

Course analysis Signal Theory EQ1220, HT23

By Tobias Oechtering, examiner

The course was given as in the previous years, but we replaced the reflective essays by reflective problem sets since with the availability of ChatGPT the reflective essay writing activity felt hard to ensure that students are not cheating and the main purpose of the activity is to make student work with the lecture content to get more familiar with the course content. Simple reflection problems were achieving this goal likewise, but we should do a minor revision of them to adapt to level of understanding where the students are at this point of time – some problems were perhaps still too difficult.

Students were actively participating in the course activities, primarily in the tutorials and projects. No changes are needed. However, there was a decay in the participation of the reflection lectures. This might be partially because students did not manage to keep the pace and the activity was not considered to be valuable. In the next course round, the reflection lectures should start earlier so that we lower the work intensity at the second half of the course when students do the second project, where I suspect that several students cannot keep the pace. This conclusion follows from the mentimeter questions at the beginning of each reflection lecture where I ask students if they managed to read and watch the corresponding material. The reflection lectures however also received most negative critique in the course feedback and I agree that there is room for improvement. Questions that just check definitions while they do not lead to some deeper understanding should be removed or revised to become more valuable focusing on understanding of concepts. One can try to have more discussions on the board providing better explanations of concepts.

We introduced in this course round two exam Q&A sessions (each 2h) before the exam and re-exam where students got the opportunity to meet the TAs and fellow students to ask questions. Several students took the opportunity and asked questions so that we should keep this offer, but one 2h session before each exam might be sufficient.

In the exam we made one difficult problem a bonus point problem. Students were able to show their problem-solving skills and got some extra points. We did this since we came up with the problem while we considered it to be too difficult as regular problem. If we have an idea of a problem which is considered to be too difficult, then this is an option to use it. It provides students just another opportunity to demonstrate their skills.

From personal exchange with students who took the course, I repeatedly hear that this course is the toughest course in the master program but also extremely valuable for the following studies. Since we try to do our best to help students to master the course, I do not plan to lower our expectations, but we will continue to try to look for more opportunities to improve the quality of our teaching. Since the course is already very developed with many learning activities, we will only do finetuning while the reflection lectures have the greatest potential for improvement.

EQ1220 - 2023-10-02

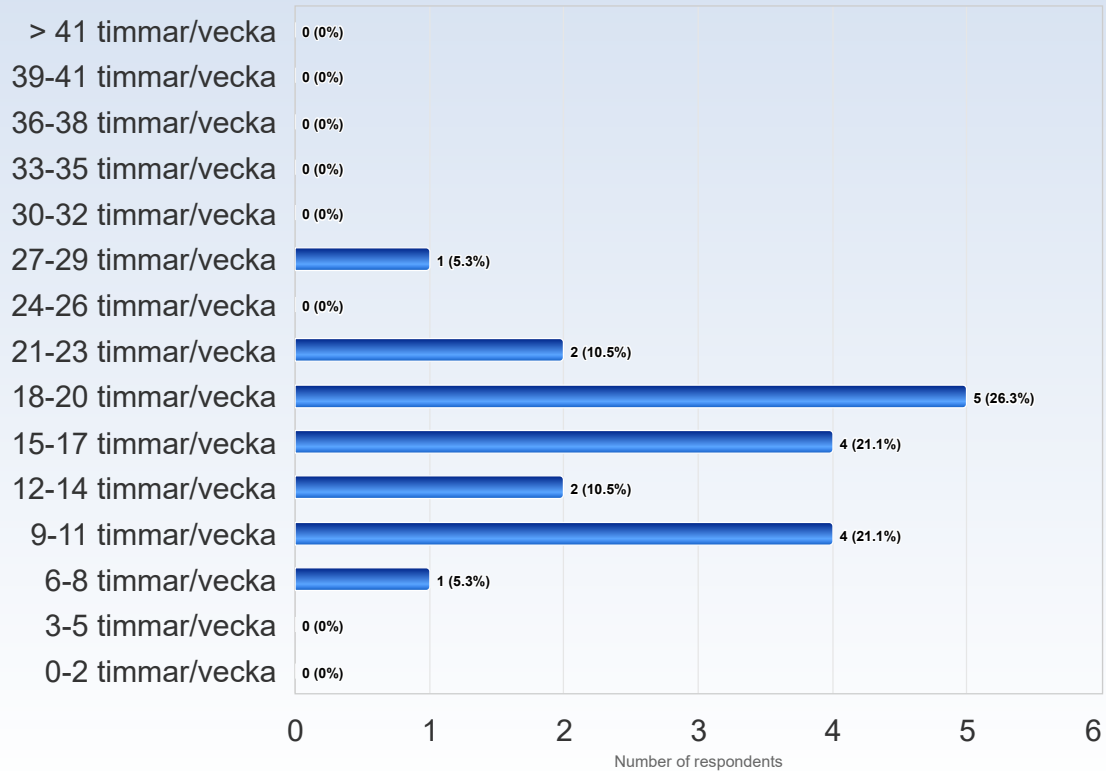
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Svarsfrekvens: 61,29 %

ESTIMATED WORKLOAD

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



Comments

Comments (I worked: 6-8 timmar/vecka)

Represent 7.5 credits. Still a lot from an EPFL exchange student but it's the only course with that real charge of study.

Comments (I worked: 9-11 timmar/vecka)

the time to work on this course is fine.

For first year student, it might be a little too much, plus the project and reading.

Good! Proper workload.

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

It doesn't take too much time since I have some relative former study experience in this area, but I don't know how others feel about this.

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

I think this is a reasonable time arrangement.

It is suitable.

I think this kind of workload suits perfectly for myself.

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

The course is given by on site lecture and recorded video lecture, but the recorded videos sometimes were not uploaded in time which leading to difficulty in understanding course content and finishing homework.

Comments (I worked: 21-23 timmar/vecka)

Actually it depends. This class is more maths-oriented. Some of the mathematical theories were very abstract, so it took me a little longer to understand them.

Comments (I worked: 27-29 timmar/vecka)

It takes too much time to read the book and watch online lecture.

LEARNING EXPERIENCE

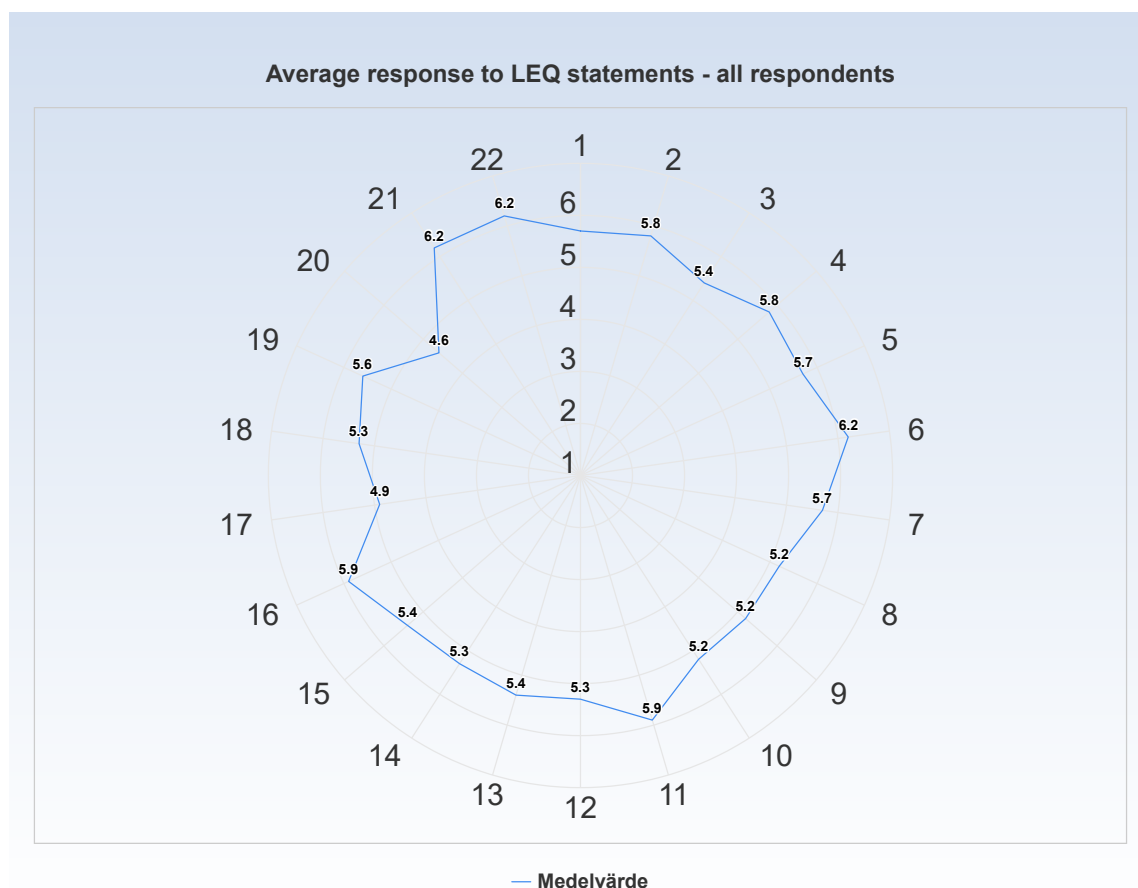
The polar diagrams below show the average response to the LEQ statements for different groups of respondents (only valid responses are included). The scale that is used in the diagrams is defined by:

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.



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.

