Assignments and Exams Organized at a Distance

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"Software Engineering Education and Reverse Engineering"

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How to conduct "crash course" - *Plan*?

- Course agenda was scheduled as follows:
  - Lectures were to be held from Monday through Saturday
  - *After* the course, assistant from Tirana will conduct *one week* of exercises
  - *During* exercises, students will solve assignments, analogous to those used in Berlin and Novi Sad.

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How to conduct "crash course" - *Plan*?

- Pre-knowledge needed was defined from a set of courses exiting in basic and master studies of Polytechnic University Tirana,
- To complete the exam, students were supposed to:
  - Solve assignments during the exercises, testing *practical* knowledge, and
  - Have an additional, probably written, exam testing *theory.*
- When starting the lectures, we did not have a plan how to conduct exams ☺

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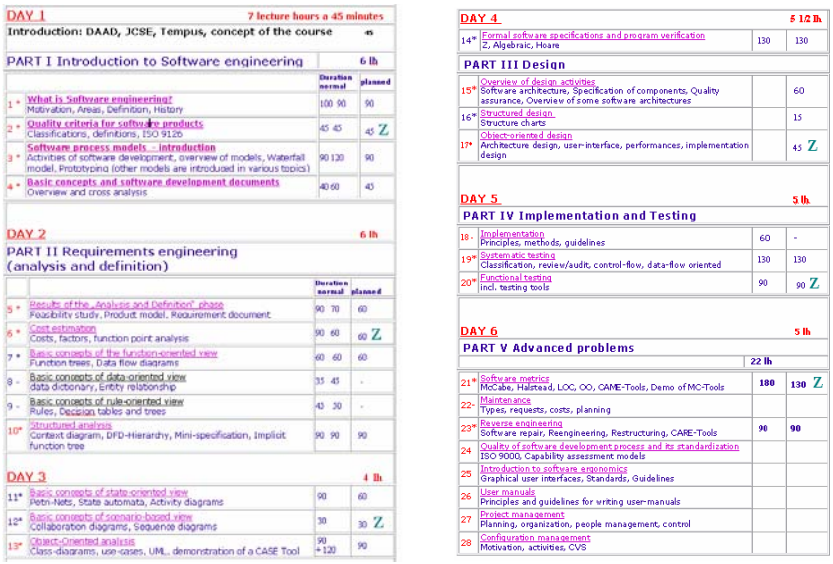
Agenda



DAY 1	7 lecture hours a 45 minutes		
Introduction: DAAD, JCSE, Tempus, concept of the course		as	
PART I Introduction to Software engineering		6 lh	
		Duration normal	planned
1 *	What is Software engineering? Motivation, Areas, Definition, History	100 90	90
2 *	Quality criteria for software products Classifications, definitions, ISO 9126	45 45	45 Z
3 *	Software process models - introduction Activities of software development, overview of models, Waterfall model, Prototyping (other models are introduced in various topics)	90 120	90
4 *	Basic concepts and software development documents Overview and cross analysis	40 60	45
DAY 2		6 lh	
PART II Requirements engineering (analysis and definition)			
		Duration normal	planned
5 *	Results of the „Analysis and Definition" phase Feasibility study, Product model, Requirement document	90 70	60
6 *	Cost estimation Costs, factors, function point analysis	90 60	60 Z
7 *	Basic concepts of the function-oriented view Function trees, Data flow diagrams	60 60	60
8 -	Basic concepts of data-oriented view data dictionary, Entity relationship	35 45	-
9 -	Basic concepts of rule-oriented view Rules, Decision tables and trees	45 30	-
10*	Structured analysis Context diagram, DFD-Hierarchy, Mini-specification, Implicit function tree	90 90	90
DAY 3		4 lh	
11*	Basic concepts of state-oriented view Petri-Nets, State automata, Activity diagrams	90	60
12*	Basic concepts of scenario-based view Collaboration diagrams, Sequence diagrams	30	30 Z
13*	Object-Oriented analysis Class-diagrams, use-cases, UML, demonstration of a CASE Tool	90 +120	90

