

LTAT.05.003

Software Engineering

**Course wrap-up, review
and exam preparation**

Fall 2020



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Schedule of Lectures

Week 01: Introduction to SE

Week 02: Requirements Engineering I

Week 03: Requirements Engineering II

Week 04: Analysis

Week 05: *Development Infrastructure*

Week 06: *Continuous Development
and Integration*

Week 07: Project Estimation /
Architecture and Design I

Week 08: Architecture and Design II

Week 09: Verification and Validation I

Week 10: Verification and Validation II

Week 11: Refactoring (and TDD)

Week 12: Agile/Lean Methods

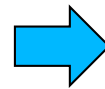
Week 13: *Agile Methods in Industry*

**Week 14: Course wrap-up, review
and exam preparation**

Week 15: no lecture (BUT:
assessment labs)

Assessment (1)

- Labs – 70% of total grade
- Exam – 30% of total grade
- Proposed Exam Dates:
 - Exam 1: Fri, 08-Jan-2021
 - Exam 2: Tue, 12-Jan-2021
 - (Retake: Tue, 26-Jan-2021)



You must register!
You can take either exam 1 **or** 2
(exclusive or)



- ~~Room: J. Liivi-403/4/5 – exams 1 & 2~~
- ~~Limit: 110 students per exam~~
- **Virtual in Moodle**
 - **08-Jan: 10:15-12:45**
 - **12-Jan: 14:15-16:45**
 - **12-Jan: 14:15-16:45**

So far registered:
82 – Exam 1
16 – Exam 2
81 ?????

(of 179 active students)

Assessment (2)

Labs – Practical Assessment

10 points per lab session. Total = 70 points.

If you get less than 30 out of 70 points in the labs, you will get a grade of 'F' in your first examination.

In this case, you will be given a second chance to improve your practical assessment (lab) score.

Condition: You have not received 0 marks in two or more labs due to non-submission

If your score after improvement is at 30 out of 70, you will become eligible for the re-take exam (korduseksam).

Note: You can only improve up to 30, not beyond

Exam – Conceptual Assessment

The Conceptual Assessment will consist of an exam worth 30 points.

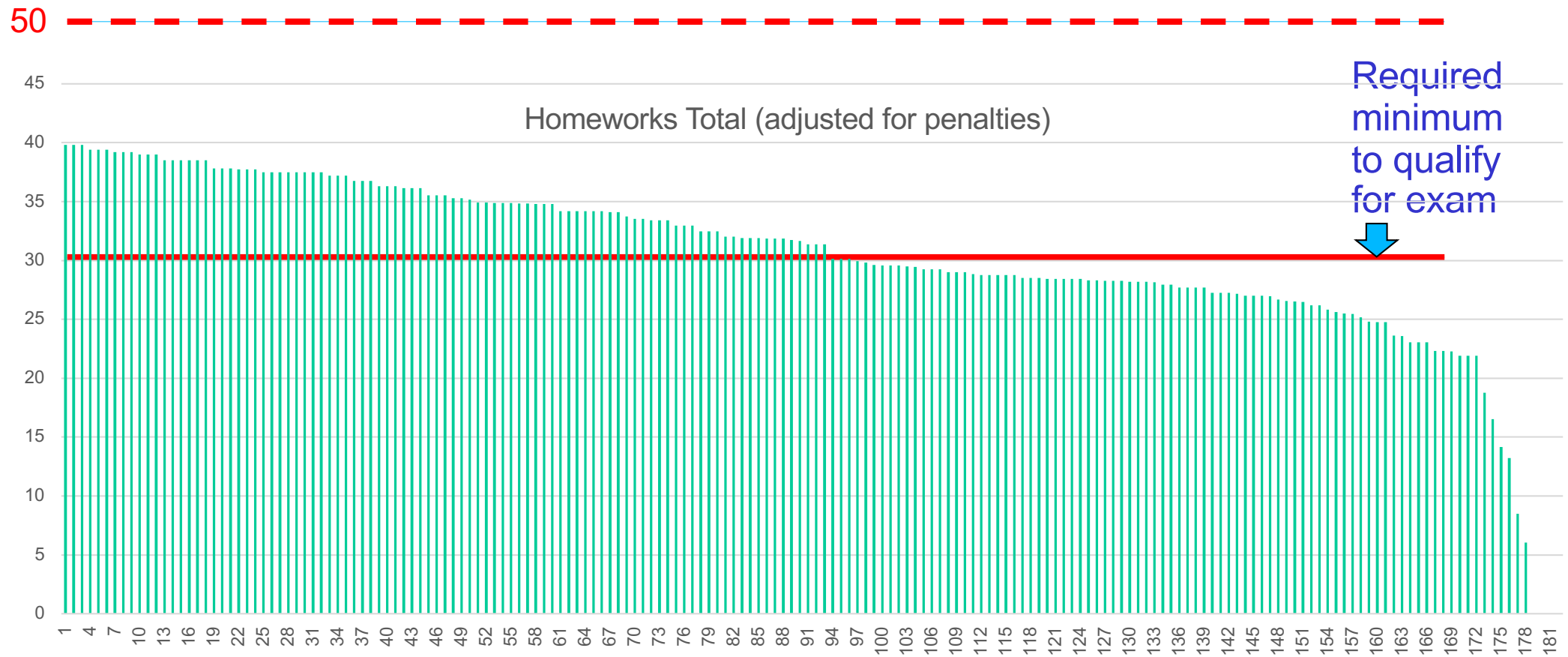
Students who get less than 10 out of 30 in this exam, will get a grade of 'F', regardless of their Practical Assessment score.

