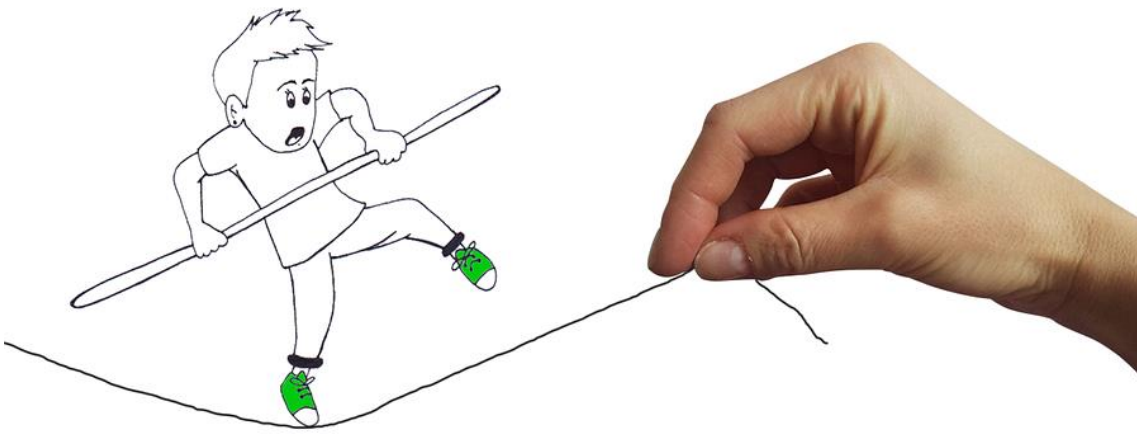


Course preparation phase

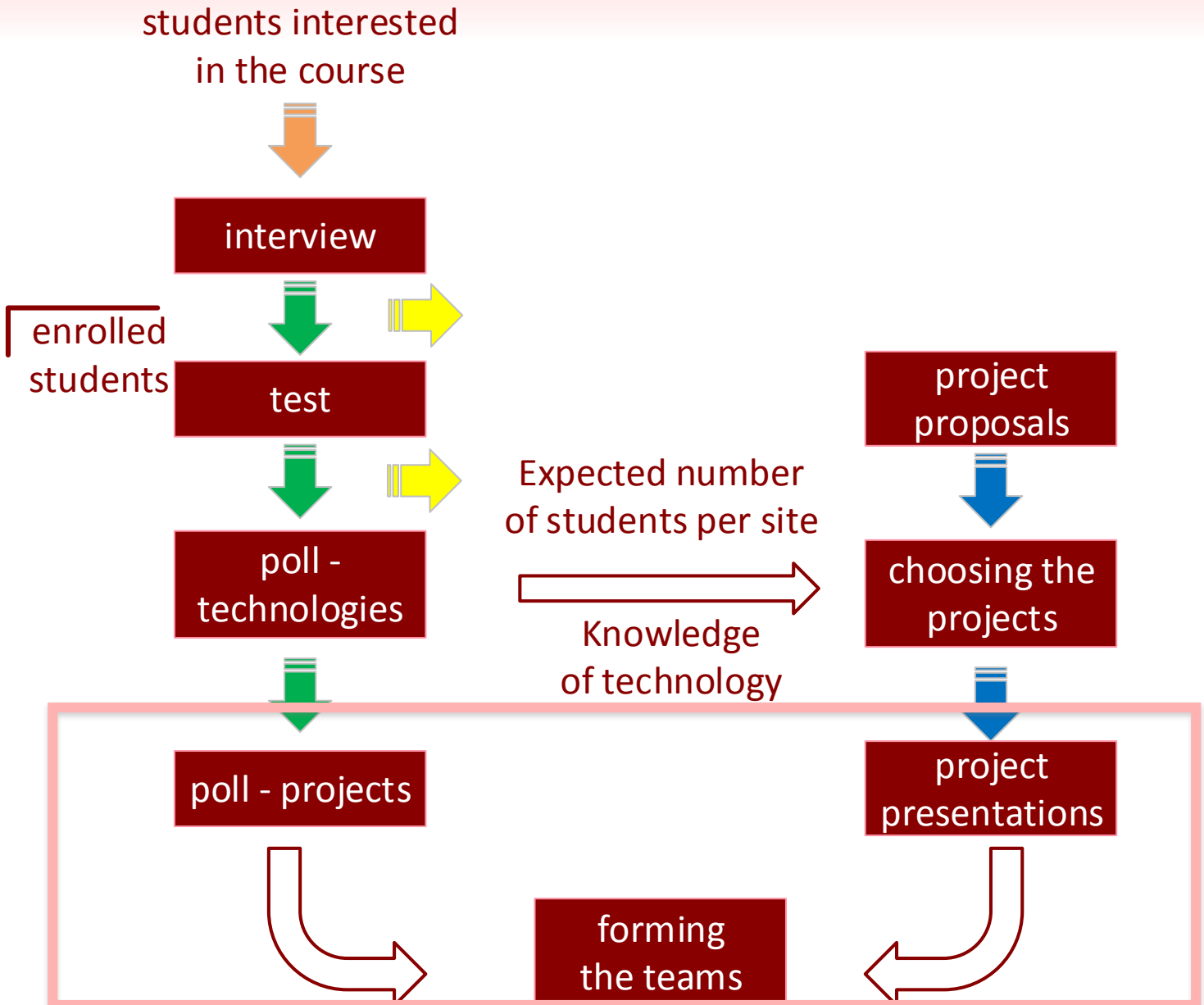


How to choose which projects to run?

- Criteria for choosing the projects
  - **all locations should have their projects**
  - keeping in touch with **industry** partners
  - students' interest in the project
  - equal workload balance on teaching sites