DAY 4			5 1/2 lh
14*	Formal software specifications and program verification Z, Algebraic, Hoare	130	130
PART III Design			
15*	Overview of design activities Software architecture, Specification of components, Quality assurance, Overview of some software architectures		60
16*	Structured design Structure charts		15
17*	Object-oriented design Architecture design, user-interface, performances, implementation design		45 Z
DAY 5			5 lh
PART IV Implementation and Testing			
18 -	Implementation Principles, methods, guidelines	60	-
19*	Systematic testing Classification, review/audit, control-flow, data-flow oriented	130	130
20*	Functional testing incl. testing tools	90	90 Z
DAY 6			5 lh
PART V Advanced problems			
		22 lh	
21*	Software metrics McCabe, Halstead, LOC, OO, CAME-Tools, Demo of MC-Tools	180	130 Z
22-	Maintenance Types, requests, costs, planning		
23*	Reverse engineering Software repair, Reengineering, Restructuring, CARE-Tools	90	90
24	Quality of software development process and its standardization ISO 9000, Capability assessment models		
25	Introduction to software ergonomics Graphical user interfaces, Standards, Guidelines		
26	User manuals Principles and guidelines for writing user-manuals		
27	Project management Planning, organization, people management, control		
28	Configuration management Motivation, activities, CVS		

Agenda – a short comparison

- In Novi Sad, during the previous semester, 23 topics were presented.
  - In Tirana, 19 topics were presented.
- In Novi Sad, students had to solve 6 team-assignments, within a given deadline of approximately 2 weeks per assignment.
  - In Tirana, students had to solve 1+3 assignments, with the same schedule.

Reminder of assignments

- Berlin: 8 assignments
- Novi Sad: 6 assignments
- Tirana: 4 assignments

	Assignments		HU	NS	TIR
1.	Review requirements specification “SemOrg”		x	x	x
2.	Function points	**(Tool)**	x	x	x
3.	Review structured analysis model		x	x	-
4.	Develop an OOA model	**Tool**	x	x	-
5.	Formal specifications	**(Tool)**	x	x	x
6.	Metrics	**Tool**	x	x	x
7.	Select test cases functionally by the CTE	**Tool**	x	-	-
8.	Select regression test cases by ATOS	**Tool**	x	-	-

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Reasons for selecting just these four assignments for Tirana

- Importance and actuality (“Structured analysis” not selected).
- (Non)-Availability of tools
- No local assistant available
- Ease of correcting at a distance
- Only four:
  - available time of students at the end of the semester,
  - available time of the correctors Bothe, Putnik

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Assignments

- The first assignment was given to students *before* the course started.
- The most important reason was acquaintance with the main case-study, that is used throughout the whole course.
- Yet, because of obligations with other exams, students approached this assignment only on Saturday, 17. March, *only 2 days* before the course started.

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Assignments

- Giving the first assignment *before* the course was possible, because it asks for only two things:
  - Some “reading” knowledge of UML with use cases, and
  - Common sense, good will, and careful work.
- Since it was solved during the weekend, and the assistant *was* present on Saturday, students had a chance for at least some help, consultations, questions ...
- The assignment was graded during the crash course, and evaluation and marks were presented by Putnik on Wednesday.
- This gave students possibility to recognize the methods and demands of „correctors“, and improve in the rest of the assignments.

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Assignments

- 17 Students were divided into 5 teams for assignment solving – same as in Berlin and Novi Sad.
- Team members were self-chosen.
- On a scale from 0 to 10, marks for the first assignment were:
  - Team 1 – didn't understand their task ☹ - 4 points
  - Team 2 – (over)-creative solution – 8 points
  - Team 3 and Team 4 – excellent solution – 9 points
  - Team 5 – perfect solution – 10 points

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Assignments

- During the last 3 years in Berlin and Novi Sad, this assignment was solved by approx 40+40 teams.
- There were some maximal marks for it – average of 2 per season in Novi Sad.
- Still, such a good solution has never been seen ☺
- What is their secret?
- You may ask them ... some of them are in this room!