This same rule will apply for the retake exam (korduseksam).

HW Performance after 4 HW Assignments

Still up to 30 additional marks possible (if no indiv. penalty applies)

179 students



Schedule of Lectures – Relevant for Exam

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assessment labs)

Topic: Introduction to SE

- Know different kinds of development methods/processes
- Know the various characteristics (attributes) of software quality
- Know what a user story is (3 elements)
- Know criteria that help assess the quality of a user story (e.g., INVEST: Independent, Negotiable, Valuable, Estimable, Small, Testable)

Topic: Requirements Engineering I + II

- Know how to describe/define 'Requirements Engineering' (RE)
- Know about the difficulties eliciting and describing software requirements
- Know examples of conflicting requirements and how to deal with them
- Know the activities involved in the RE process (elicitation, analysis, specification, validation)
- Know the difficulties of requirements elicitation
- Know the difference between functional and non-functional requirements (aka 'quality requirements')

Topic: Requirements Engineering I + II (cont'd)

- Know different ways of defining/specifying requirements
 - i.e., user stories and use cases
- Know how to draw a use case diagram
- Know the elements of a use case description
- Know how to estimate projects with user stories (story points)
- Know how to estimate projects with use cases (use case points)

Topic: Analysis

- Know types of domain classes
 - business objects (e.g., order, receipt), real world objects (e.g., materials), actors/workers/persons (e.g., controller, customer), events (e.g., sale, payment)
- Know how to identify domain classes
 - E.g., by identifying nouns in domain descriptions
- Know how to identify attributes of domain classes
 - E.g., simple data types (like 'order number')
- Know how to create a domain model
 - Outside-in approach (boundary, control, entity concepts)
 - Setting-up an enterprise approach ('workers' vs. 'things', 'doing' vs. 'knowing' concepts)

Topic: Architecture and Design I + II

- What is the main purpose of Architecture/Design? Why is it important? How is it related to quality?
- Know the purpose of architectural views
- Know examples of architectures (e.g., MVC)
- Know what Design Patterns are

Topic: Refactoring

- Know what 'refactoring' is
- Know examples of 'code smells' and examples of 'refactorings'
- Work through Martin Fowler's introductory example on refactoring

Topic: Verification and Validation I + II

- Know the difference between 'verification' and 'validation'
- Know what the 'testing paradox' is
- Know the difference between 'error', 'fault', 'failure'
- Know the terms 'test case', 'test suite', 'test oracle', 'test verdict'
- Know what testing levels, methods and types are
- Know the difference between 'white-box' and 'black-box' testing, and know why they are complementary
- Know how to apply 'black-box' and 'white-box' testing techniques
- Know test coverage criteria (and how to use them)
- Know how to test usability requirements

Topic: Agile/Lean Methods

- Know the spirit of the 'agile manifesto' and know how to explain/interpret it
- Know examples of agile software development methods
- Know elements of XP and Scrum (e.g., TDD, Planning Poker, Pair Programming)
- Know the difference between XP and Scrum