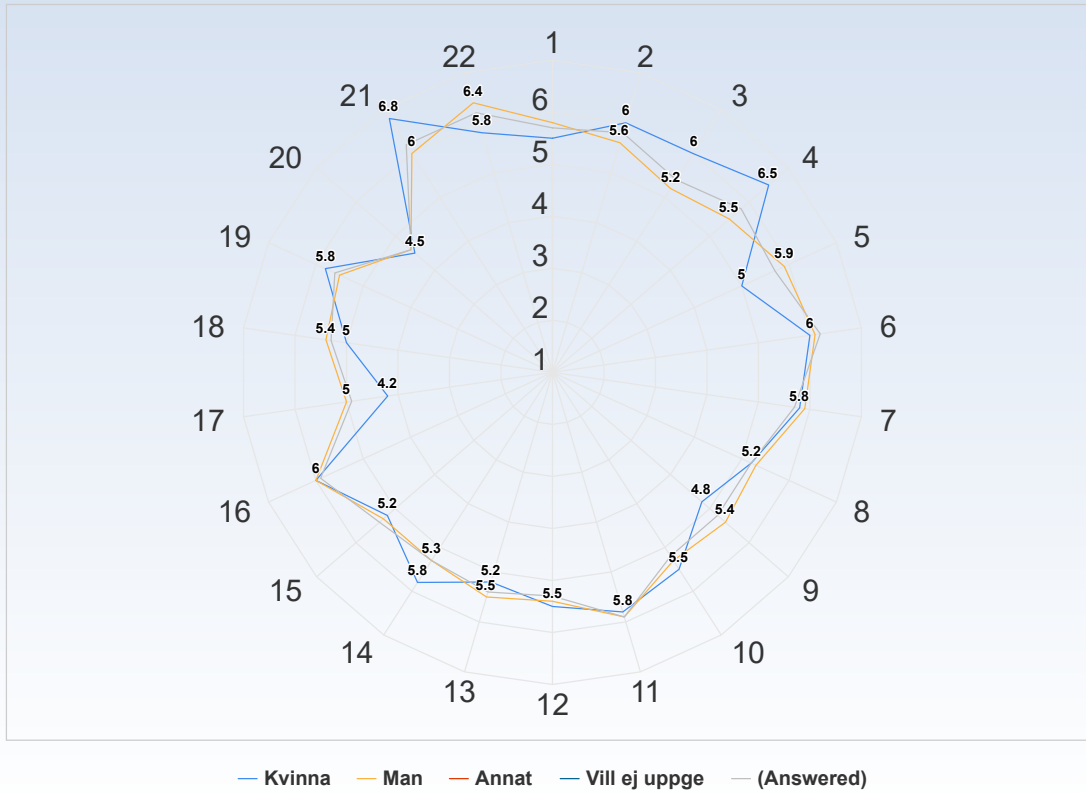
Biggs J. & Tang, C. (2011). *Teaching for Quality Learning at University*, Chapter 6, pp. 95-110. Maidenhead: McGraw Hill.

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



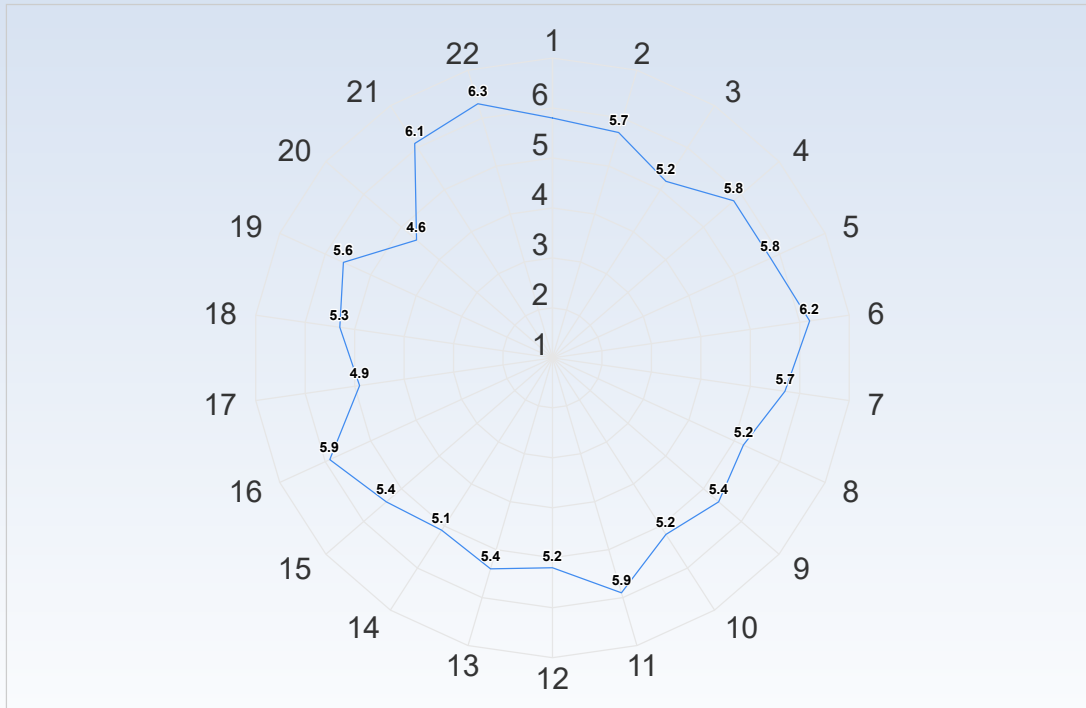
Comments

Comments (I am: Man)

Good.

Sorry for no idea.

Average response to LEQ statements - per type of student



- Internationell masterstudent
- Svensk student i årskurs 4-5
- Internationell utbytesstudent
- Annan typ av student
- Svensk student i årskurs 1-3
- Vill ej uppge

Comments

Comments (I am: Internationell masterstudent)

Sorry for no idea.

It is a good bridge to get acquainted with the knowledge of signal in English.

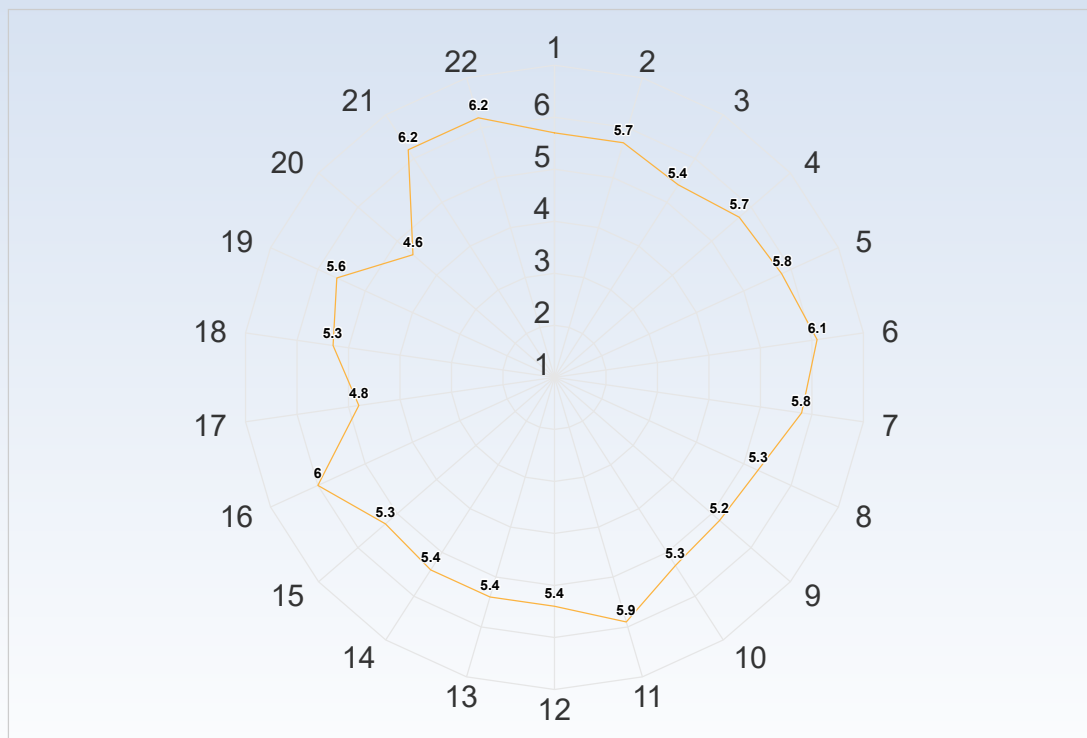
Good.

It need lost of prior knowledge about signal and system, stochastic signal theory and DSP.

Comments (I am: Internationell utbytesstudent)

Bachelor 3rd year (last year bachelor) epfl lausanne

Average response to LEQ statements - per disability



— Ja — Nej — Vill ej uppge

Comments

Comments (My response was: Nej)

Sorry for no idea.

GENERAL QUESTIONS

What was the best aspect of the course?

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

Tutorials, project work.

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

tutorial lectures

Most formulas and theorems are proved with coherent procedures, which makes them more understandable.

This course gave a comprehensive reflection about some basic concepts in Signal and System, Communication Principles and other bachelor level courses - in a way that focused more on math. It was surprisingly good to re-arrange my knowledge about all these courses, which improved my previous knowledge framework.

tutorials

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

Enough exercises are included in the tutorial which helped me a lot. The reflective lecture which focused on concepts had a great influence on the degree of understanding.

I think the best part is the project. In most case, some practices that related to real engineering problem could let us understand some concepts deeply. It give us both theoretical and practical experience.

This course consists of many different modules, which enables me to learn it from different perspectives and it was great to me.

