

## **Course Analysis DD2459 2021**

**Course Name:** Software Reliability Sofrel21 (period 3 2021)

**Course code:** DD2459

**Examination components:** Labs 3hp, Examination 4.5hp

**Number of students:** 53

**Student performance:** 50 students passed the take home exam of March 15 2021 (13 A, 16B, 8C, 3D, 8E. 2FX)

36 students have completed all 3 lab exercises (June 15 2021)

26 students have completed the course (June 15<sup>th</sup> 2021)

The course consisted of 8 lectures, 3 seminars and 3 laboratory classes

The examiner, teacher and lab supervisor was Karl Meinke

### **Summary of Student Questionnaire**

The response to the LEQ student questionnaire was 17 out of 53 (32%). 6 questions were used with 1 additional question about the filmed lectures. This was to make the questionnaire short and easy to answer – thus raising the response rate.

Overall the students were very positive to the course, especially the seminars that went through lab work and the online lectures which had been pre-recorded before the course started. Area of improvement were mainly faster grading of the lab exercises, and possibly live recording of the classes.

The questionnaire summary is attached as an Appendix.

### **Analysis**

The course was adapted this year to online teaching, mainly by revising and improving the lecture slides to be more self-contained, better connected to the course book, and by recording each lecture as a film (using Loom and iMovie). The effect of this was beneficial. The strengths of the course are that it addresses theory and practice equally, and the labs are appreciated. The main weakness this year was the lack of assistance for grading lab work.

Next year we will consider to hire a lab assistant. It may be possible to record the lectures live if teaching is again on Zoom, otherwise this would be difficult.



## DD2459 - 2021-02-23

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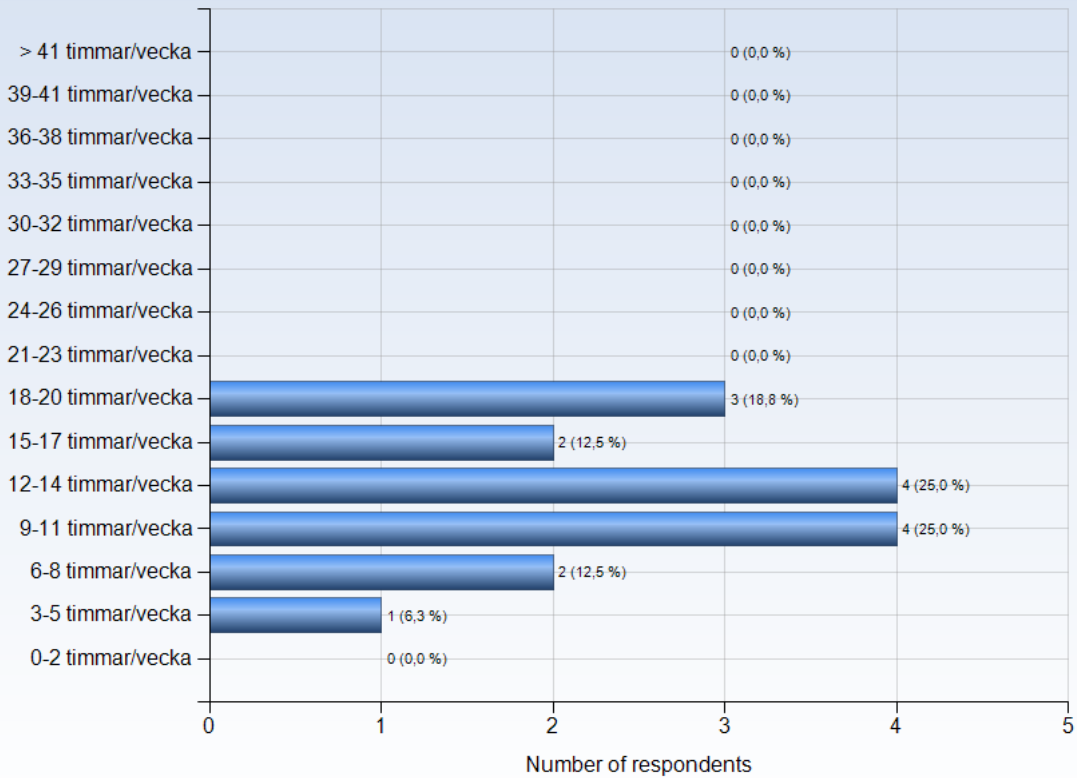
Antal respondenter: 53  
Antal svar: 17  
Svarsfrekvens: 32,08 %

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## ESTIMATED WORKLOAD

On average, how many hours/week did you work with the course (including scheduled hours)?



### Comments

Comments (I worked: 3-5 timmar/vecka)

More hours at the end of the course though.

Comments (I worked: 12-14 timmar/vecka)

It is definitely not the most intense course from this perspective, however since no lab results have been given, it is not a useful metric since I can't tell whether or not this was enough time to complete said tasks. If it wasn't more time would likely have been spent.

I would say that it was an easy course for me.

Comments (I worked: 15-17 timmar/vecka)

Some weeks more, some less, depending on the labs. Have seemed like a fair amount of workload!

Comments (I worked: 18-20 timmar/vecka)

Felt like the workload matched the number of credits very well!