Exam until last year ... 'Open Book' 'Open Laptop'



LTAT.05.003 – Software Engineering

Written Exam – 27 January 2020

Start: 14:15 – End: 16:45

Important Notes:

- You are only admitted to this exam, if you have at least 30 marks from the lab assignments.
- The exam is open-book and open-laptop. Web browsing is allowed, but you are neither allowed to use e-mail clients or Instant Messaging clients nor to share any information “live” with anybody inside or outside the exam room.
- This document (question sheet) contains 6 pages (including the cover page). Please check that you have received 6 pages.
- At the end of the exam you must submit both the question sheets and your answer sheets. To avoid that any of your solutions get lost, make sure to write your name (and student ID) on each sheet of paper that you submit.
- Write clearly. Answers that are illegible cannot be counted as correct answers. Only answers written in English will be marked.
- To answer Part 1, use the separately distributed answer sheet. Answers given on the question sheets will not be marked!
- To answer Parts 2 and 3, use the separately distributed blank paper. Answers given on the question sheets will not be marked! Also, please number the pages on your answer sheets.
- At the end of the exam you must return the problem sheet. If you take the question sheets with you (out of the exam room), this will be considered academic fraud (cheating) and treated accordingly.
- Total exam marks: 30 (equivalent to 30% of total course grade). You must get at least 10 marks in this exam to not fail the course.

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PART 1: Multiple-Choice Questionnaire (10 marks)

PART 2: Open Questions (10 marks)

PART 3: Constructive Tasks (10 marks)

Total: 30 marks (=100%)

Exam this year

...

‘Open Book’ ‘Open Laptop’ in Moodle



TARTU ÜLIKOOL Search courses Dietmar Alfred Paul Kurt Pfahl

Software Engineering (LTAT.05.003) 10:15-12:00 (TA: Siim Tanel Leissaar) → Zoom Link
Group 8 Thu 10:15-12:00 (TA: Caroline Hofter) → Zoom Link

Dashboard / LTAT.05.003_Eng

Reminders

Forum Block

Announcements
(No posts)

Panopto

Live Sessions
No Live Sessions

Completed Recordings
[Lecture13-Zoom-Video-2020](#)
[Lecture12-Zoom-Video-2020](#)
[Lecture11-Zoom-Video-2020](#)
[\[Show All\]](#)

Podcast Feeds
[Audio Podcast\(RSS\)](#)
[Video Podcast\(RSS\)](#)

Links
[Course Settings](#)
[Download Recorder\(Windows | Mac\)](#)

Exam 1

This is the first exam option. Exam 1 takes place on Friday, Jan 08 and starts at 10:15 am. You must be registered in SIS for exam 1 (any of the three rooms is ok) if you want to take this exam. In addition, you must have at least 30 points from the homework assignments (after subtraction of penalties, if any) in order to be admitted to the exam.

The exam lasts 150 min and consists of several parts.

After 150 min the exam closes automatically and whatever you have filled into the answers will be saved and used for marking.

The maximum number of points is 30. You must achieve at least 10 points (out of 30) to not fail the course.

NOTE: You do not need to submit. At the end of the exam time, Moodle will automatically close the exam and submit the data you have entered up to that point. However, if you are sure that you have finished before the end time, you may submit yourself. Just keep in mind that **you cannot re-open the exam once you have submitted. You only have one attempt.**

Exam 1 Questions

Instructions: - to be added -

NOTE: You do not need to submit. At the end of the exam time, Moodle will automatically close the exam and submit the data you have entered up to that point. However, if you are sure that you have finished before the end time, you may submit yourself. Just keep in mind that **you cannot re-open the exam once you have submitted. You only have one attempt.**

Exam 2

This is the first exam option. Exam 2 takes place on Tuesday, Jan 12 and starts at 14:15 am. You must be registered in SIS for exam 2 (any of the three rooms is ok) if you want to take this exam. In addition, you must have at least 30 points from the homework assignments (after subtraction

Exam Structure – Until last year ...

-
-
-
- Part 1 (10 marks): Multiple Choice – 30 min
- Part 2 (10 marks): Open Questions – 60 min
- Part 3 (10 marks): Problems where a solution needs to be developed – 60 min

Exam Structure – New this year ...