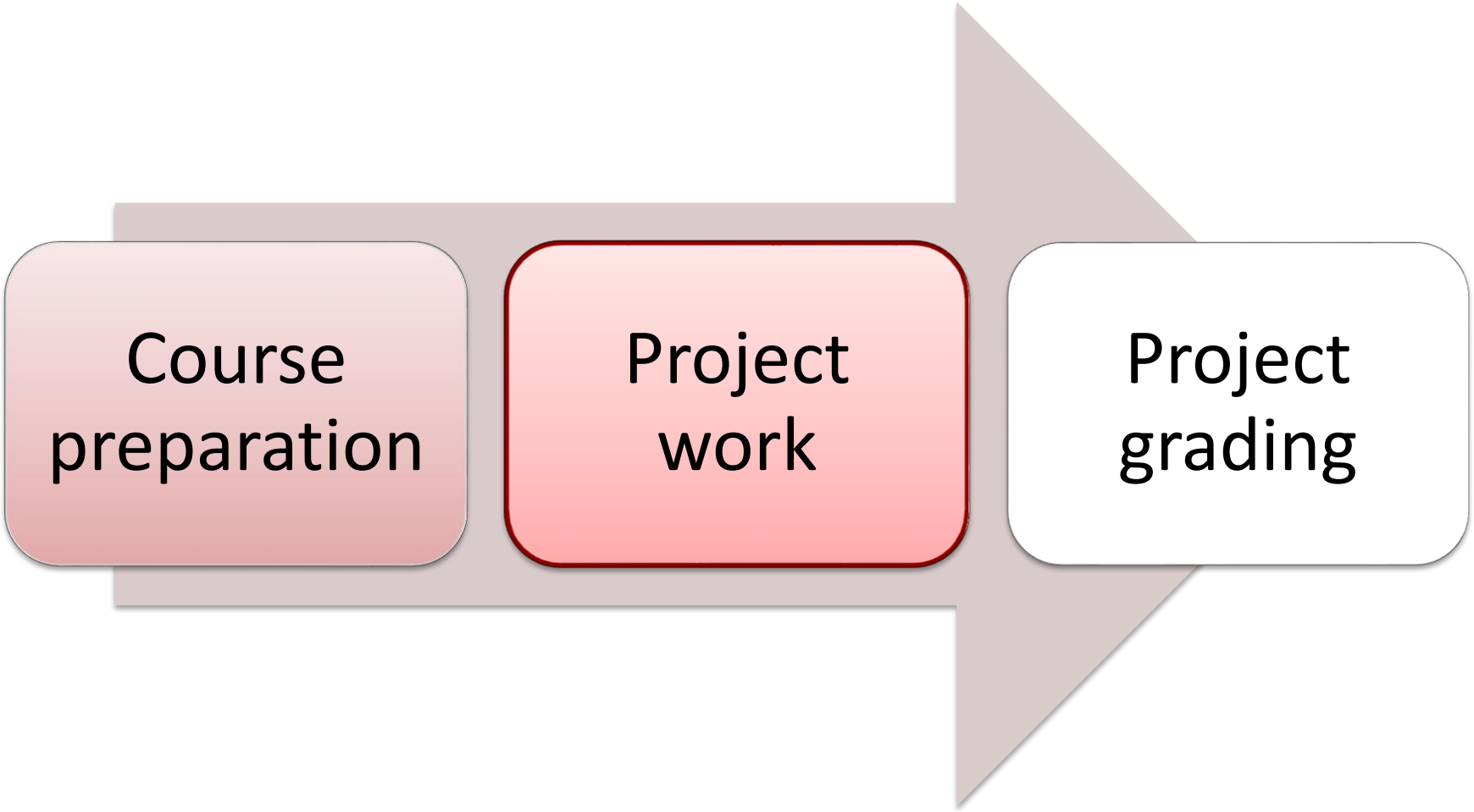
Course preparation phase



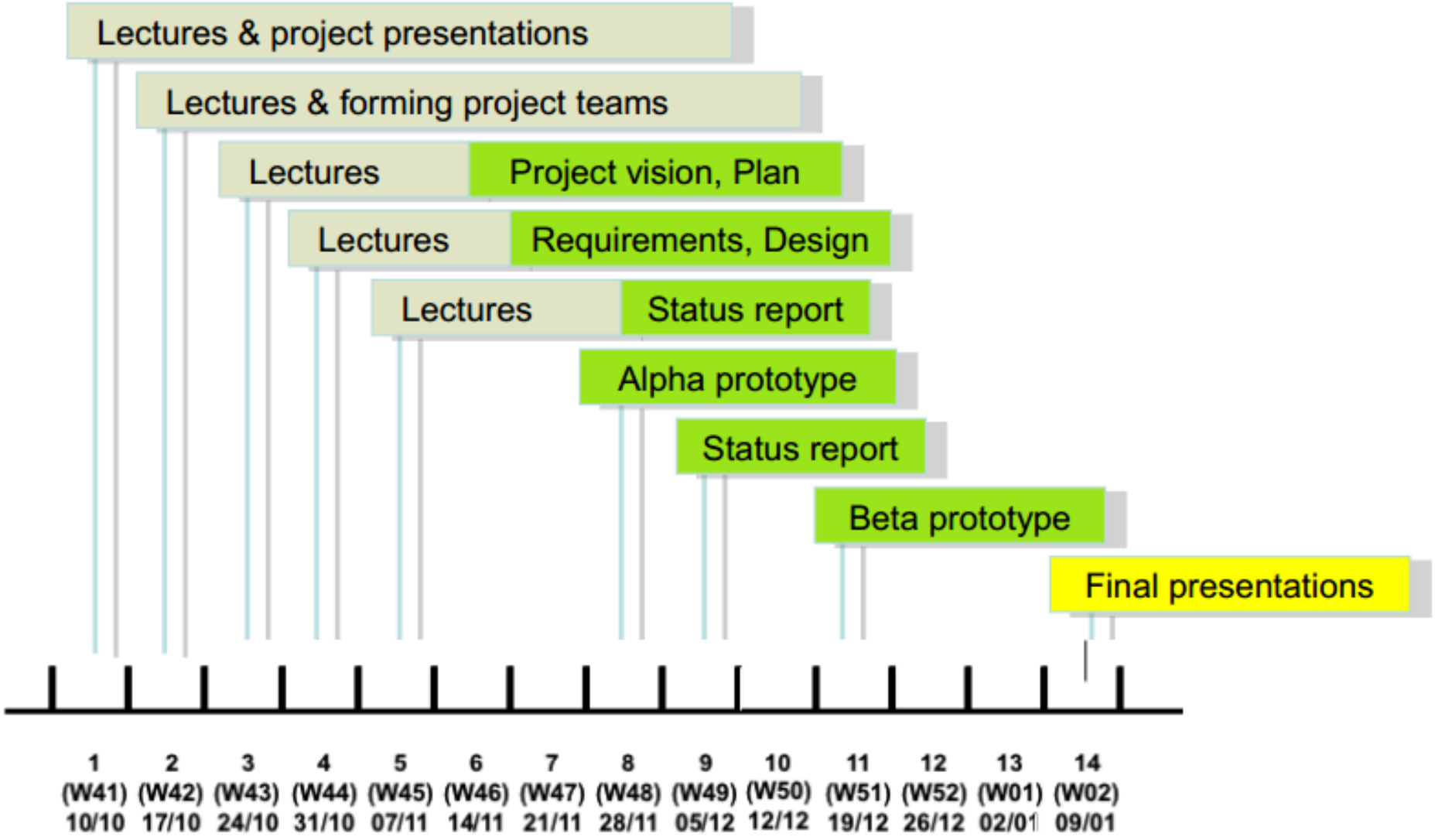
Forming the project teams

- Typical project team
  - 2 sites, 3-4 students per site
  - exceptional situation: 1 site & remote customer
- Criteria for assigning students to project
  - project **motivation**, knowledge of **technologies**
  - … having in mind all the global limitations
  - … trying to optimize the overall motivation
  - … while minimizing the project risks