## LEARNING EXPERIENCE

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The polar diagrams below show the average response to the LEQ statements for different groups of respondents (only valid responses are included). The scale that is used in the diagrams is defined by:

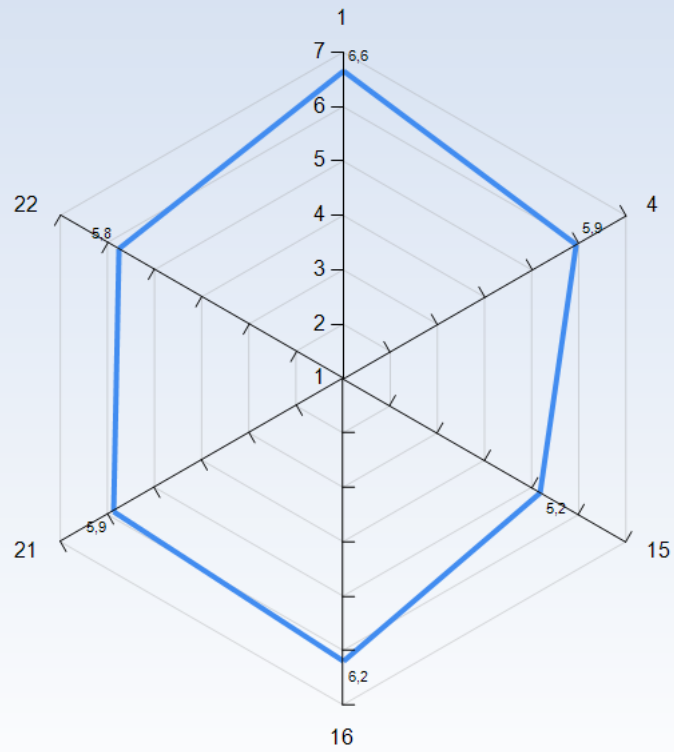
1 = No, I strongly disagree with the statement

4 = I am neutral to the statement

7 = Yes, I strongly agree with the statement

**Note! A group has to include at least 3 respondents in order to appear in a diagram.**

### Average response to LEQ statements - all respondents



— Medelvärde



## **KTH Learning Experience Questionnaire v3.1.4**

### **Meaningfulness - emotional level**

#### *Stimulating tasks*

1. I worked with interesting issues (a)

#### *Exploration and own experience*

2. I explored parts of the subject on my own (a)

3. I was able to learn by trying out my own ideas (b)

#### *Challenge*

4. The course was challenging in a stimulating way (c)

#### *Belonging*

5. I felt togetherness with others on the course (d)

6. The atmosphere on the course was open and inclusive (d)

### **Comprehensibility - cognitive level**

#### *Clear goals and organization*

7. The intended learning outcomes helped me to understand what I was expected to achieve (e)

8. The course was organized in a way that supported my learning (e)

#### *Understanding of subject matter*

9. I understood what the teachers were talking about (f)

10. I was able to learn from concrete examples that I could relate to (g)

11. Understanding of key concepts had high priority (h)



### *Constructive alignment*

- 12. The course activities helped me to achieve the intended learning outcomes efficiently (i)
- 13. I understood what I was expected to learn in order to obtain a certain grade (i)

### *Feedback and security*

- 14. I received regular feedback that helped me to see my progress (j)
- 15. I could practice and receive feedback without being graded (j)
- 16. The assessment on the course was fair and honest (k)

## **Manageability - instrumental level**

### *Sufficient background knowledge*

- 17. My background knowledge was sufficient to follow the course (f)

### *Time to reflect*

- 18. I regularly spent time to reflect on what I learned (l)

### *Variation and participation*

- 19. The course activities enabled me to learn in different ways (m)
- 20. I had opportunities to influence the course activities (m)

### *Collaboration*

- 21. I was able to learn by collaborating and discussing with others (n)

### *Support*

- 22. I was able to get support if I needed it (c)



## **Learning factors from the literature that LEQ intends to examine**

We tend to learn most effectively (in ways that make a sustained, substantial, and positive influence on the way we think, reflect, act or feel) when:

- a) We are trying to answer questions, solve problems or acquire skills that we find interesting, exciting or important
- b) We are able to speculate, test ideas (intellectually or practically) and learn from experience, even before we know much about the subject
- c) We are able to do so in a challenging and at the same time supportive environment
- d) We feel that we are part of a community and believe that other people have confidence in our ability to learn
- e) We understand the meaning of the intended learning outcomes, how the environment is organized, and what is expected of us
- f) We have adequate prior knowledge to deal with the current learning situation
- g) We are able to learn inductively by moving from concrete examples and experiences to general principles, rather than the reverse
- h) We are challenged to develop a true understanding of key concepts and gradually create a coherent whole from the content
- i) We believe that the work we are expected to do will help us to achieve the intended learning outcomes
- j) We are able to try, fail, and receive feedback before, and separate from, each summative assessment of our efforts
- k) We believe that our work will be considered in an honest and fair way
- l) We have sufficient time for learning and devote the time needed to do so





m) We believe that we have control over our own learning, and not that we are being manipulated

n) We are able to collaborate with other learners struggling with the same problems

## Literature

Bain, K. (2004). *What the Best College Teachers Do*, Chapter 5, pp. 98-134. Cambridge: Harvard University Press.

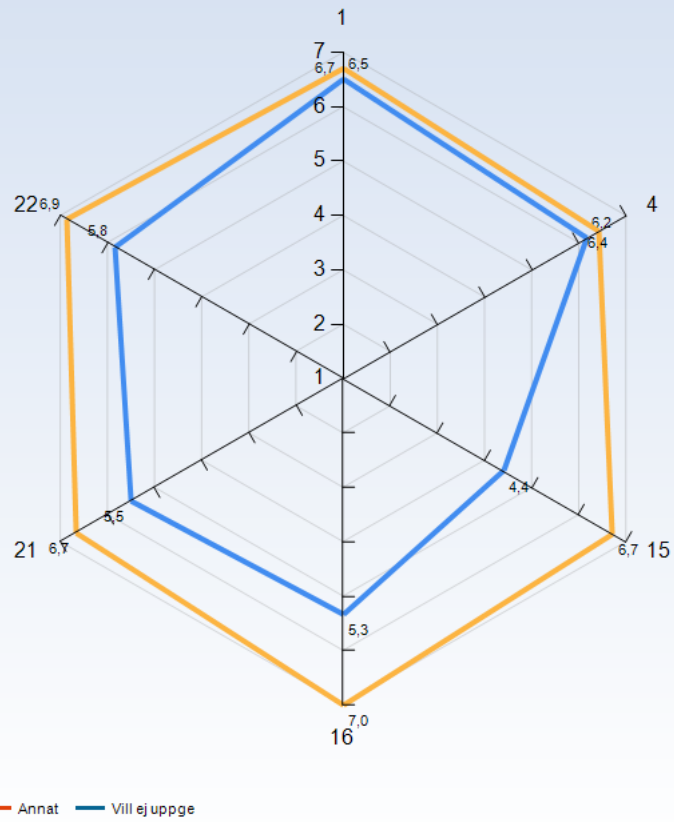
Biggs J. & Tang, C. (2011). *Teaching for Quality Learning at University*, Chapter 6, pp. 95-110. Maidenhead: McGraw Hill.