- Part 1 (16 marks): Multiple Choice – 50 min
- Part 2 (14 marks): Open Questions & Problems where a solution needs to be developed – 100 min
- ~~• Part 1 (10 marks): Multiple Choice – 30 min~~
- ~~• Part 2 (10 marks): Open Questions – 60 min~~
- ~~• Part 3 (10 marks): Problems where a solution needs to be developed – 60 min~~

Exam – Part 1

Example (Exactly one correct answer):

- You execute a program that is supposed to add up 3 numbers n_1 , n_2 , and n_3 . You correctly enter the value '1' for each number and you see the following message on the screen: 'Sum = 4'. Which of the following terms describes your experience best:
 - A. I made an error
 - B. I debugged the program
 - C. I located a fault
 - D. I triggered a failure

Exam – Part 2 – Open Question

Example:

Assume that a list of requirements contains the following two user stories:

- (US1) As a customer, I want to narrow down hotel search results by country, so I can find the right hotel more quickly.
- (US2) As a hotel receptionist, I want to see the list of rooms not yet booked

Answer the following questions Q1 to Q3:

Q1: Which of the two user stories is of better quality? Justify your answer.

Q2: What are the three elements of a complete user story? Explain each part briefly

Q3: What is the purpose of the 'why'-part in a user story? For whom and why is it useful?

Exam – Part 2 – Development of Solution

Example:

- The code snippet below shows a function that calculates fines for speeding when driving a car. Fines are calculated based on age of the driver (age), the excess speed (overspeed), and the number of penalty points (penaltypts) already accumulated in the driver's police record.

```
1 public static int speedingfine (int age, int overspeed, int penaltypts) {
2     int fine = 0;
3     if ((age >= 25) && (overspeed < 30) && (penaltypts < 3))
4         fine = fine + 100 * overspeed;
5     if ((age < 25) || (penaltypts >= 3))
6         fine = fine + (200 * overspeed);
7     if (overspeed >= 30)
8         fine = fine + 5000;
9     return fine; }
```

- To do: Provide a minimum set of test cases that achieves 100% statement coverage. Remember that complete test cases include both input values and expected output values. (Note: You will get a penalty, if the number of test cases is not the minimum)

How to prepare for the exam?

- Work through old exams (see course wiki "Exams")
- Prepare a cheat sheet
- **Do not expect that you have enough time DURING the exam to search for answers in the internet!**
- Bring your computer to exam
- ~~Bring pen (and replacement pen) to exam~~

Training Quiz

(Exam Part 1)

Question 1

- Which of the following statements does not explain why requirements engineering is difficult?

Answer choice:

1. Because no UML notation exists for describing requirements
2. Because requirements can change over time
3. Because it is difficult to identify the relevant stakeholders, and, once identified, the stakeholders have difficulties describing what they want/need
4. Because stakeholders have conflicting requirements

Question 2

- What are User Story Points not used for?

Answer choice:

1. To estimate project effort
2. To estimate project quality
3. To estimate project duration
4. To estimate team velocity

Question 3

- Which of the following statements about use case descriptions is not correct?

Answer choice:

1. A participating actor is an actor who helps achieve the goals of the initiating actor
2. An alternate flow describes exceptions from or extensions to the normal interaction scenario
3. Preconditions describe the state of the system before the start of the interaction scenario
4. A use case diagram is a graphical representation of a use case description

Question 4

- Which of the following statements about code refactoring is correct?

Answer choice:

1. Refactoring does always change the program design
2. Refactoring is done in order to add new functionality
3. Refactoring is a test activity
4. Before refactoring a component, a test suite for this component must be in place

Question 5

- Which of the following statements is correct?

Answer choice:

1. Regression testing can efficiently be done manually
2. Equivalence class partitioning is a white-box testing technique
3. Black-box testing techniques exploit knowledge about the code that is tested
4. White-box testing techniques exploit knowledge about the code that is tested

Question 6

- In order to solve a problem, you execute a data-mining program developed by a friend of yours. You provide the required input and press the 'start' button. Instead of seeing the expected result, the program aborts. Which of the following describes your experience best?

Answer choice:

1. I made an error (while using the program)
2. I debugged an error
3. I triggered a failure
4. I localized a fault

Question 7

- Which of the following types of meetings is not defined by SCRUM?