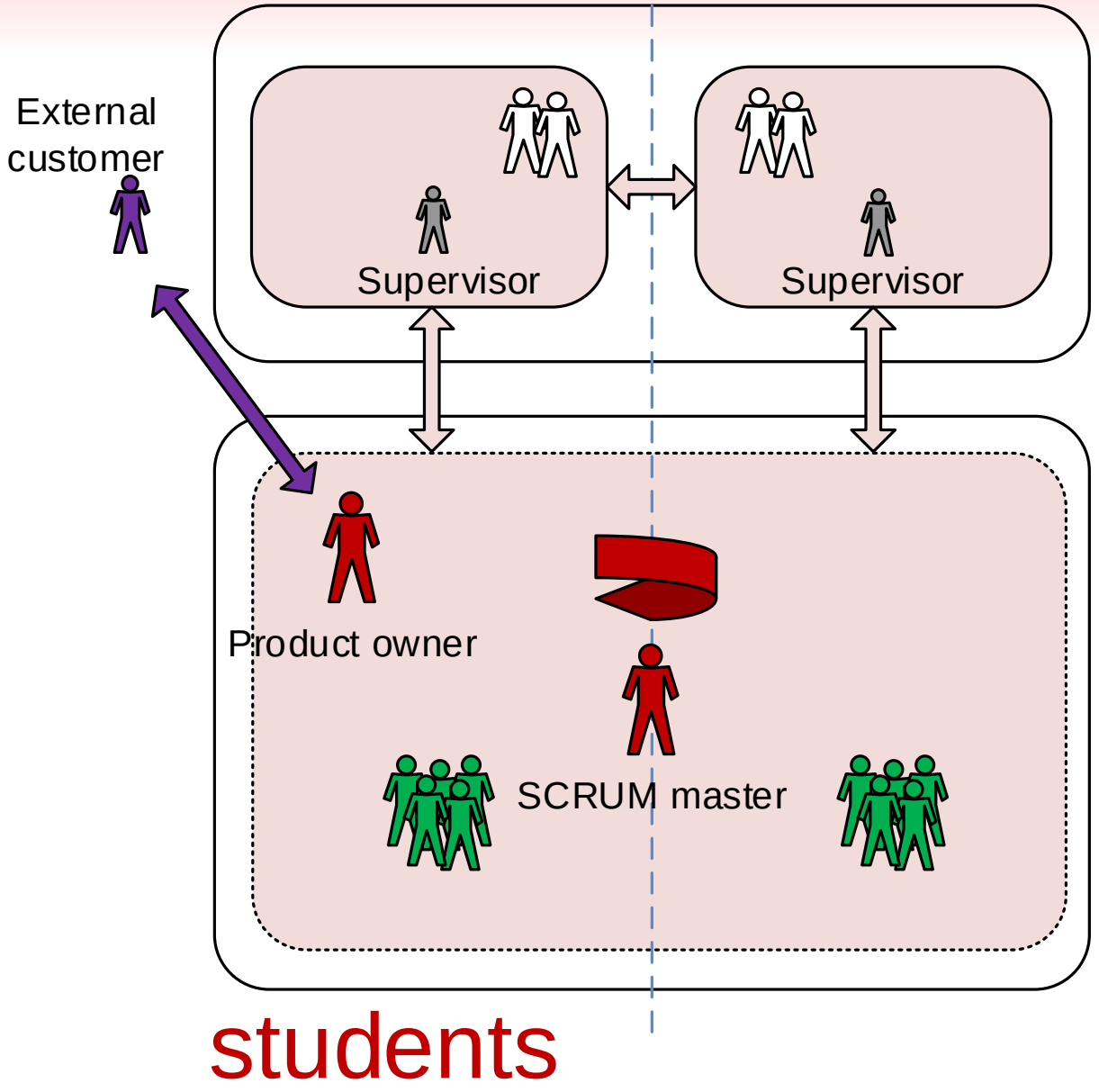
Course phases



Timeline


Lectures & project presentations
Lectures & forming project teams
Lectures
Project vision, Plan
Lectures
Requirements, Design
Lectures
Status report
Alpha prototype
Status report
Beta prototype
Final presentations
1 (W41) 10/10
2 (W42) 17/10
3 (W43) 24/10
4 (W44) 31/10
5 (W45) 07/11
6 (W46) 14/11
7 (W47) 21/11
8 (W48) 28/11
9 (W49) 05/12
10 (W50) 12/12
11 (W51) 19/12
12 (W52) 26/12
13 (W01) 02/01
14 (W02) 09/01

Project team (self)-organization



So what is a successful project?

- 1 team of students
- 1 team of **teachers**
  - *tight coupling* ☺

Taking care of the team…

- role-playing
  - supervisor + customers
- *Teaching Perspectives Inventory:*
  - **nurturing type**
- **communication!**

Documentation

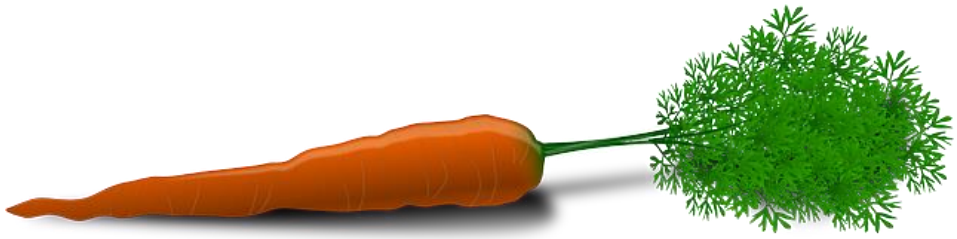
Deliverable	Date
Project plan document (v.1)	**2017-11-03 23:59**
Requirements Definition document (v.1)	**2017-11-10 23:59**
Design Description document (v.1)	**2017-11-10 23:59**
Sprint Report, Sprint Backlog, Sprint Burndown	**during the sprints, update after review & restrospective meeting(s)**
Minutes of Meeting	**During project**
Technical documents, project policies etc.	**During project**
Revisions of existing documents ...	**On major changes**
Acceptance test plan	**2017-12-22 23:59**
SCORE report	**2018-01-15 23:59**
Test report	**2018-01-19 23:59**
Final Project Report, final versions of existing documents, other project-related documentation (as negotiated with the customer)	**2018-01-19 23:59**
Final product (installation, source code, etc.)	**2018-01-19 23:59**