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

Tutorial

tutorials

What was the best aspect of the course? (I worked: 21-23 timmar/vecka)

There are a lot of things to do. This helps me get a full picture of exactly what the course does.

tutorial

What was the best aspect of the course? (I worked: 27-29 timmar/vecka)

Signal theory courses typically involve solving complex mathematical problems related to signals, which can enhance critical thinking and problem-solving skills.

What would you suggest to improve?

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

Reflection lectures take time and are not that useful.

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

Solutions to exercises can be improved.

nothing needed to improve

if there were more bonus points, it would be great.

sometimes the reflective lectures can be a little confusing. when it needs students to discuss the choice, we mostly cannot correct the wrong choices we made. hence, i think it is better to ask someone who actually understand the statements to illustrate or the professor can just reveal the answer and tell us the reasoning.

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

I found the two hours true or false lecture not very useful. There was too many YouTube ads on your video. At least 3x40 sec during a 15 min videos

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

Maybe the course can introduce more guest lecture from industry area in the future. Because the context of this course seems too theoretical, I think we can learn some true application in industry area to strengthen our understanding.

The online lecture is not suitable for this lesson as it highly relies on mathematics. Besides, the answers to the reflective lecture's problems may contribute to the revision. Markov chain is anticipated.

In reflection lecture, I think it can add something just like an exercise or an example after each statement.

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

I studied mostly by the textbook since the videos did not help me to understand the concepts. The textbook is well structured and concepts are well explained. I think I would structure (video) lectures according to the book and highlight the most important ideas. Furthermore, the reflection lectures can be improved, e.g. by studying related problems and then conclude to basic concepts by or after solving those. At least I learn best by solving problems and then circle back to the important concepts.

The recorded video lecture and on-site lecture.

more real classes to discuss topics

What would you suggest to improve? (I worked: 21-23 timmar/vecka)

Maybe the professor could go over more specific examples in reflective lectures rather than concepts.

What would you suggest to improve? (I worked: 27-29 timmar/vecka)

The disparity between the lecture content and exercise problems is substantial, making it challenging for me to tackle exercises unaided.

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)

Doing all the tutorials and seeing videos in time

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

take the bonus points

Pre-study and revise regularly, especially contents given by the slides and online lectures.

It is also important to revise the concepts and theorems on reflection lectures.

Do your work everyday.

learn textbook carefully.

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

Try to follow the course timeline in the very beginning, since the basic concepts are very useful in the following study.

Stochastic is stochastic.

try hard!

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

take tutorials

Learn more mathematics before this course.

Read the textbook

What advice would you like to give to future participants? (I worked: 21-23 timmar/vecka)

Consolidate your basic maths knowledge before taking this course.

What advice would you like to give to future participants? (I worked: 27-29 timmar/vecka)

Actively participate in class discussions, ask questions, and engage with the material. The more actively you participate, the better you're likely to understand and retain the information.

Is there anything else you would like to add?

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

Nothing else.

no

no

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

NO

No.

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

no

The tutorials are very helpful and the TAs very friendly and patient

NO

Is there anything else you would like to add? (I worked: 21-23 timmar/vecka)

No.

Is there anything else you would like to add? (I worked: 27-29 timmar/vecka)

No

SPECIFIC QUESTIONS

RESPONSE DATA

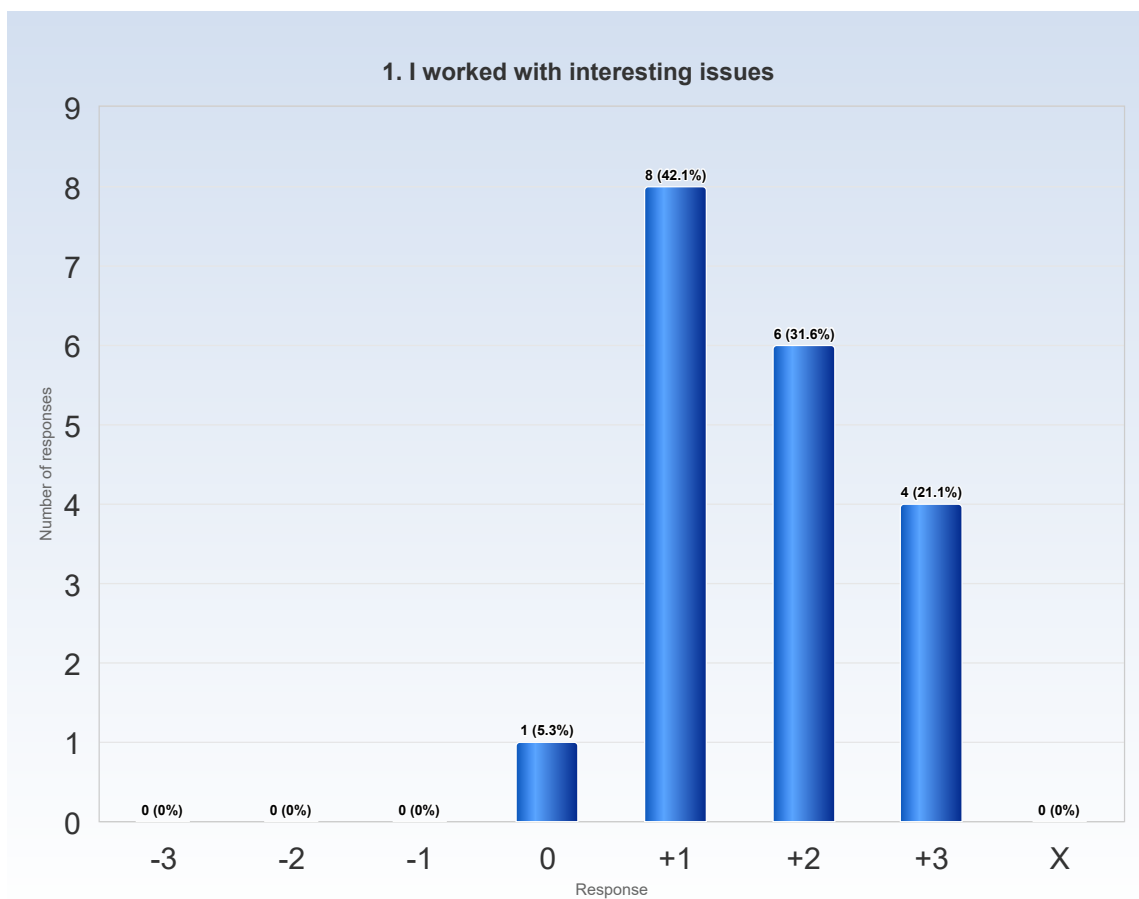
The diagrams below show the detailed response to the LEQ statements. The response scale is defined by:

-3 = No, I strongly disagree with the statement

0 = I am neutral to the statement

+3 = Yes, I strongly agree with the statement

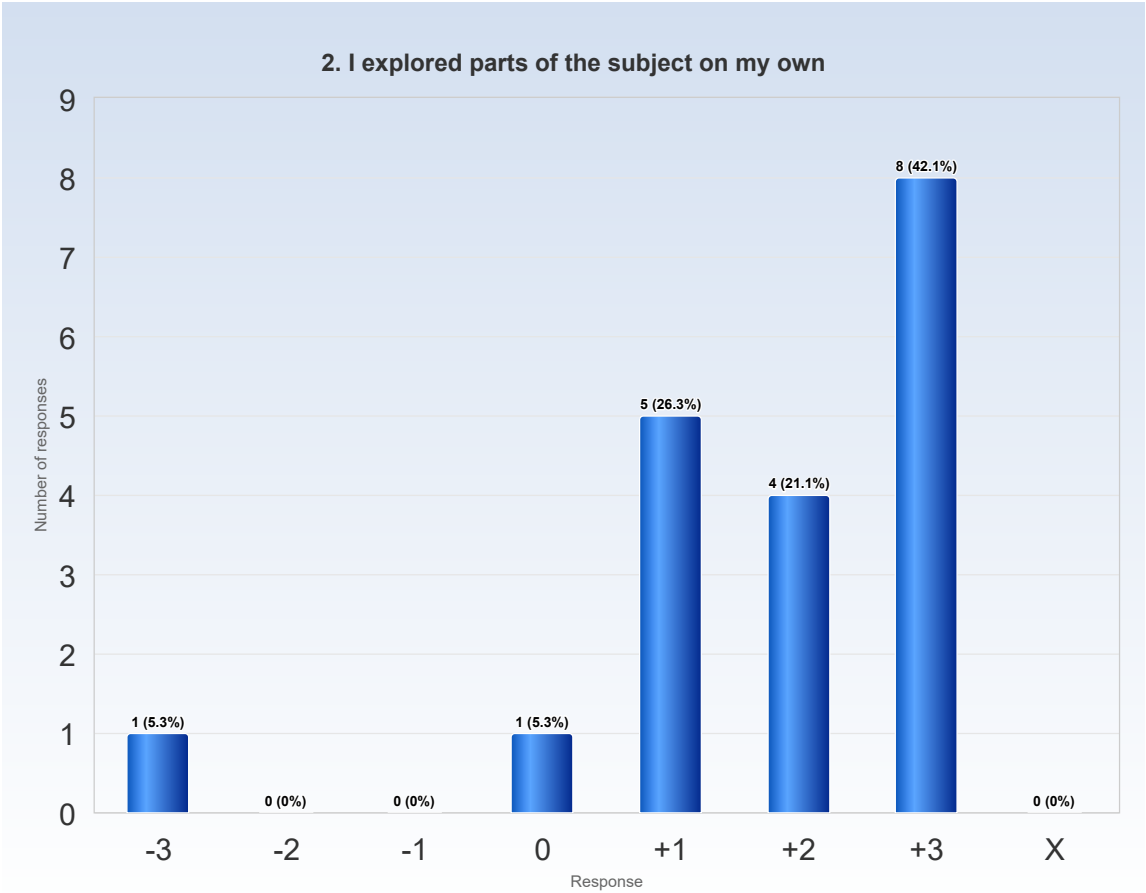
X = I decline to take a position on the statement