Elmgren, M. & Henriksson, A-S. (2014). *Academic Teaching*, Chapter 3, pp. 57-72. Lund: Studentlitteratur.

Kember, K. & McNaught, C. (2007). *Enhancing University Teaching: Lessons from Research into Award-Winning Teachers*, Chapter 5, pp. 31-40. Abingdon: Routledge.

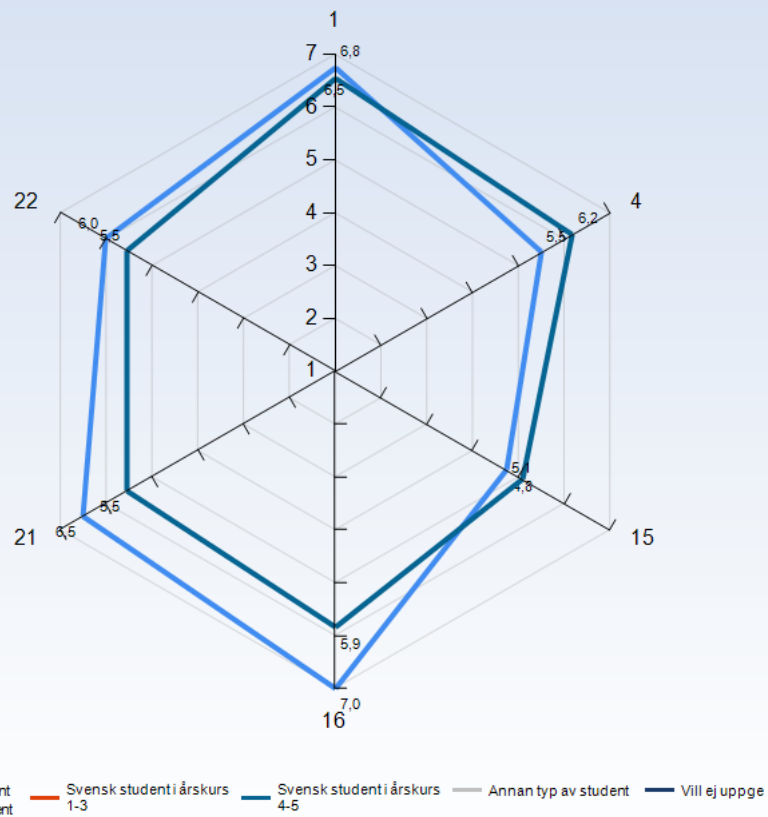
Ramsden, P. (2003). *Learning to Teach in Higher Education*, Chapter 6, pp. 84-105. New York: RoutledgeFalmer.

### Average response to LEQ statements - per gender



Comments

### Average response to LEQ statements - per type of student



### Comments

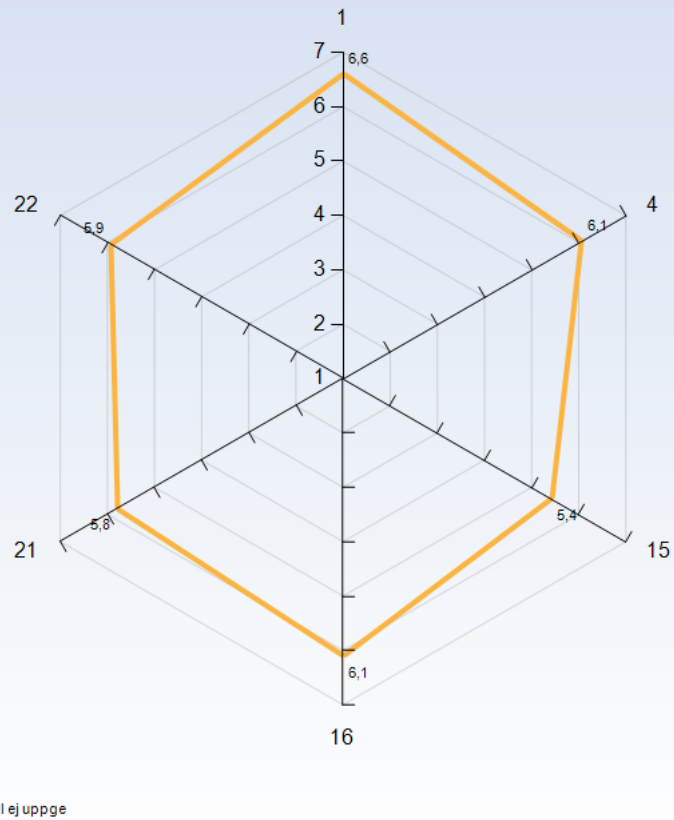
Comments (I am: Internationell masterstudent)

The English of the instructor was 100% clear. I really loved that.

Comments (I am: Svensk student i årskurs 1-3)

I am currently on the bachelor part of my program, and reading this as my first masters level course. The prerequisites listed on the course page give a fair description of the required knowledge for following this course.

### Average response to LEQ statements - per disability



#### Comments

Comments (My response was: Ja)

I have an anxiety disorder and I recently started to be on medication. Thus, for some moment, I had to suffer from side effects including blurred vision, difficulty focusing on work, and sleeping disorder. This course was perfectly fine for me because I could work when I'm 100% okay.



## GENERAL QUESTIONS

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### What was the best aspect of the course?

What was the best aspect of the course? (I worked: 3-5 timmar/vecka)

Great professor!

What was the best aspect of the course? (I worked: 6-8 timmar/vecka)

The videos and lectures were very nicely explained and easy to understand.

What was the best aspect of the course? (I worked: 9-11 timmar/vecka)

Working with interesting subject and labs that is highly relevant to the course and exams. Also that we have open deadlines for that. It was nice to have a session where we could briefly go through the lab questions, it was really helpful.