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Assignments 2 to 4

- Given to students *after* all of the lectures.
- For each assignment, teams had 2 weeks.
- Also, for each assignment, promised (and achieved) feedback was within 10 days.
- It was agreed, that the final mark will be decided based on points won at assignments – 40%, and on a written exam – 60%.

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Complete results for assignments

- Results for each team, for each assignment, are given in a table.
- After each assignment, each team received the whole table, with all of the results. We tried to create a sense of friendly competition ☺

RBr	Team	Practice				
		I	II	III	IV	Total
		10	10	10	10	40
1	1	10	6	8	9	33
2	2	9	9	9	10	37
3	3	9	9	8	10	36
4	4	8	8	7	10	33
5	5	4	8	8	10	30

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Assignments – conclusions

- Were the assignments too difficult? No – in our opinion, but You better ask students:
  - Advices and suggestions were given to teams during the course,
  - They had experience with the previous assignment(s), so
  - None of the teams failed on any of the rest of the assignments.

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Assignments – conclusions

- Were the assignments useful? Yes – in our opinion, of course:
  - “Problematic” points from some of the lectures were cleared during the assignments solving,
  - Since the points gained at theoretical part were slightly lower than expected, points for the assignments had a positive influence on the final marks

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Assignments – conclusions

- Was it a problem that assignments were solved at the distance? Yes – in our opinion, but hopefully, not too much:
  - Students did have some questions, and asked them over e-mail. Of course, those questions were appropriately answered.
  - Experience from Novi Sad is that the most of the questions asked and answered over e-mail, were re-asked again “in person” couple of days later.

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Assignments – conclusions

- Finally, all of the marks were presented to all of the teams. As mentioned, we wanted to create a sense of friendly competition.
  - Such a thing *is not* allowed in Germany.
  - Such a thing *is* a common practice in Novi Sad.
  - What about the rest of the project?
  - Or, what the rest of the project thinks about this practice?

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Lectures

- Lectures were given for 6 days, from Monday to Saturday, on the average:
  - (around) 2 lecture hours by prof. Bothe,
  - (around) 2 lecture hours by his assistant,
  - Again (around) 2 lecture hours by prof. Bothe.
- Yet, because of the bad flight-schedule, last two days were assigned to the assistant/Friday and professor/Saturday.

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Exercises

- Even with the famous punctuality of prof. Bothe, plan and its realization *could not* match completely!
- Home-assistant was supposed to work with Putnik *during* the course, and get acquainted:
  - with the assignments,
  - with the course organization,
  - with the eLearning support system Moodle (used in Novi Sad for JCSE support)
  - with the main case-study, and
  - with the set of around 350 exam questions.

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Lectures and exercises – revisited

- Home-assistant *does not* exist ☹.
- Hmmm ... maybe we should pick one or two from the available group?
- Home-professor (guess) *does not* exist either ☹ ☹
- Why?
- Combination of usual problems – lack of qualified personnel and better salaries somewhere else, forced Polytechnic University of Tirana to employ part-time professors for some of the courses...
- ... Software Engineering being the one of those!

Lectures and exercises – revisited

- Home-professor for SE has his own private software company ...
- ... and was too busy during the week crash course was conducted ...
- ... so that he visited us *only* on the first day, introduced himself, got introduced to the project and the course organization for about *one hour*...
- ... apologized, and left, never to return during that week ☹

Consequences for the crash-course

- Course schedule had to be adjusted to the actual situation:
  - Agenda has been extended with the classes where Putnik gave advices and explanations concerning the rest of the assignments,
  - Our dilemma about the number of additional assignments was solved – only 3 more,
  - It's been decided firmly that the exam *must be* conducted *on distance*, organized by prof. Cico in Tirana, submitted electronically, and corrected within a reasonable time by prof. Bothe and assist. Putnik,
  - Which as a consequence introduced another task for (poor) assistant – translation of a set of question to English.