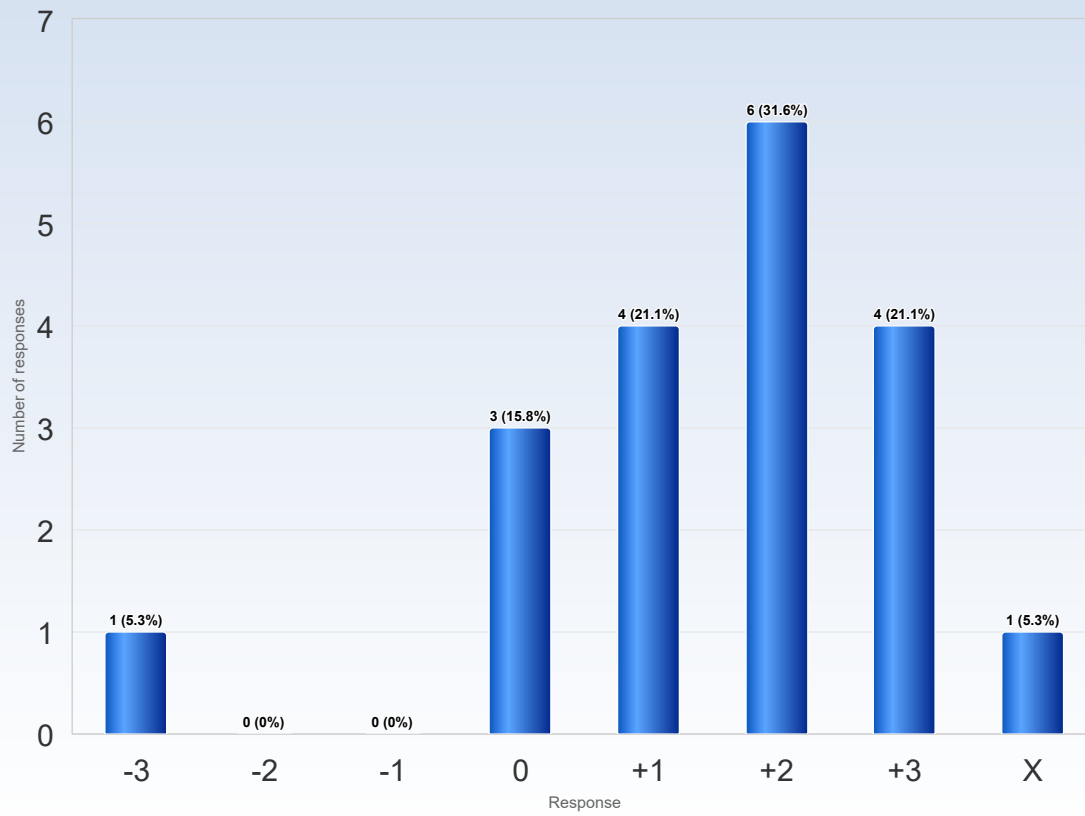
Comments

Comments (My response was: +1)

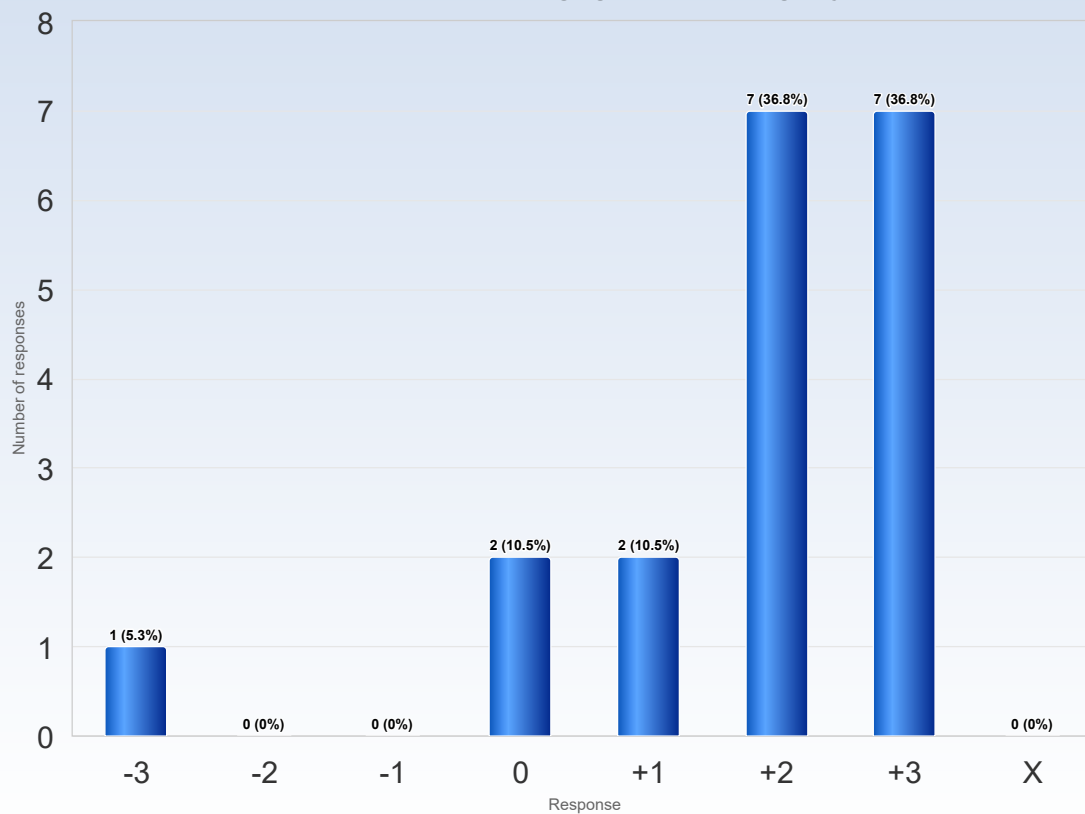
The project 2 is difficult to understand even if it is an interesting real application.



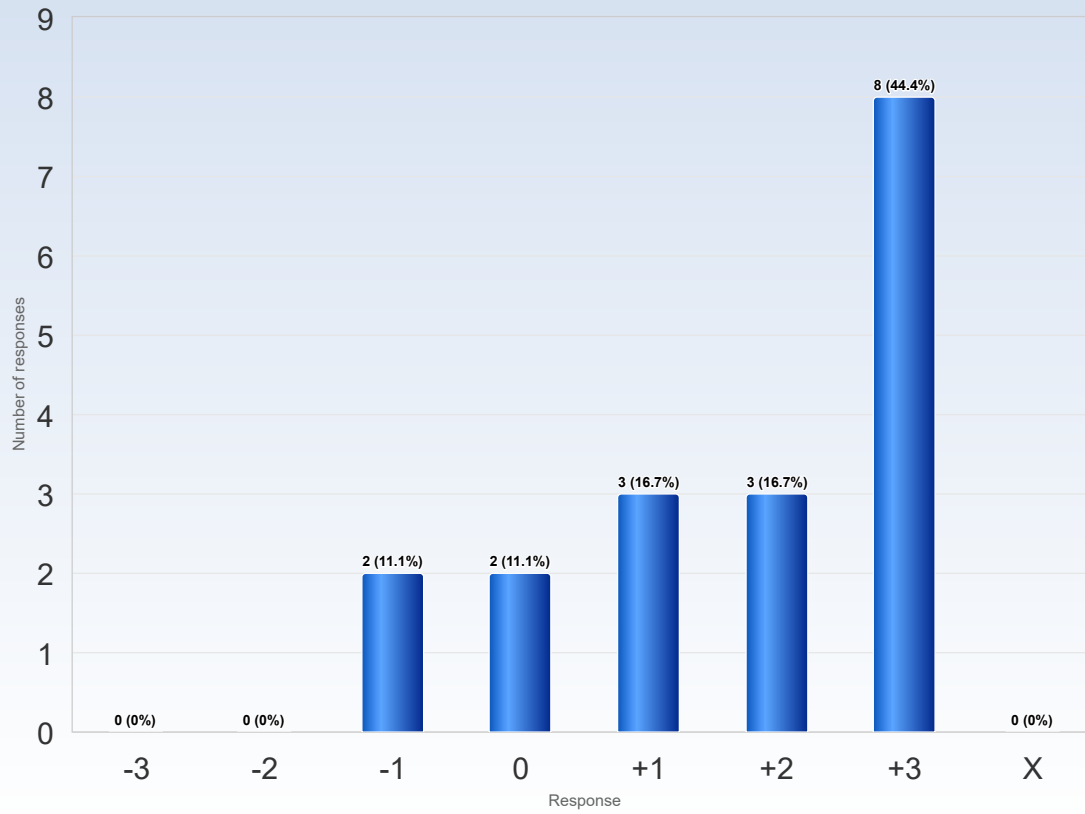
3. I was able to learn by trying out my own ideas