The practical lab in the course

Interesting course content. I really appreciate that the lecturer pre-recorded all the lectures so the students were able to both watch the recordings before and after the live lecture. It made it easier to come up with questions to ask during the lectures.

Lectures and prerecorded lectures

What was the best aspect of the course? (I worked: 12-14 timmar/vecka)

The video recorded lectures, it allowed me to revisit the lectures at any time and sift through them when doing the Lab assignments. Not only do I appreciate them being available at all times, but also the clearly evident effort that was put into making them structured and cohesive. It is by far the best video lectures I have had when comparing to other courses. Really appreciate the work put in!

When the teaching goes back to being in a classroom again, I would personally suggest keeping the video lectures up on the canvas page. It allows you to revisit the lectures as many times as you want and re-watch areas that might be a bit more difficult to understand.

Interesting topics that also were presented well by the professor.

The labs! So much fun to work with!

The due date was not tight, so I could manage my schedule flexible. Also, this course support recorded lectures, which edited perfectly. When I couldn't attend a class, I took it once. It saved a lot of time.

What was the best aspect of the course? (I worked: 15-17 timmar/vecka)

I like that all the information in the course was available from the start, allowing me to plan ahead and take the course elements as I wanted. I still followed along with the course actively, I was just happy to be able to plan.

The structure and that it was always so clear what to do and when. Many courses are just a mess of assignments and seminars and keeping up with what to do next. In this course, it was crystal clear and therefore easy to plan and be prepared. The pre-recorded lectures were so valuable since some topics were harder to grasp and I re-watched some parts a couple of times. That really does a lot when trying to learn, not just pass a course.

What was the best aspect of the course? (I worked: 18-20 timmar/vecka)

Interesting and useful subject. Good lectures that covered all the material.

I had never been exposed to testing before, and this course gave me a more comprehensive understanding of testing techniques.

The subject



### What would you suggest to improve?

What would you suggest to improve? (I worked: 6-8 timmar/vecka)

A poll (which were the most difficult questions in the assignment) could have been taken in the exercise sessions. This would have helped in focusing more on the model solutions of the hard questions.

What would you suggest to improve? (I worked: 9-11 timmar/vecka)

It would be nice to have more exercise question to practice on. Especially when it comes to JML language. Would like to get lab result earlier.

The information on the canvas page. At the moment the canvas page contains the pre-recorded lectures and some links to the course page in social. It was a bit difficult to find information. Furthermore, it would be appreciated if we could have gotten some feedback on the submitted labs before the exam.

It was unclear why we went through the lab during lectures. Felt more like a grading would be better and mention what was wrong so we could fix it. Since the lectures felt a bit to short and the easier questions where usually at the start. I would suggest sending a poll on which questions to go through so that the majority of the people who are present gets the most out of it.

What would you suggest to improve? (I worked: 12-14 timmar/vecka)

I think recording the lectures about the labs, where they are introduced could be a good addition, it doesn't reveal any answers but allows the space for missing the online lecture on it. These do not have to be edited and can just be uploaded as-is.

Another, which I can understand is debatable, improvement could be to add the raw video recordings of the lectures going through the answers for the labs. It allows you to understand the solutions at your own pace, being able to rewind and relisten to the arguments provided for the solution. However, I understand that not doing so avoids spreading the solutions more than necessary which could affect the intended pedagogy. I'd argue though that it's possible to record these online lectures by everyone attending it.

Anyway, I think uploading these lectures is a thought worth considering!

The sessions were we went through the answe to the labs often spent too much time on sometimes simple questions. Due to this, not all questions were able to be answered during the session. Maybe there should be an additional such session were anything left from the previous ones could be answered?

Speed of grading the labs, I think two-three assistants for the course would be quite nice. Since I am about to start taking the course exam and I have no clue if any of the ideas I have about the major aspects of the course are incorrect.

I would like to learn a bit more if I have to take this course again. Some lectures were a bit ambiguous for me. I wanted to learn more examples and practice. Also, there were typos on the lecture note. Also, I want to learn more latest techniques.

What would you suggest to improve? (I worked: 15-17 timmar/vecka)

I think it could be made more clear that some of the lab results are impossible to make objective, and that you should be able to be confident in those answers even if they differ from what others have answered.

The harder parts of the labs were not sufficiently covered I think. For example, lab 3: we never really got an example of a good way to build a testing framework, or how pairwise testing of an array should be conducted? I think it was the most interesting lab and in the lab session, we only had time to cover the first part which was really sad.

What would you suggest to improve? (I worked: 18-20 timmar/vecka)

The grading of the labs. When is it done? What happens if you don't pass?

Some questions in previous exams lack solutions and some are clearly wrong. It makes you question the exams as a whole.



### What advice would you like to give to future participants?

What advice would you like to give to future participants? (I worked: 6-8 timmar/vecka)

Follow lectures, and do assignments on your own. The assignments can also be worked on individually.

What advice would you like to give to future participants? (I worked: 9-11 timmar/vecka)

Finish the labs early on, they are really helpful to get an understanding of the course.

Do the practical lab with more efforts

Take your time to understand the different concepts that are presented during the course.

If you understand most of the things revolving Test Requirements, Test Suite and Coverage for most of the different coverages you are good to go.

That's why I would emphasize in learning lab 1 and really understand what you have done in that lab.

What advice would you like to give to future participants? (I worked: 12-14 timmar/vecka)

Try your best to attend to everything and make sure to do the home assignments before the lecture with the solutions is given.

Make sure that you try to complete the labs before the lab sessions so that you can learn from any mistakes you may have made.

Get the labs done as quickly as possible!

What advice would you like to give to future participants? (I worked: 15-17 timmar/vecka)

Start each lab about a week before each lab help session, so you have two weeks before the walkthrough. This is plenty of time, and keeps you synced with lectures and lab content.

What advice would you like to give to future participants? (I worked: 18-20 timmar/vecka)

Be active during the lectures and take good notes.