Presentations ☺

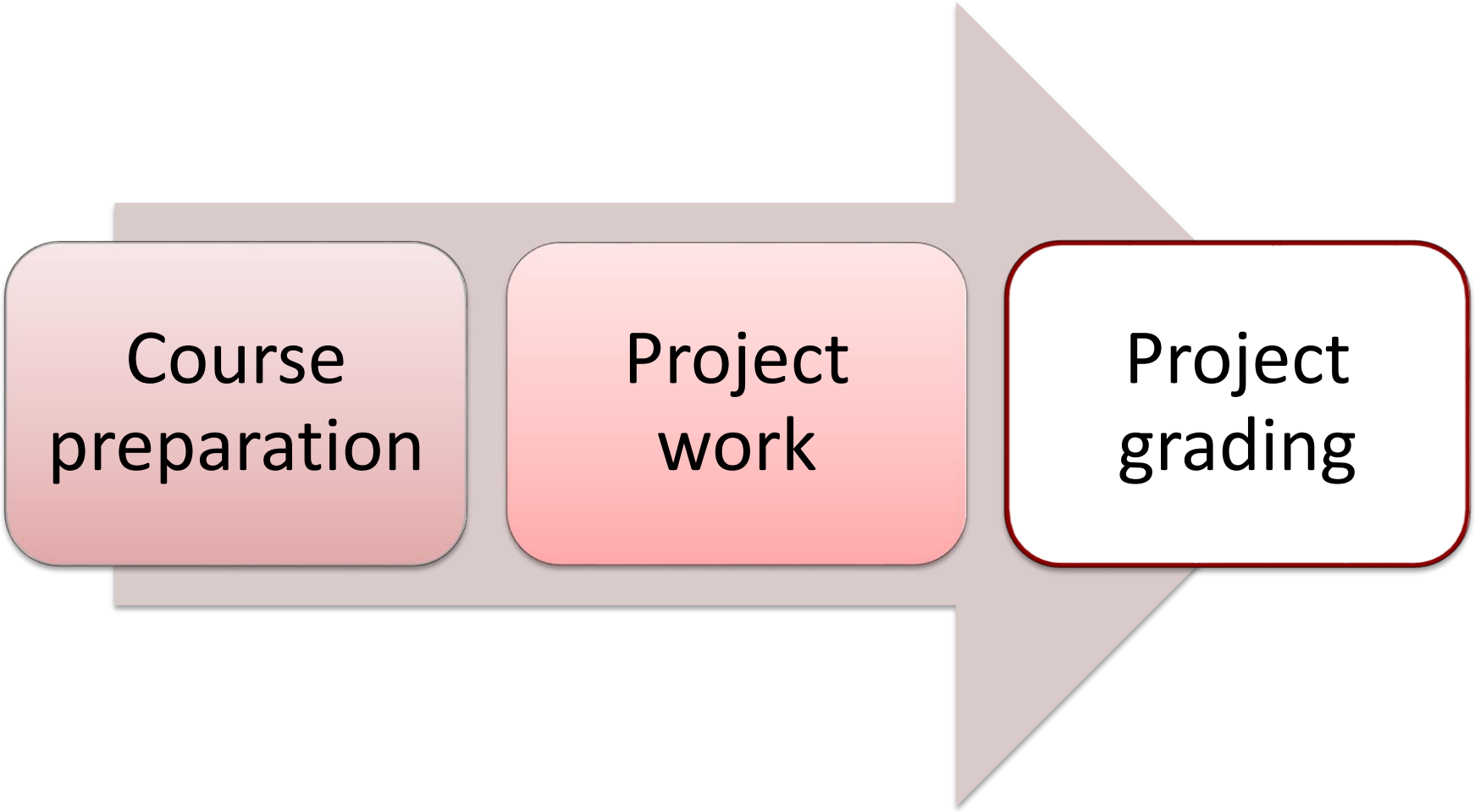
Presentation	Date
Project vision & Project Plan	**2017-10-17**
Requirement, Design, revised Project Plan	**2017-10-31**
Status Report	**2017-11-14**
Milestone - Alpha prototype	**2017-11-28**
Milestone - Beta prototype	**2017-12-12**
Final project presentation	**2018-01-09**

The mechanism of making decisions

- What's better – **dictatorship** or **democracy**?
  - leadership style different across cultures
  - giving out / taking tasks
  - proactivity / passivity of the team members
  - the „terror of democracy"
  - personality and ability of the leaders, changing / rotating roles

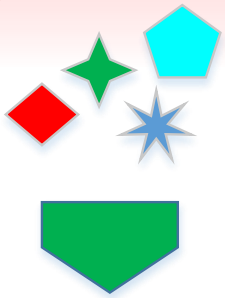


Course phases



How to get the students' grades?

project work results



evaluation

grade points

in-team points distribution

supervisor observation

final questionnaire

individual grade

Project evaluation criteria

- 50+ grading criteria divided into 4 groups:
  - product
  - process
  - documentation
  - presentation

In-team points division

- Staff sees it as a *black-box* approach
- This is **not** the final grade
- Dilemma 1:
  - points as grade (1-5)?
  - points as points (1-100 or similar)?
- Dilemma 2:
  - how will in-team division be done?

Supervisors' observations

- Activity and attendance on meetings
  - meeting observations
  - *minutes-of-meeting* documents
- Project proactivity
- Weekly reports
- Tool logs
  - SVN/Git, task division and assignment
- Presentation activity

Final questionnaire

- Each student answers the questionnaire on:
  - cooperation in the local, as well as remote part of the projec team
  - various communication aspects
  - cultural differences and their work influence
  - process used
  - DSD-experiences
- Good data source for future analysis

Final grading

- Respect deadlines on all universities!
- The process should be **cooperative**
  - all sides included
- Formally, the grade can be given (and „defended”) **only by the local teacher**!

„e” in DSD

Technology in DSD

- not *Yet Another LMS-based course*
- virtual space for students and staff
- tools, technologies, approaches
  - joint lectures
  - collaborative software engineering
  - communication
  - delivering presentations and products
  - feedback

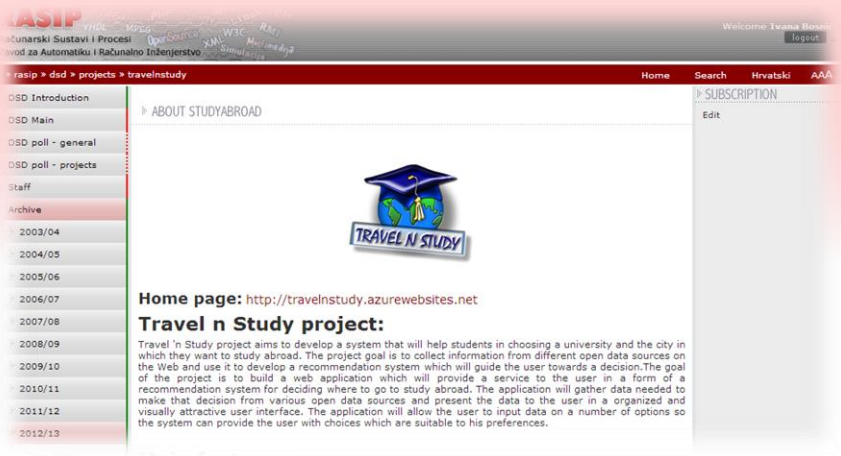
Technology need - I

- Need:
  - synchronous in-class communication
- Used for:
  - audio and video conferences
  - desktop sharing
- Tools used:
  - Polycom, Skype
  - Adobe Connect
  - WebEx