4. The course was challenging in a stimulating way



5. I felt togetherness with others on the course

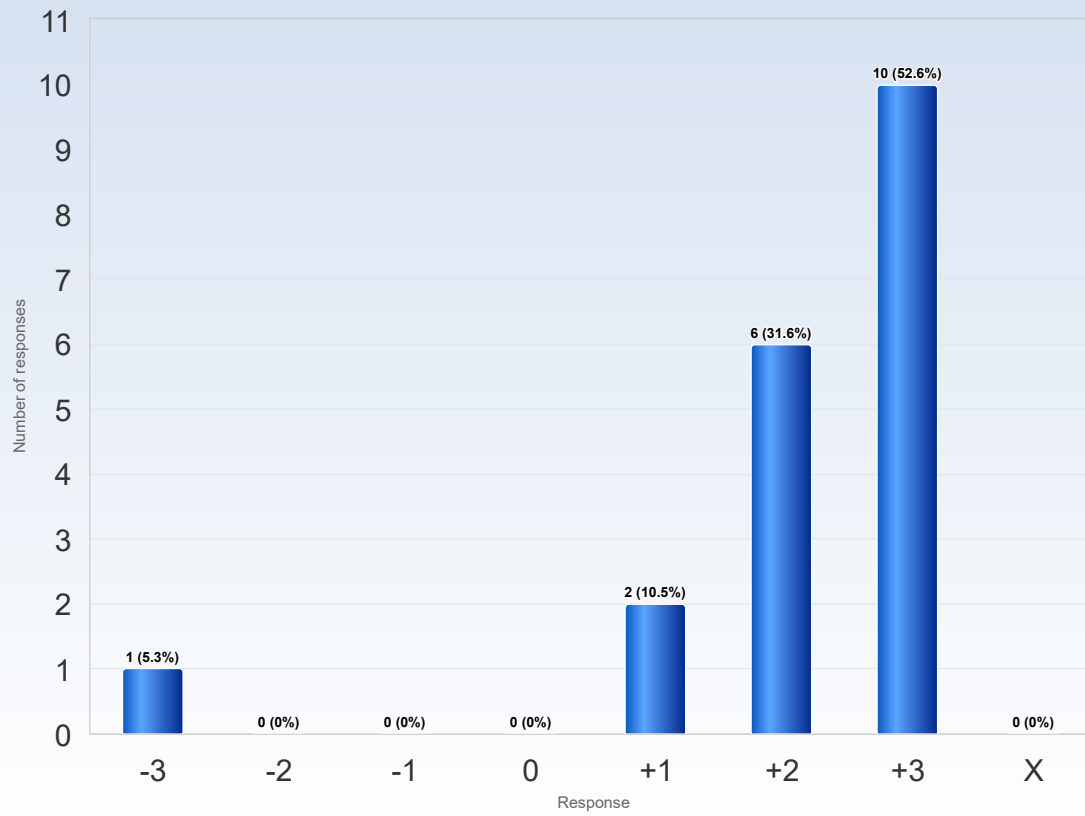


Comments

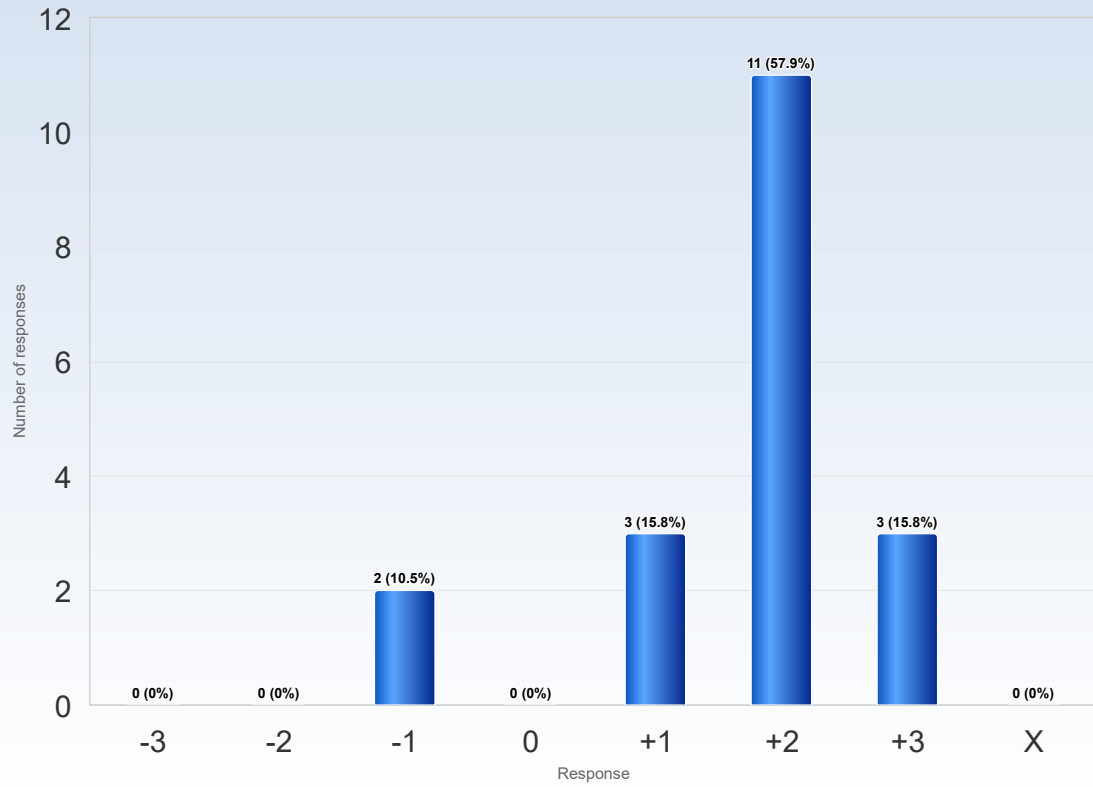
Comments (My response was: +3)

Tutorials are great! Good exchange and good recap work from the two assistants.

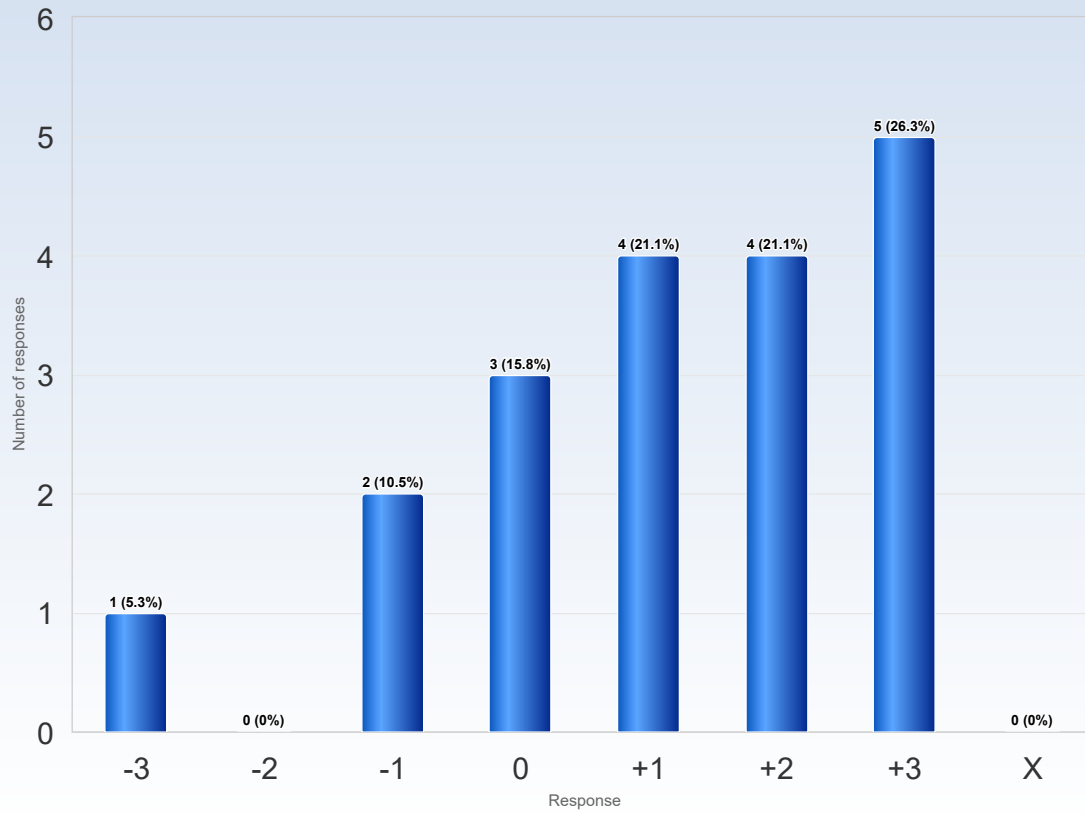
6. The atmosphere on the course was open and inclusive