Start looking at exams early

### Is there anything else you would like to add?

Is there anything else you would like to add? (I worked: 6-8 timmar/vecka)

I really appreciate the efforts of the professor that he recorded lecture videos before itself. The efforts were good willed and the lecture videos were really nice and at par with the online classes. But I would say the professor could have recorded the live lectures itself, and would have created a recorded video if there was a problem in recording any live lecture.

Is there anything else you would like to add? (I worked: 9-11 timmar/vecka)

Could you upload past re-exams, since there are too few exercise questions.

Is there anything else you would like to add? (I worked: 12-14 timmar/vecka)

Overall I just want to say that I am really happy with how the course is structured and how good the video recordings of the lectures were! I really appreciate the effort put into those!

I think the course did a very good job in introducing me to testing and what it can look like. I certainly did not have this complex image of testing in my head before taking this course. I was surprised to see that there actually are quite a significant amount of mathematical formulations involved, which is something I enjoy. Made my understanding of testing more robust as I can fall back on my math to properly understand it. Cheers!

Is there anything else you would like to add? (I worked: 15-17 timmar/vecka)

Thank you for the great course! Most courses get the basics wrong, like information spreading and communication, scheduling and instructions and things like that. Getting these things right should be a low bar to clear, but since most courses do not, I appreciate that this one does.

Actually very impressed that Karl Meinke had taken the time in advance to pre-record all lectures. That was so helpful and also complemented the live videos (which I watched since it's more interactive).

Is there anything else you would like to add? (I worked: 18-20 timmar/vecka)

The lectures are great. If the course have to be done digitally again, I would make sure to provide the possibility to get help with labs in your pair instead of in front of everyone. This could be done using breakout rooms or with every pair having their own zoom room and using it as a location in the KTH-queuing system. Getting feedback on the lab submissions before the exam.



## SPECIFIC QUESTIONS

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### Kommentera din inlärningsupplevelse med de filmade föreläsningarna på Canvas

#### Kommentera din inlärningsupplevelse med de filmade föreläsningarna på Canvas

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I was unable to attend some lectures due to personal things, but also a schedule collision. The lectures really helped. I appreciate that all of them were uploaded at the start of the course, rather than being recordings of live lectures, which are often messy and longer than they need to be to convey the information. For those live lectures that I was able to attend, I speeded through the recorded lecture beforehand to prepare, which was very beneficial to my learning.

I want to suggest recording the live lecture too, and uploading them afterwards, since some important questions might come up during the lecture that you might want to save a record of.

As already mentioned, this was so appreciated by me. I've watched a mix of live and pre-recorded lectures and feel that it really helped me when learning. Also, it made it possible to watch in advance which was good since I sometimes started with the labs in advance.

I really enjoyed them! It was great to be able to watch the more complicated parts more than once, and even before the actual lecture in order to ask questions if there was anything I didn't understand. I found it easier to follow along and stay focused during the filmed lectures since I could choose tempo, when to watch and not have questions from other students interrupting the "flow" of the lecture.

It is very good for me personally to have filmed lectures. You have the option to view the material in advance if you want to, which is good. Furthermore, I have had a lot of scheduling collisions with other courses, and since I knew that I could always opt for the filmed lecture, this greatly reduced the amount of stress involved with taking several courses at once.

The learning experience was really good. As said before the recorded lectures were of great quality (both technically and academically). It really helped to go back and forth the lecture for better understanding. It was easier to catch up with the lectures even when I missed a class.

The pre-recorded was really well-made and helpful. Works well as a complement to the live lecture.

It worked great!

Already written about this, see earlier comments.

The filmed lectures are very useful for review ! And I hope that in the future lab discussion sessions can be recorded as well.

The filmed lectures worked well for me. I found that watching the recorded lectures worked better for me than the lectures on zoom. The reason for this being that you can go through the course content in your own pace better.

YES! The filmed lectures are great! Absolutely wonderful to have recorded lectures to go back to if one forgets anything (since lecture slides unfortunately aren't always the most helpful)! By far one of the things that has helped me the most in a number of courses during this pandemic!

This course support recorded lectures, which edited perfectly. When I couldn't attend a class, I took it once. It saved a lot of time.





## RESPONSE DATA

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The diagrams below show the detailed response to the LEQ statements.  
The response scale is defined by:

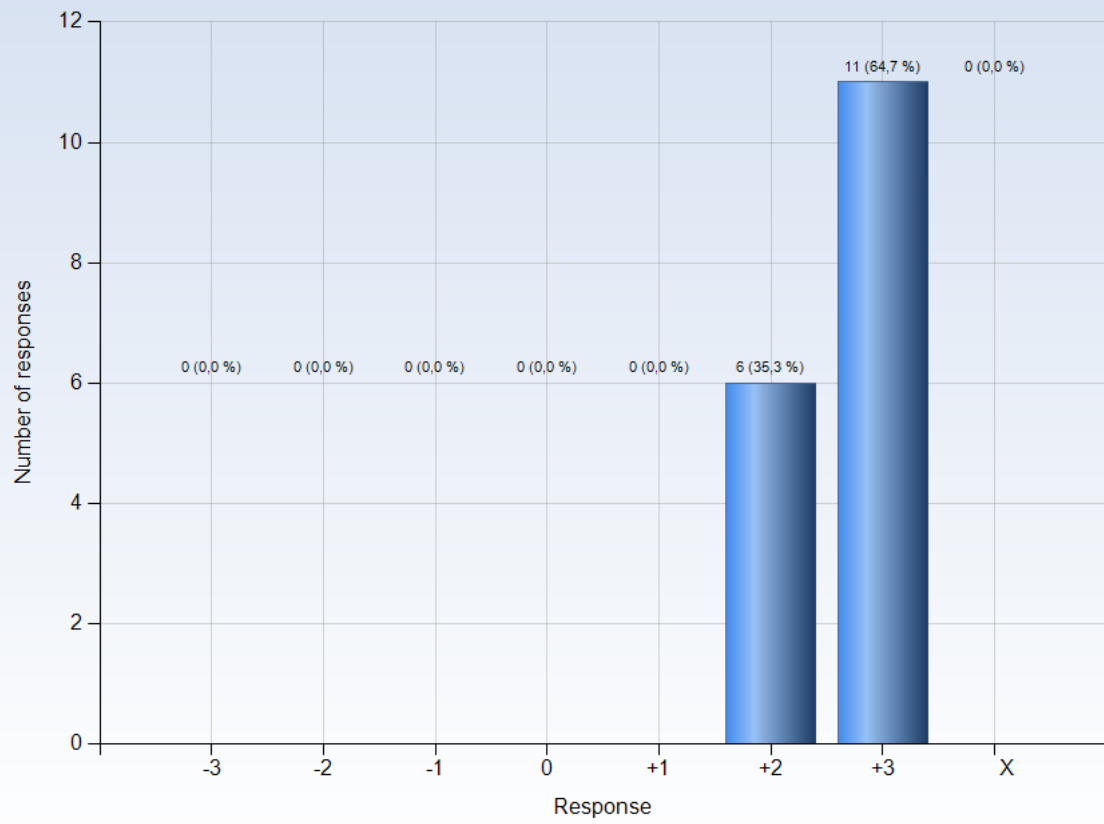
-3 = No, I strongly disagree with the statement