Technology need - II

- Need:
  - **synchronous collaboration**
- Used for:
  - **instant messaging**
- Tools used:
  - **Skype**
  - **FB Messenger**
  - **…**

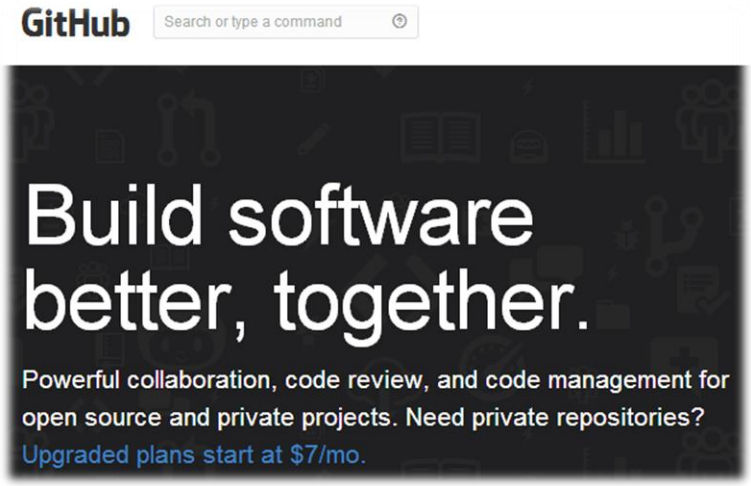
Technology need - III



- Need:
  - asynchronous collaboration
- Used for:
  - sharing news, document collaboration
  - polls and questionnaires, discussion groups
- Tools used:
  - FER CMS
  - Google Groups, Google Docs, Slack
  - Doodle

Technology need – IV

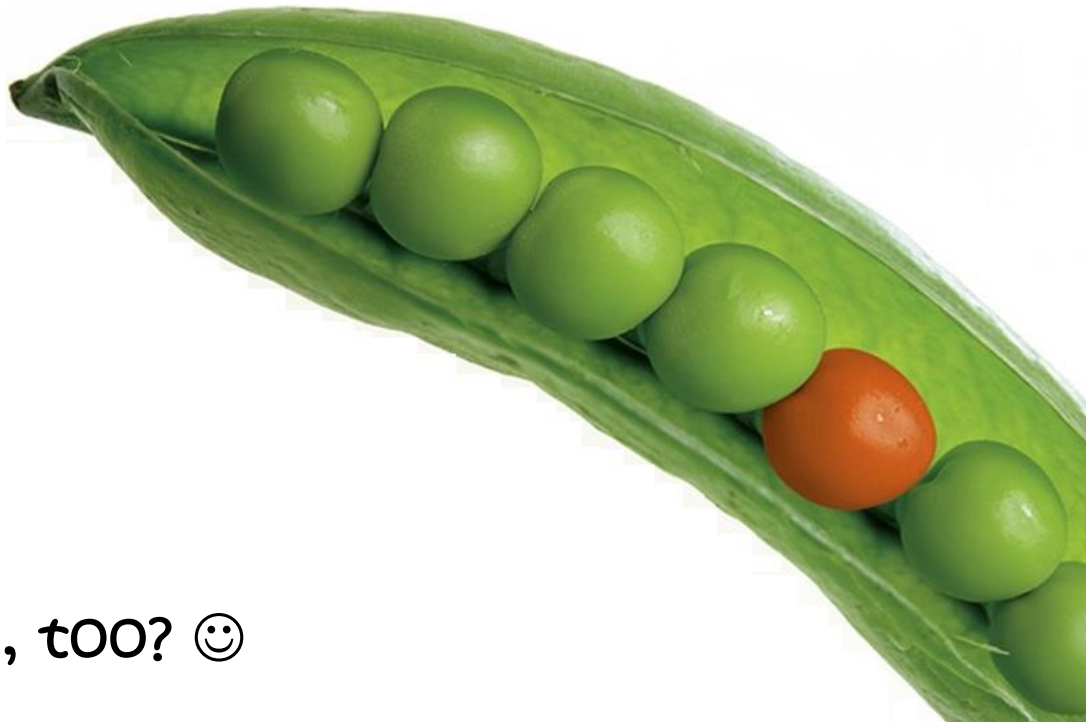
- Need:
  - software development collaboration
- Used for:
  - versioning system
  - bug reporting software
  - project management
- Tools used:
  - SVN, Git, BugZilla, Redmine
  - Trello, Asana



Choosing a {*tool, technology, approach…*}

- stability, availability over the years?
- free / open source?
- **students** (sometimes ☺) **do know better!**
- new experiences

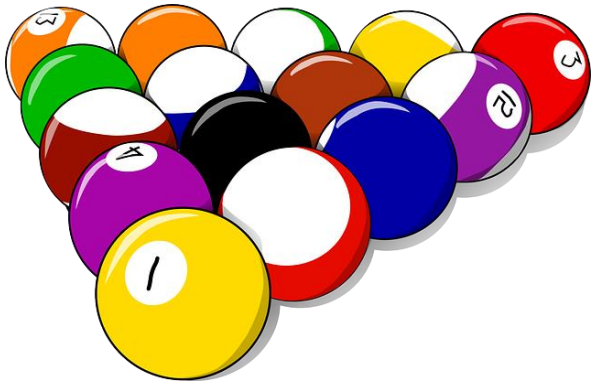
Organizational challenges *



* don't you love this term, too? ☺

Course enrollment

- POLIMI:
  - attending the first lecture...
  - ... but, what about the 2nd one?
- FER:
  - pre-enrollment
- MDH:
  - pre-enrollment (*sort of*)



Course **un**enrollment

- ERASMUS?

Dear Ivana, **20.10.**

After some time thinking about it, I've decided to quit this course. The reason is that, although I find it really interesting and for sure I'd learn tons of things, I don't really need those ECTS and as I'm not a experienced computer programmer i think it's gonna take a lot of my time here in Zagreb which I'd like to use to enjoy my Erasmus.

- Is students' knowledge good enough?
  - „pre-evaluation & advice

- Restricted enrollment?

Enrollment to the remote university

- FER & POLIMI → **MDH**

FER and POLIMI students: Enrollment to MDH 15.10.2014. at 13:24

Dear FER and POLIMI students,

as a part of DSD course, you can be officially enrolled as a distance student to Mälardalen University. It's free and you get the transcript of records for this course, taken also at MDH.