Answer choice:

1. SCRUM Master Meeting
2. Sprint Retrospective
3. Daily Scrum (or 'Stand-Up Meeting')
4. Sprint Planning Meeting

Question 8

- If three developers work two days each, how much effort have they spent?

Answer choice:

1. 6 person-days
2. 6 days
3. 2 person-days
4. None of the above

Prepare for Exam

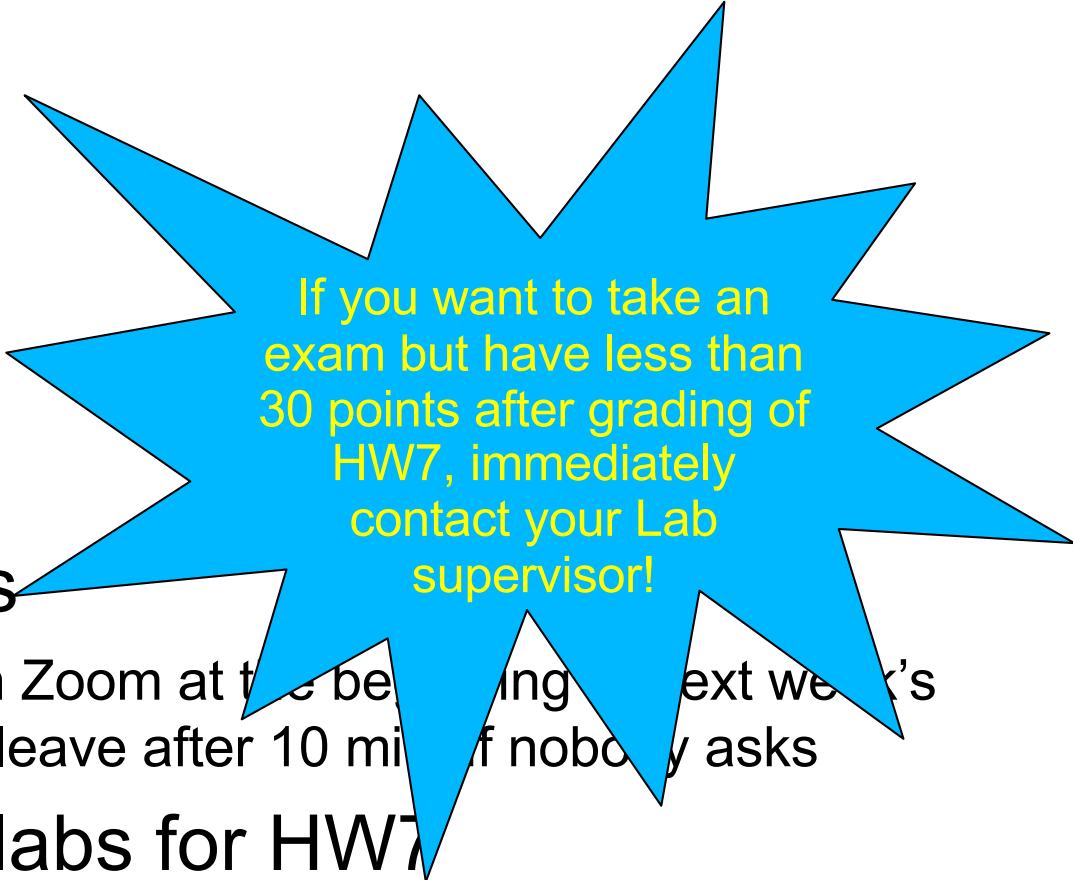
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Next Week

- Date/Time:
 - No regular lectures
 - NB: I will be available in Zoom at the beginning of next week's lecture for questions / I leave after 10 min, if nobody asks
 - BUT: Assessment labs for HW7
- For you to do:
 - Complete and submit Lab Task 7 in time
 - Prepare for the exam!

Next Week

- Date/Time:
 - No regular lectures
 - NB: I will be available in Zoom at the beginning of next week's lecture for questions / I leave after 10 min if nobody asks
 - BUT: Assessment labs for HW7
- For you to do:
 - Complete and submit Lab Task 7 in time
 - Prepare for the exam!



If you want to take an exam but have less than 30 points after grading of HW7, immediately contact your Lab supervisor!

Thanks for coming to the (virtual) lectures!

**I wish you all the best for the
exam!**

... and a happy holidays!