0 = I am neutral to the statement

+3 = Yes, I strongly agree with the statement

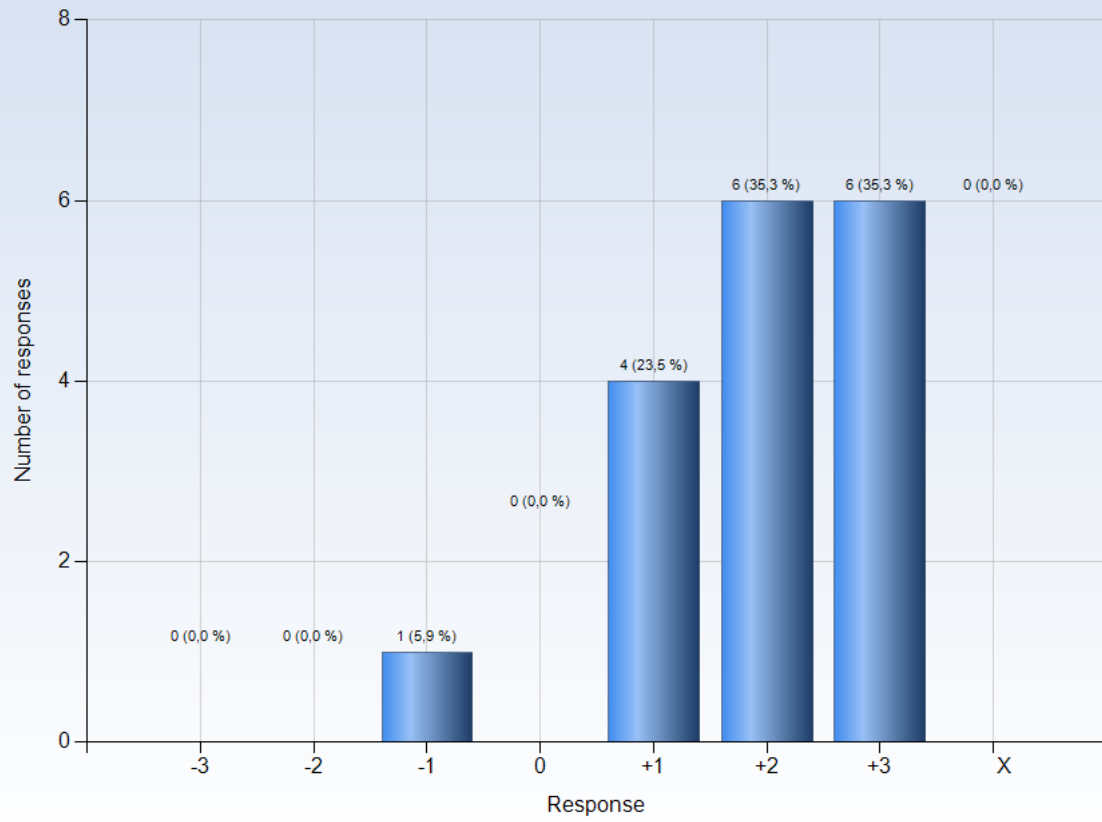
X = I decline to take a position on the statement