The process:

1. Download **MDH admission form** from the repository below. Be careful to select the right folder for your university!
2. Fill (on the **computer**!), print, **sign** and bring the form to your teaching staff, **by Tuesday, 2014-10-21.**

Ivana Bosnić

[Delete | Edit] [Add comment (0)]

Enrollment to the remote university

- MDH & POLIMI → **FER**

MDH and POLIMI students: Enrollment to FER

21.10.2015. at 16:00

Dear MDH and POLIMI students,

as a part of DSD course, you can be officially enrolled as a distance student to University of Zagreb, Faculty of Electrical Engineering and Computing (FER). It's free and you get the transcript of records for this course, taken also at FER (looks good on your CV!). Additionally, it is important for our course organization on each university..

The process is a bit tedious, but you'll manage :) In order to complete the process, you need to provide us 4 documents:

1. Application for determination and assignment of the Personal Identification Number (OIB)
2. Letter of authorization for FER to obtain the Croatian Personal Identification Number in your name.
3. Application for admission at FER (which needs the above Identification Number)
4. Scan/copy of your **passport / European ID card.**

Please, read and **follow these steps carefully**!

1. **USE CAPITAL LETTERS** (like me now). Write clearly, please!
2. Download **DSD_FER_ID_draft_EN.pdf** and fill it.
    1. If you have a PDF editor, fill it on the computer, otherwise, print it and fill it by hand.
    2. Skip *Natural person master citizen number (MBG)*.
    3. Check the 2nd page of the document for **instructions on form chapter 1.2.**
    4. You do not need to fill *OIB* and *MBG of the **parents**.*
    5. Skip *Chapter 2* (*Legal Entity*).
    6. Under *Chapter* 3 (*List of documents)* write "Letter of authorization" and "Copy of passport / ID-card"
    7. **Sign the document**.
3. Take a look at the **DSD_FER_Letter_of_Authorization_Smith_Michelle.pdf**. This is similar to DSD_FER_Letter_of_Authorization, but translated to English.
4. Download **Letter of Authorization: [MDH - .doc** or .**odt] ::::: [POLIMI - .doc** or .**odt]**
    1. Fill **your name** on the computer, remove highlights.
    2. Print and **sign** the document.
5. Download **FER Application for admission: [MDH - .doc** or .**odt] ::::: [POLIMI - .doc** or .**odt]**
    1. Fill it on the computer. Leave the Identification number (OIB) field **empty**.
    2. Print and **sign** the document
6. Bring all 4 documents in paper to your teaching staff **by Tuesday, 2015-10-27.**
7. Upload your **FER Application for admission** to your **project Web page**. Change the document name (your real Lastname, Firstname).

Any questions? Ask Ivana.

DOKUMENTACIJA POTREBNA ZA ODREĐIVANJE I DODJELJIVANJE OIB-a

STRANA FIZIČKA OSOBA

1. Zahtjev za određivanjem i dodjeljivanjem OIB-a
2. Putovnica – original na uvid, a kopija se prilaže uz Zahtjev

Iznimno, ako strana fizička osoba ne posjeduje putovnicu uz Zahtjev mora priložiti:
- europsku osobnu iskaznicu (državljani Europske unije) ili
- identifikacijski dokument iz države državljanstva uz dokaz o pripadajućem državljanstvu

STRANA PRAVNA OSOBA

1. Zahtjev za određivanjem i dodjeljivanjem OIB-a
2. Akt o osnivanju (rješenje ili izvadak iz nadležnog registra koji mora biti na hrvatskom jeziku ili preveden na hrvatski jezik od strane ovlaštenog sudskog tumača)

Kada Zahtjev u ime strane osobe (fizičke i pravne) podnosi OPUNOMOĆENIK, uz prethodno navedenu dokumentaciju (preslike dokumenata) mora dostaviti i punomoć.

PUNOMOĆ mora biti izdana za postupak određivanja i dodjeljivanja OIB-a. Punomoć mora biti sastavljena na hrvatskom jeziku ili prevedena na hrvatski jezik, budući je u Republici Hrvatskoj u službenoj upotrebi hrvatski jezik. Punomoć se zadržava u nadležnoj ispostavi Porezne uprave i mora biti ovjerena od strane javnog bilježnika samo iznimno ako postoji sumnja u njezinu vjerodostojnost. Ukoliko je punomoć izdana na javnog bilježnika, odvjetnika, javnopravno tijelo, banku nije potrebna ovjera punomoći. Ukoliko Zahtjev podnosi fizička osoba za stranu osobu, potrebna je ovjera punomoći.

Dokumentaciju potrebnu za određivanje i dodjeljivanje OIB-a stranim osobama možete preuzeti i na engleskom i njemačkom jeziku.

Zahtjev za određivanjem i dodjeljivanjem osobnoga identifikacijskog broja možete preuzeti na hrvatskom, engleskom i njemačkom jeziku.

ECTS course points

FER-I (old curriculum)

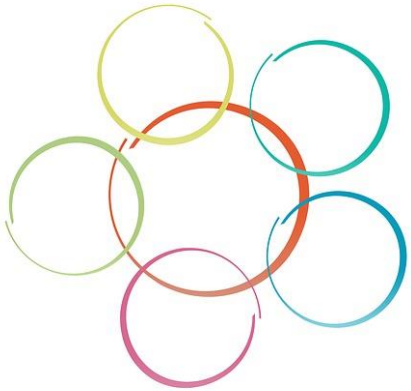
- MDH – 7.5
- FER – **4**

FER-II (new curriculum)