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Consequences for a future

- For the next school year, as mentioned, there might be a possibility to pick an appropriate assistant(s) from a group
- Professor for the next school year is still a mystery ...

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Exam

- The greatest challenge was that the exam had to be organized at the distance:
  - There is no local professor and no local assistant,
  - Prof. Bothe and assist. Putnik had their lectures/exams at the same time,
  - There might be a problem of financing yet another visit to Tirana.

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Exam

- In Berlin, exam consists of assignments and questions answered *orally*.
- In Novi Sad, exam consists of assignments and 3-4 *written* exams during the year.
- We used experiences and questions from Novi Sad, translating and adjusting them to material presented in Tirana.

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Exam

- In Novi Sad, written exam has 15-20 questions of a different form:
  - Multiple choice questions,
  - Choice questions,
  - True/False questions, and
  - Open questions
- For Tirana, we decided to use only “open questions”.

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Exam

- Exam was organized by professor Cico at Polytechnic University Tirana.

Exam

- As mentioned – results of the exam were slightly lower than we expected ☹
  - All of the preparation for the exam was through a self-study, without possibility to ask, or consult lecturers,
  - Preparation was done only on the basis of slides (but than again, the same stands for Novi Sad, each year).
  - Lectures and slides were in foreign language!

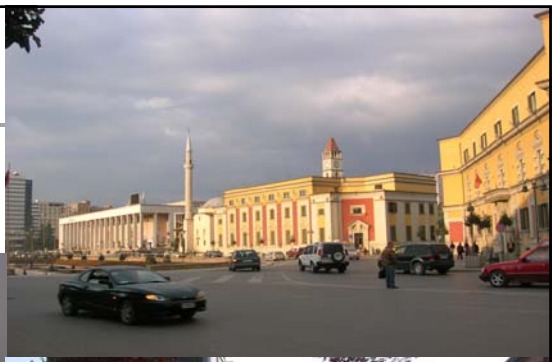
Exam

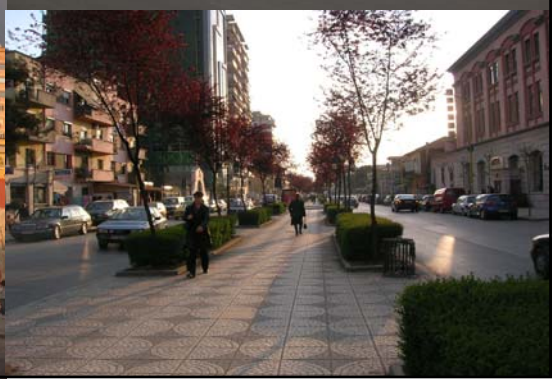
- Still, the final results are quite satisfactory, and might even get better – we agreed to give another chance to those wishing it.
- Complete results are as follows:

RBr	Name	Team	Practice Total 40	Exams Total 60	Total	Mark
1	[illegible]	1	37.95	47.7	**85.68**	9
2	[illegible]	3	41.4	42.0	**83.38**	9
3	[illegible]	1	37.95	31.6	**69.58**	7
4	[illegible]	3	41.4	32.8	**74.18**	8
5	[illegible]	2	42.55	18.4	**60.95**	7
6	[illegible]	3	41.4	40.3	**81.65**	9
7	[illegible]	4	37.95	51.2	**89.13**	9
8	[illegible]	5	34.5	25.3	**59.80**	6
9	[illegible]	4	37.95	42.6	**80.50**	9
10	[illegible]	1	37.95	32.8	**70.73**	8
11	[illegible]	5	34.5	16.1	**50.60**	6
12	[illegible]	2	42.55	30.5	**73.03**	8
13	[illegible]	2	42.55	50.0	**92.58**	10
14	[illegible]	5	34.5	32.2	**66.70**	7
15	[illegible]	4	37.95	55.2	**93.15**	10
16	[illegible]	3	41.4	39.1	**80.50**	9
17	[illegible]	5	34.5	0.0	**34.50**	-

Touristic part

Touristic part





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