### 1. I worked with interesting issues



Comments

#### 4. The course was challenging in a stimulating way

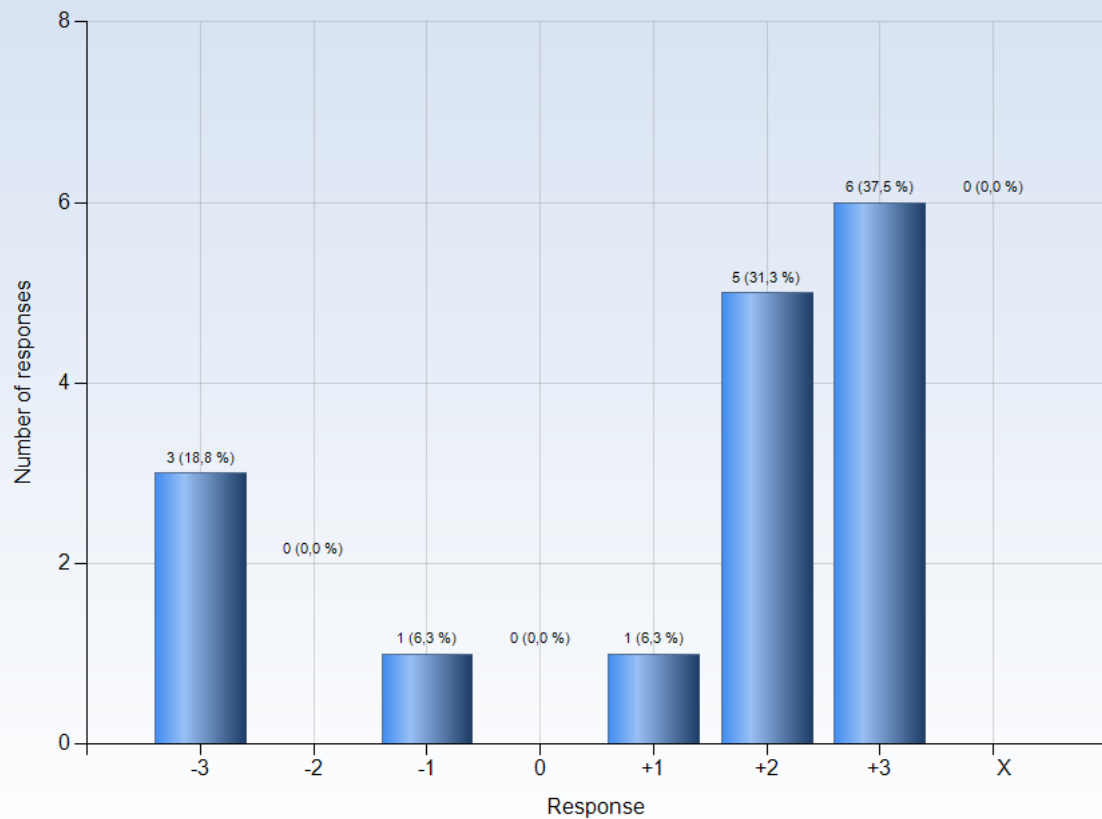


#### Comments

Comments (My response was: +2)

Lab 1 was more time consuming than interesting. The questions were interesting, but it got a bit repetitive after a while.

### 15. I was able to practice and receive feedback without being graded



#### Comments

Comments (My response was: -3)

No, also no results from the labs have been had which is unfortunate because it would be great to know for the exam if one has misinterpreted any part of the course.

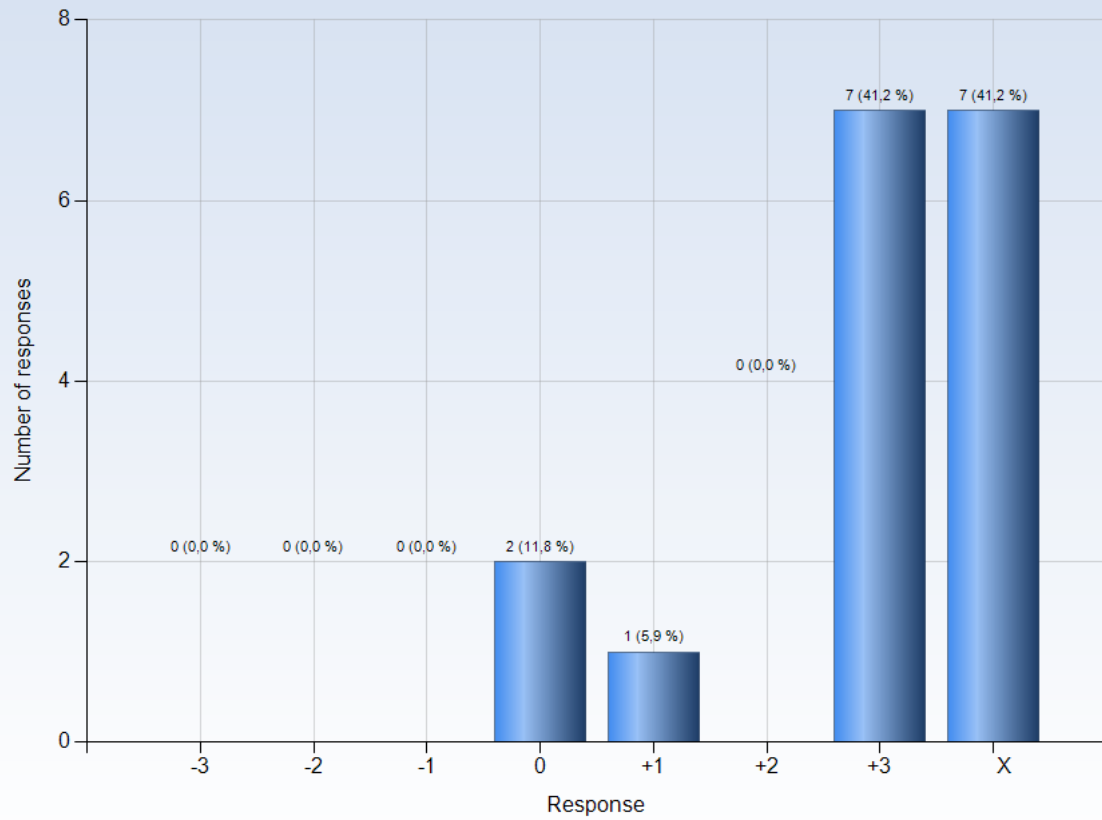
Comments (My response was: +2)

It was possible to ask questions during lectures, labs and exercises. But the lab/exercise sessions were only once a week. I think it would be beneficial to have another lab session each week to let the students ask questions about both the labs and the course content.

Comments (My response was: +3)

The lab sessions are excellent!

### 16. The assessment on the course was fair and honest



#### Comments

Comments (My response was: +1)

Feedback from the labs would have been good to get before the exam

Comments (My response was: X )