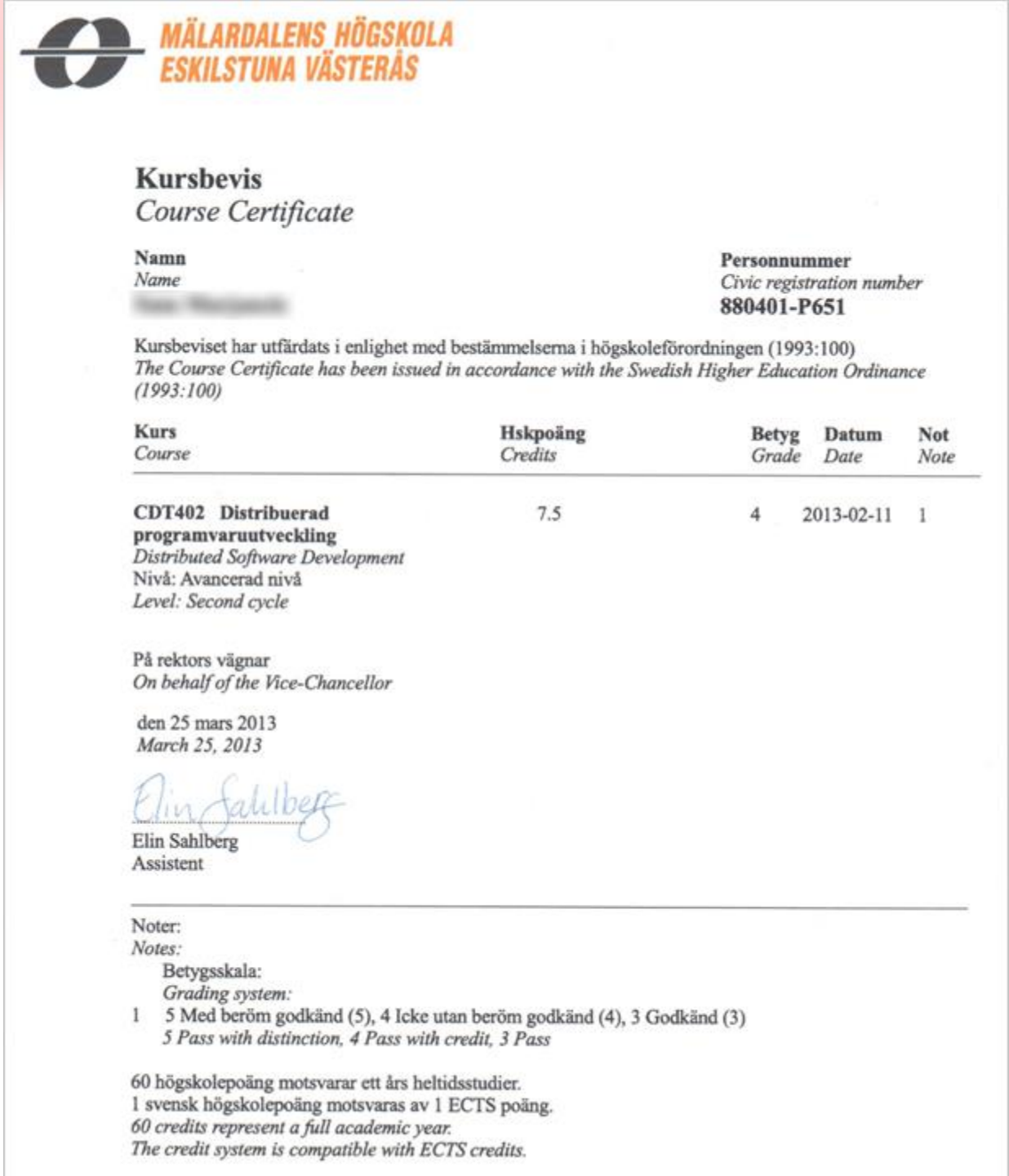
- MDH – 7.5
- FER – **8**
- **…**
- POLIMI - 5

Joint grading

- Giving the same grade!
  - MDH – either fail or 3, 4, 5
- What if – there's no joint-same grades? ☺
  - A, B, C… grades
- *Official Transcript of Records*



Joint grading



MÄLARDALENS HÖGSKOLA
ESKILSTUNA VÄSTERÅS

Kursbevis
Course Certificate

Namn
Name
[redacted]

Personnummer
Civic registration number
880401-P651

Kursbeviset har utfärdats i enlighet med bestämmelserna i högskoleförordningen (1993:100)
The Course Certificate has been issued in accordance with the Swedish Higher Education Ordinance (1993:100)

Kurs *Course*	**Hskpoäng** *Credits*	**Betyg** *Grade*	**Datum** *Date*	**Not** *Note*
CDT402 Distribuerad programvaruutveckling *Distributed Software Development* Nivå: Avancerad nivå *Level: Second cycle*	7.5	4	2013-02-11	1

På rektors vägnar
On behalf of the Vice-Chancellor

den 25 mars 2013
March 25, 2013

Elin Sahlberg

Elin Sahlberg
Assistent

Noter:
Notes:

Betygsskala:
Grading system:

1 5 Med beröm godkänd (5), 4 Icke utan beröm godkänd (4), 3 Godkänd (3)
5 Pass with distinction, 4 Pass with credit, 3 Pass

60 högskolepoäng motsvarar ett års heltidsstudier.
1 svensk högskolepoäng motsvaras av 1 ECTS poäng.
60 credits represent a full academic year.
The credit system is compatible with ECTS credits.

Joint grading

Republic of Croatia
University of Zagreb
Faculty of Electrical Engineering and Computing

Zagreb, January 15th, 2015
Number: **0036482607-DOCUMENT NOT VALID (for testing ONLY)**

Upon the paragraph 159 of the General procedure act this Faculty issues the following

CERTIFICATE

Mr. **Andrea Bottoli**, born on April 6th, 1988 in Mantova, Italy, student from the Politecnico di Milano enrolled as a guest student at the Faculty of Electrical Engineering and Computing, in the graduate university study of **Computing** in duration of 4 semesters, profile: **Computer Engineering**.

Mr. **Andrea Bottoli** passed examinations and completed exercises in the following courses:

	Subject	Total hours		ECTS credits	Date of examination	Grade	Remark
		Lectures	Exercises				
1.	Distributed Software Development	60	45	8.0	02/05/2014	5 (excellent)	--

Total ECTS credits: 8.0

GA: 5.000 at 5.00 scale

Remarks: * Grade not counted towards GA
** Not graded

Grading scale:
The Croatian national grading scale consists of five grades with numerical equivalents: *izvrstan* – 5 (excellent); *vrlo dobar* – 4 (very good); *dobar* – 3 (good); *dovoljan* – 2 (sufficient); *nedovoljan* – 1 (fail); The minimum passing grade is 2 (sufficient).

Academic calendar

	RUJAN 07/08				
Po		3	10	17	24
Ut		4	11	18	25
Sr		5	12	19	26
Ce		6	13	20	27
Pe		7	14	21	28
Su	1	8	15	22	29
Ne	2	9	16	23	30

	RUJAN 11/12				
Po		5	12	19	26
Ut		6	13	20	27
Sr		7	14	21	28
Ce	1	8	15	22	29
Pe	2	9	16	23	30
Su	3	10	17	24	
Ne	4	11	18	25	

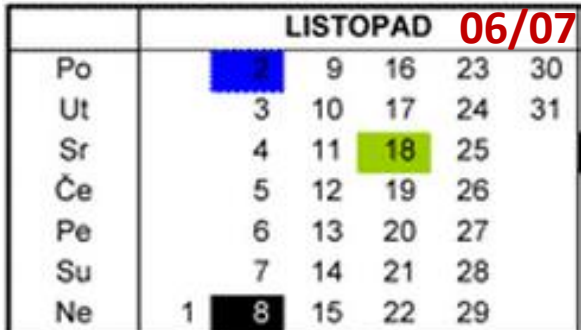
	RUJAN 08/09				
Po	1	8	15	22	29
Ut	2	9	16	23	30
Sr	3	10	17	24	
Če	4	11	18	25	
Pe	5	12	19	26	
Su	6	13	20	27	
Ne	7	14	21	28	

	LISTOPAD 12/13				
Po	1	8	15	22	29
Ut	2	9	16	23	30
Sr	3	10	17	24	31
Če	4	11	18	25	
Pe	5	12	19	26	
Su	6	13	20	27	
Ne	7	14	21	28	