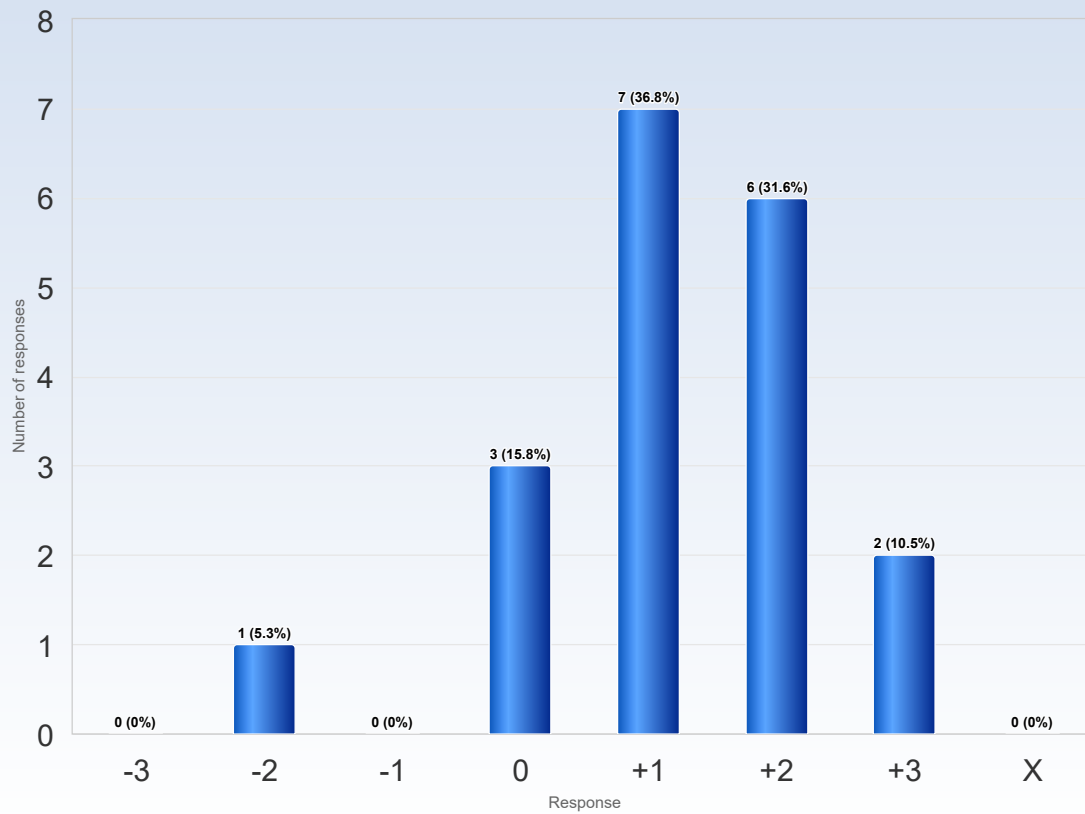
7. The intended learning outcomes helped me to understand what I was expected to achieve



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



9. I understood what the teachers were talking about

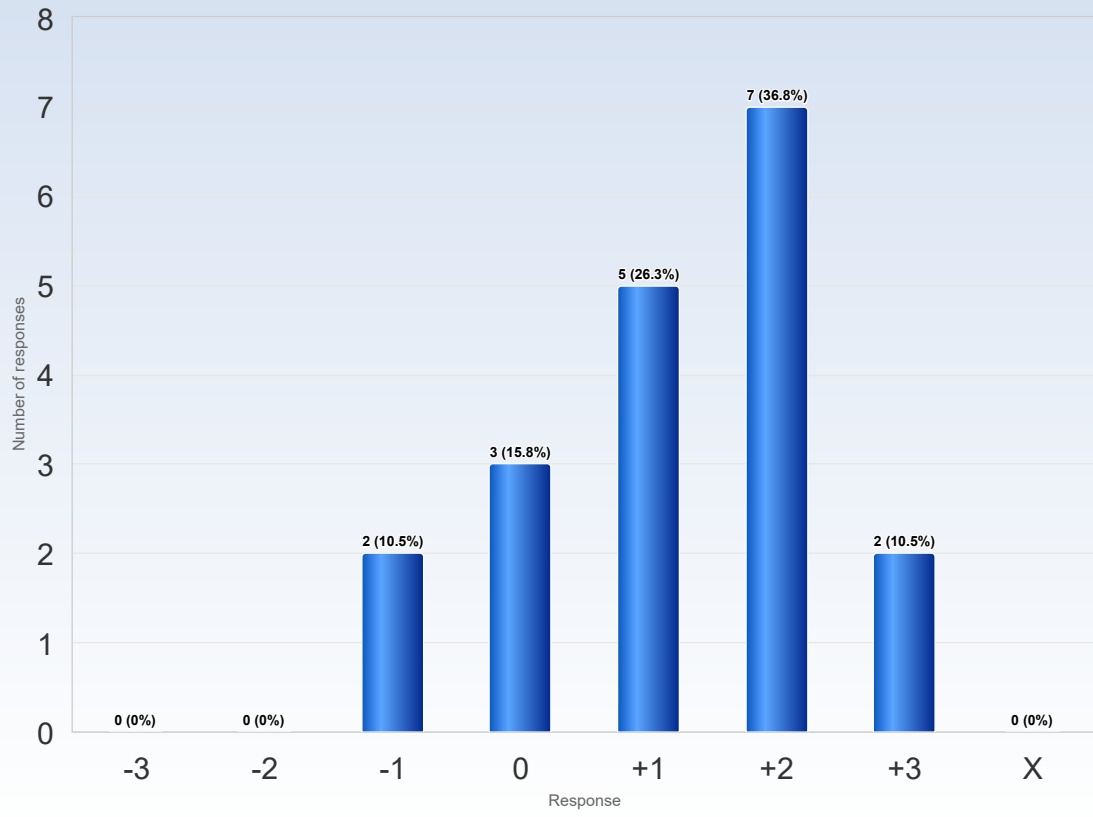


Comments

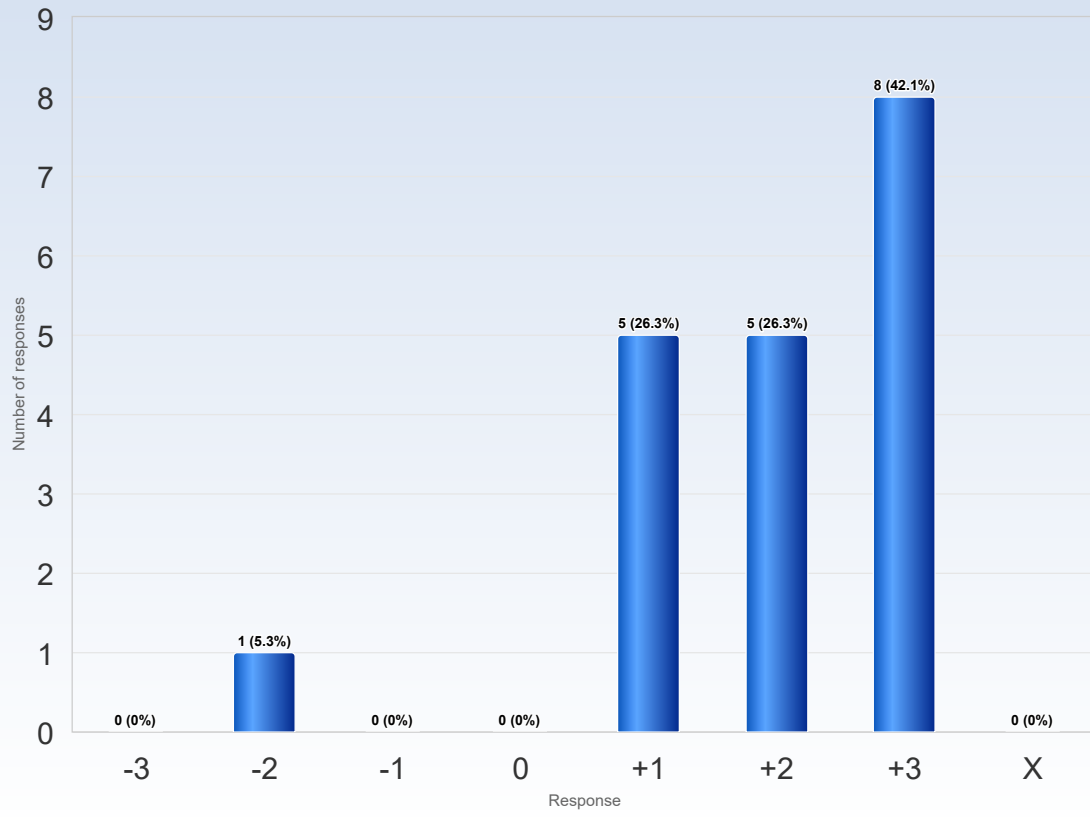
Comments (My response was: 0)

Sometimes the course is really theoretical compare to the exercise and tutorial part. The reflection lectures are not a good recap but the tutorials one are. Reflective problems are a good idea but they come before having the opportunity to see the lecture, so they become useless because you just lose time trying things you haven't done before.

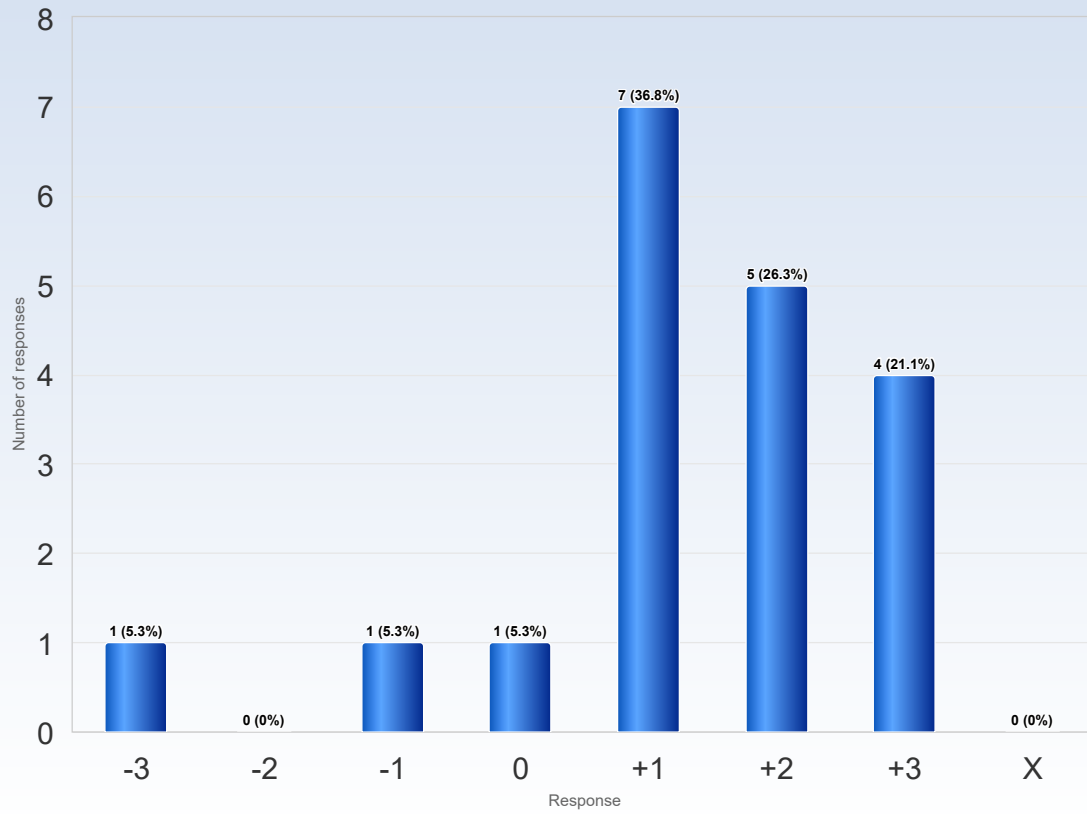
10. I was able to learn from concrete examples that I could relate to