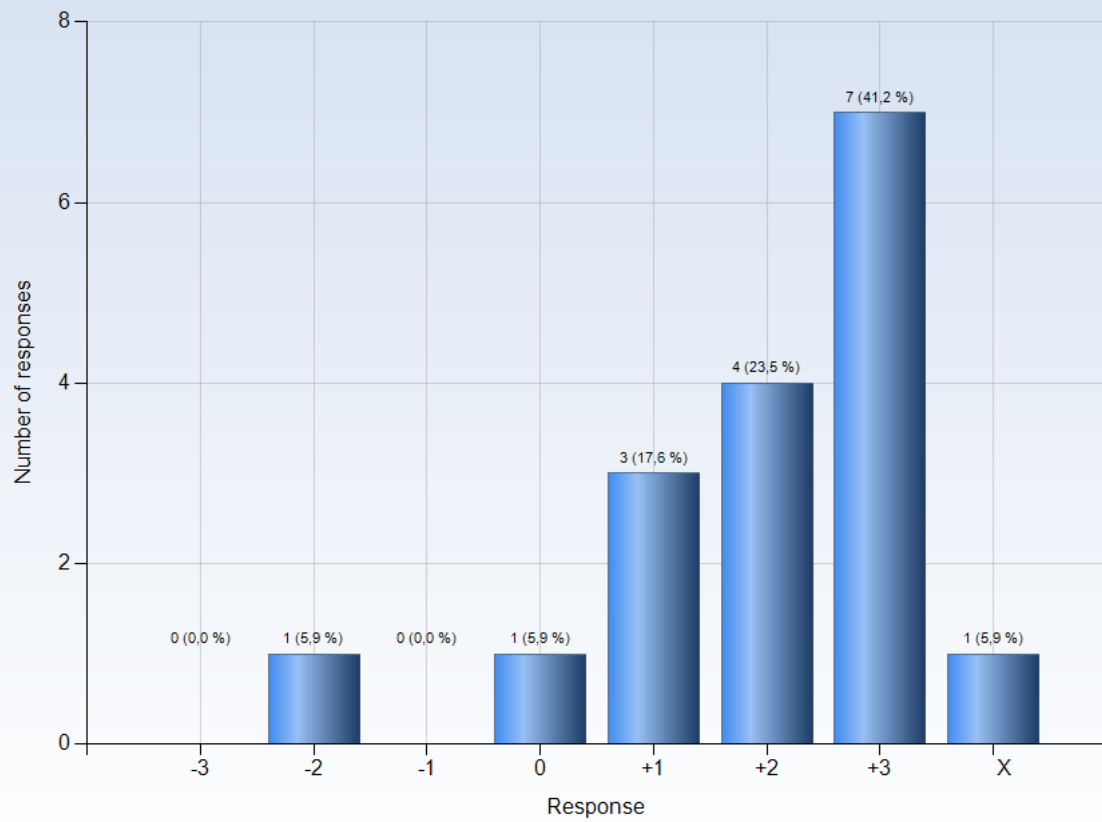
Havn't been assessed yet.

The assignments weren't graded until yet.

Have not got any individual feedback on the submitted labs and the exam has not ended yet.

No clue because no assessments have made.

### 21. I was able to learn by collaborating and discussing with others



#### Comments

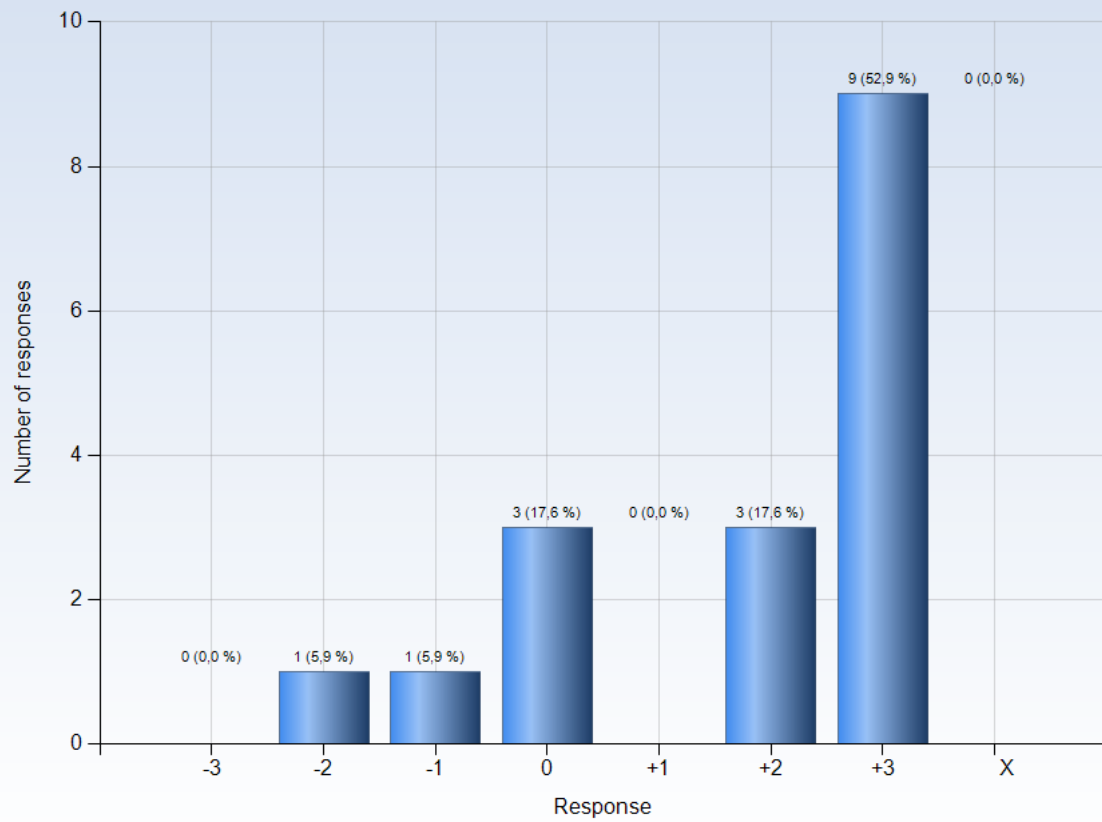
Comments (My response was: +1)

My answers mostly reflected the fact the the pandemic have made it difficult to collaborate with other students than my lab partner.

Comments (My response was: X )

I chose to work alone, but we were encouraged to pick a lab partner.

## 22. I was able to get support if I needed it



### Comments

Comments (My response was: 0)

It would have been better with breakout rooms during labs because everyone does not feel comfortable with asking questions in front of other students.

Comments (My response was: +2)

I didn't need that much support. But I think it would be beneficial to add contact information to the teachers if someone would want to ask something outside the scheduled lectures etc.

Comments (My response was: +3)

The lab sessions were excellent, and when I had a question outside those hours, professor Meinke was quick to reply by mail.