	LISTOPAD 05/06				
Po		3	10	17	24	31
Ut		4	11	18	25	
Sr		5	12	19	26	
Če		6	13	20	27	
Pe		7	14	21	28	
Su	1	8	15	22	29	
Ne	2	9	16	23	30	

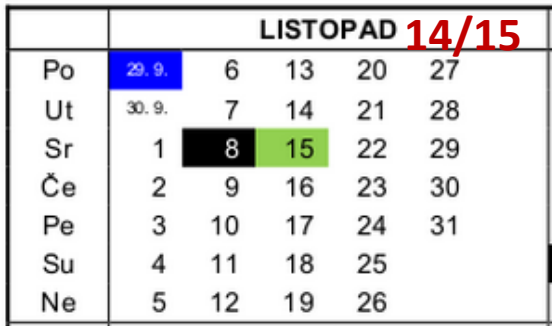
	RUJAN 09/10				
Po		7	14	21	28
Ut	1	8	15	22	29
Sr	2	9	16	23	30
Če	3	10	17	24	
Pe	4	11	18	25	
Su	5	12	19	26	
Ne	6	13	20	27	

	LISTOPAD 13/14				
Po	30. 9.	7	14	21	28
Ut	1	8	15	22	29
Sr	2	9	16	23	30
Če	3	10	17	24	31
Pe	4	11	18	25	
Su	5	12	19	26	
Ne	6	13	20	27	



	LISTOPAD 06/07				
Po		2	9	16	23	30
Ut		3	10	17	24	31
Sr		4	11	18	25	
Če		5	12	19	26	
Pe		6	13	20	27	
Su		7	14	21	28	
Ne	1	8	15	22	29	

	RUJAN 10/11				
Po		6	13	20	27
Ut		7	14	21	28
Sr	1	8	15	22	29
Če	2	9	16	23	30
Pe	3	10	17	24	
Su	4	11	18	25	
Ne	5	12	19	26	



	LISTOPAD 14/15				
Po	29. 9.	6	13	20	27
Ut	30. 9.	7	14	21	28
Sr	1	8	15	22	29
Če	2	9	16	23	30
Pe	3	10	17	24	31
Su	4	11	18	25	
Ne	5	12	19	26	

Academic calendar

- The end of semester is – **the end!**
- **mid-term exam** weeks

- And speaking about calendars…
  - Diwali, Christmas, New Year…
  - Gregorian, Julian… ☺

And the point of these slides is?

Flexibility ☺

Students’ feedback

Students' feedback

- initial questionnaire
- periodic polling – "How happy am I?"
- final questionnaire
- **course evaluation**

10 years

15 questions

264 students

In general...

Year	03	04	05	06	07	08	09	10	11	12	Avg
Students #	21	52	44	26	11	28	36	15	22	9	**28,33**
Statement 1	4,71	4,58	4,32	4,08	4,36	4,14	4,67	4,53	4,23	4,11	**4,38**
Statement 2	4,48	4,29	4,02	3,88	4,27	4,11	4,19	4,18	4,09	4,11	**4,16**

1. As a whole the course was: **4,38**
2. The course has fulfilled my expectations: **4,16**

Some general comments...

- *"Another week and **I would have died**."*

- *"**I was scared** at the beginning, but now I feel lucky I had been a part of this course."*

- *"This course was **one of the best** that I had on faculty."*

And some more to think about…

- *"…I found out that it takes a lot of work to make something work as you want it to work."*

- *"When getting at the FER I thought that **every course will be like this**. Soon I changed my mind and thought that something like **this exists only in america**. I'm very glad I found something like this at FER."*

“It ain’t over… “

- **“What can be improved in the course?”**
- Students’ suggestions on:
  - *Technical resources*
  - *Knowledge level*
  - *Project selection and assignment*
  - *Lectures, Course organization*
  - *Workload, Course advising, Grading…*
- Explaining **why do we do** what we do?
- **Adapting the course** ☺

Well, this is self-praise... ☹

- 2013/2014:
  EUNIS Dorup E-learning Award
- 2009/2010:
  IELA international e-learning contest
  - *runner-up*
- 2008/2009:
  UNIZG – „The best e-course“
  - *2. award*

10 tips to succeed ☺

*Ten Tips to **Succeed in***
Global** Software Engineering **Education

https://dl.acm.org/citation.cfm?id=2337385

Advice #1

Start communication by brute force

Advice #2

Get the students to be familiar
with each other as soon as possible

Advice #3

Keep communication levels consistently high

Advice #4

Ensure that students keep the other students in mind

Advice #5

Keep the students highly motivated

Advice #6

Remember: we are different

Advice #7

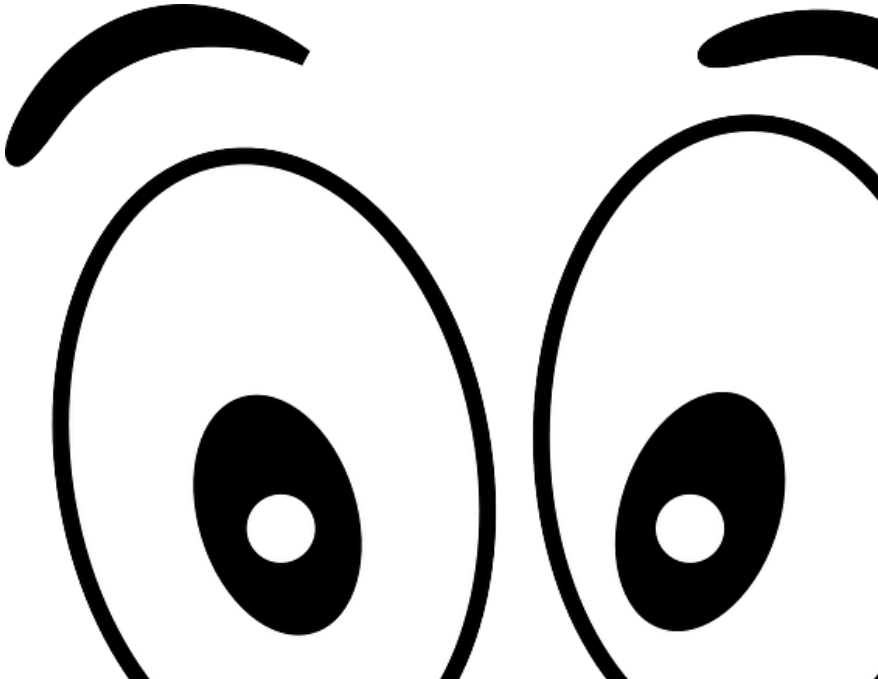
Be flexible – overcome the differences

Advice #8

Be flexible – beat the administration

Advice #9

Be alert



Advice #10

Be enthusiastic

A usual DSD conclusion:

"Quite hard but I guess
that's what the real life is like."

www.fer.unizg.hr/rasip/dsd

…polls, projects archive, awards,
promo-movies, research papers…

Have a question? Ask @ivki or ivana.bosnic@fer.hr