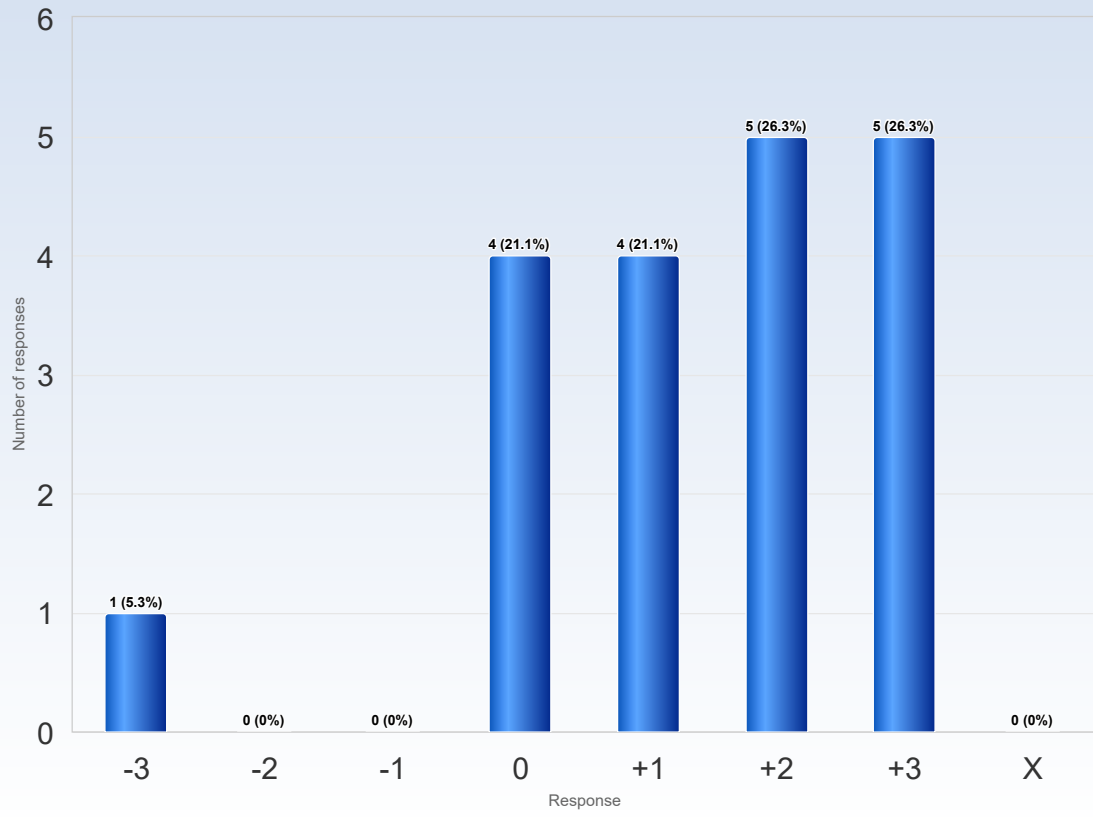
11. Understanding of key concepts had high priority



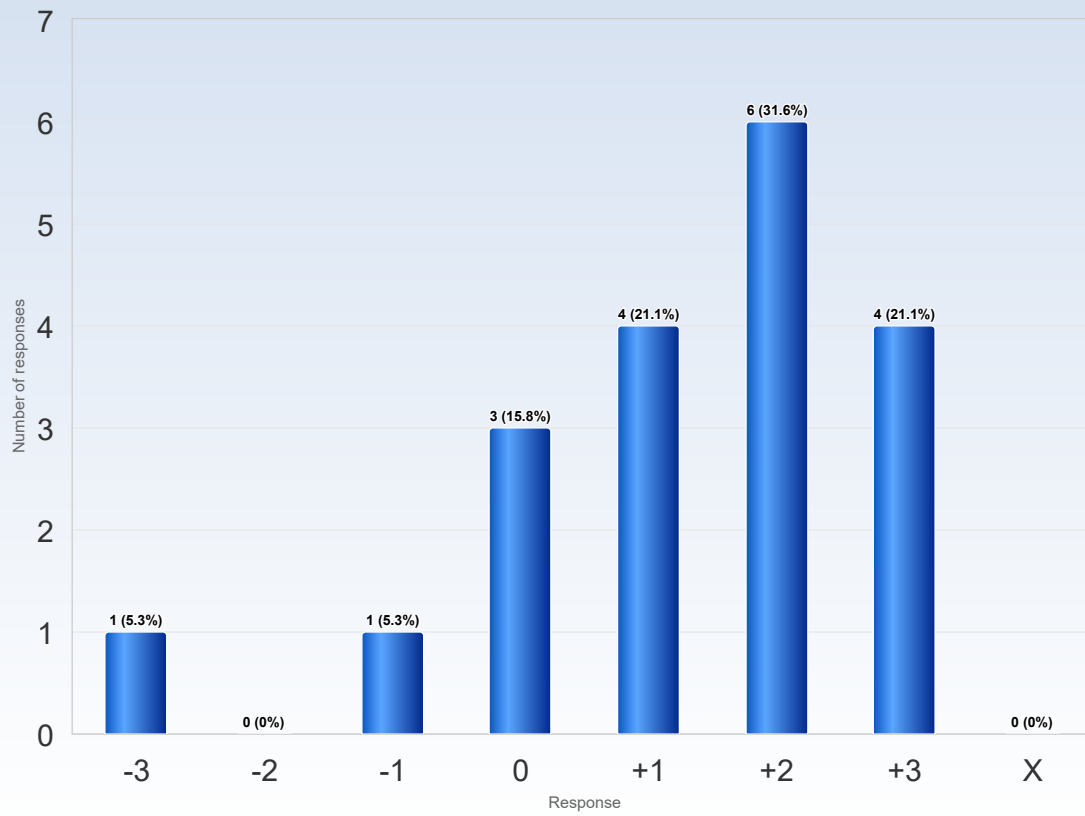
12. The course activities helped me to achieve the intended learning outcomes efficiently



13. I understood what I was expected to learn in order to obtain a certain grade



14. I received regular feedback that helped me to see my progress

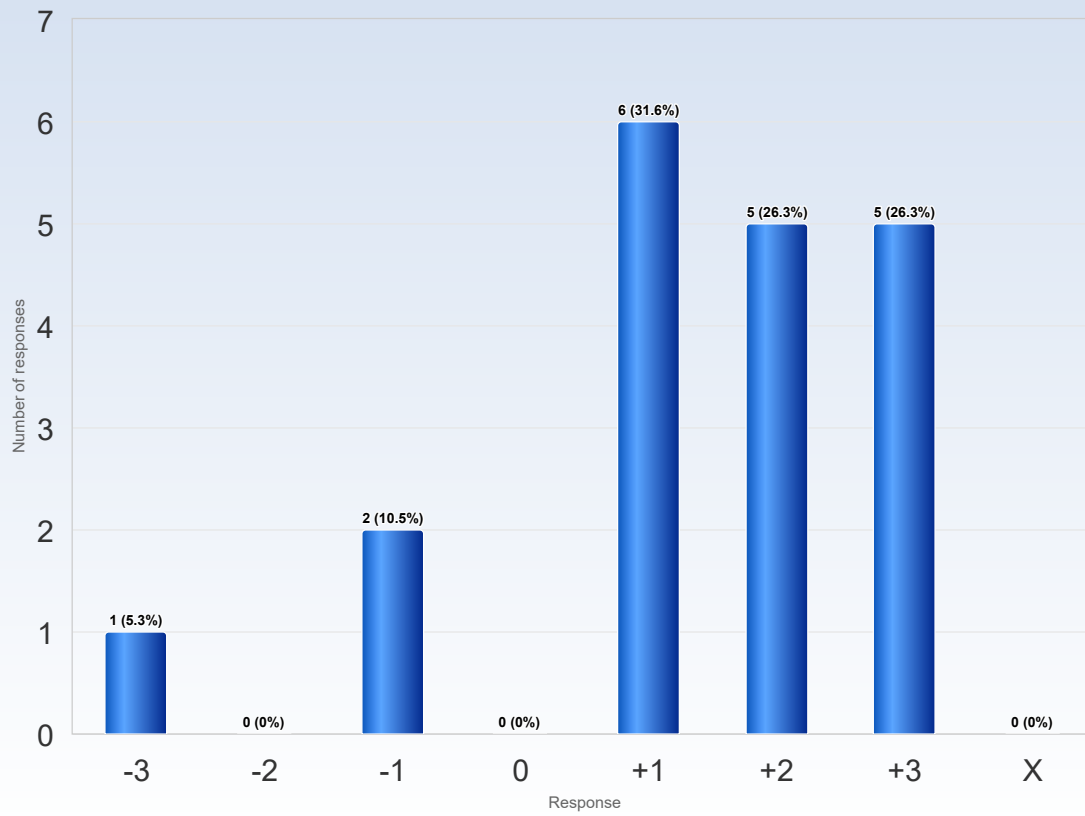


Comments

Comments (My response was: +3)

Good assistants !

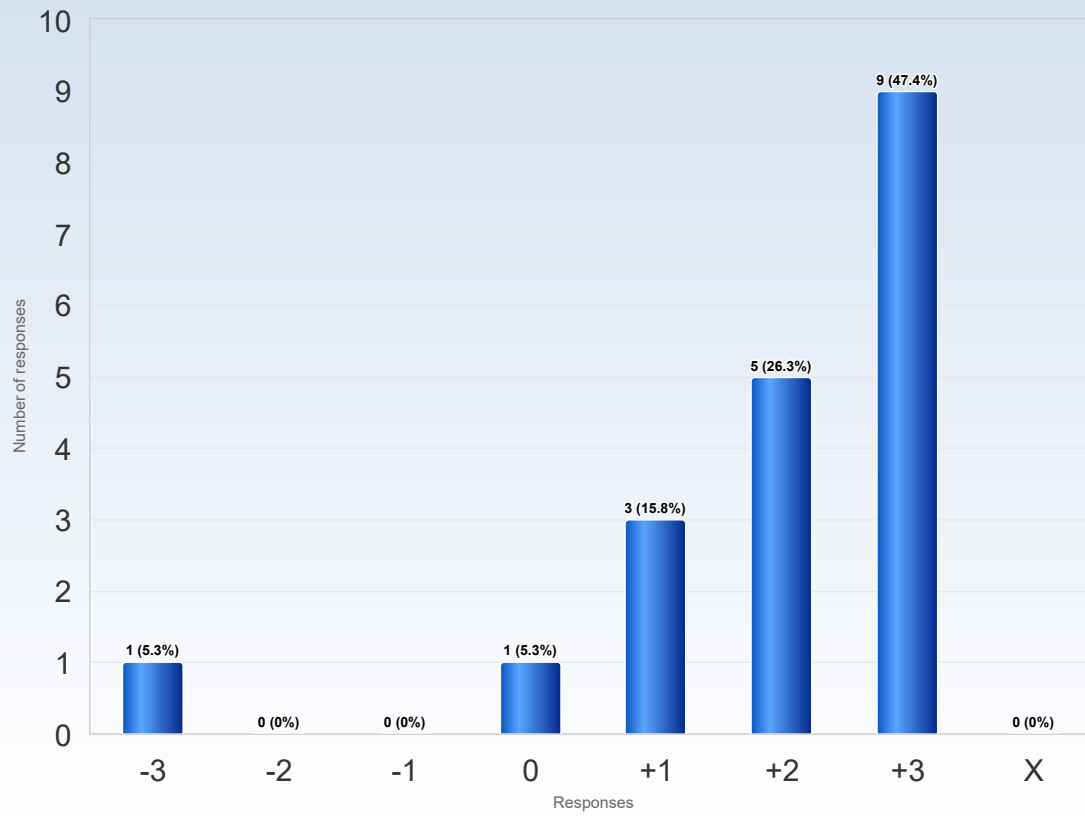
15. I could practice and receive feedback without being graded



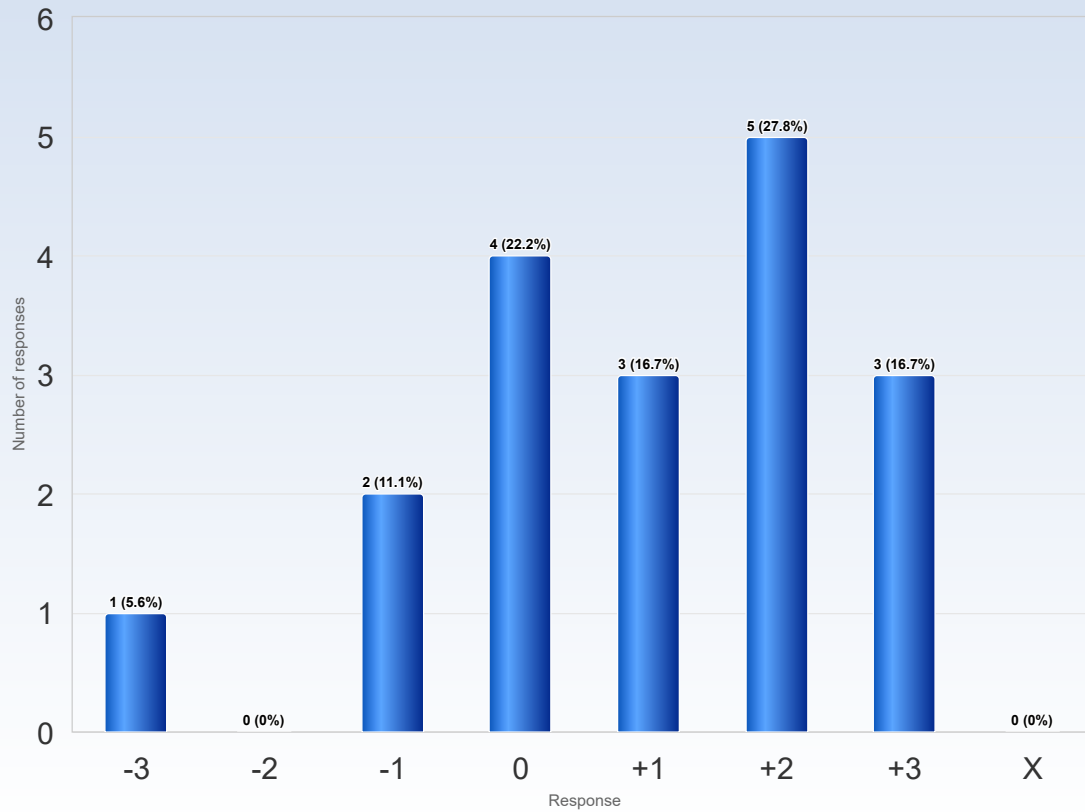
Comments

Comments (My response was: +3)
Really good tutorials sessions

16. The assessment on the course was fair and honest



17. My background knowledge was sufficient to follow the course

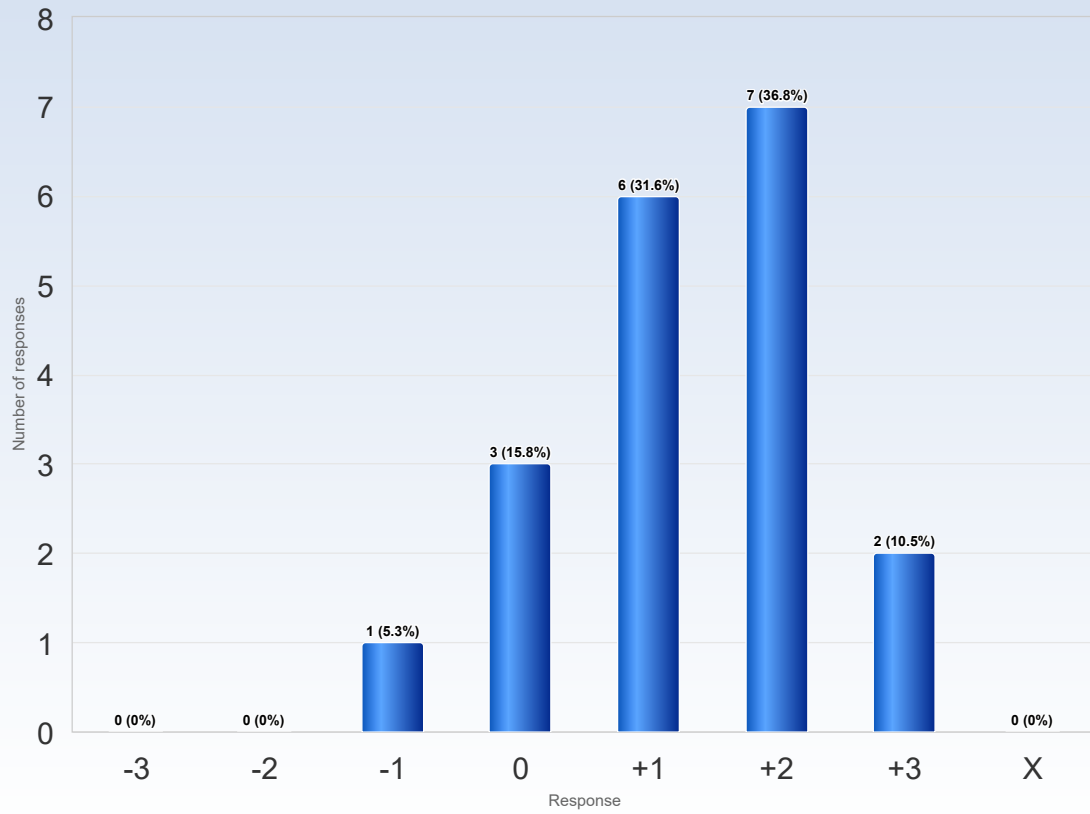


Comments

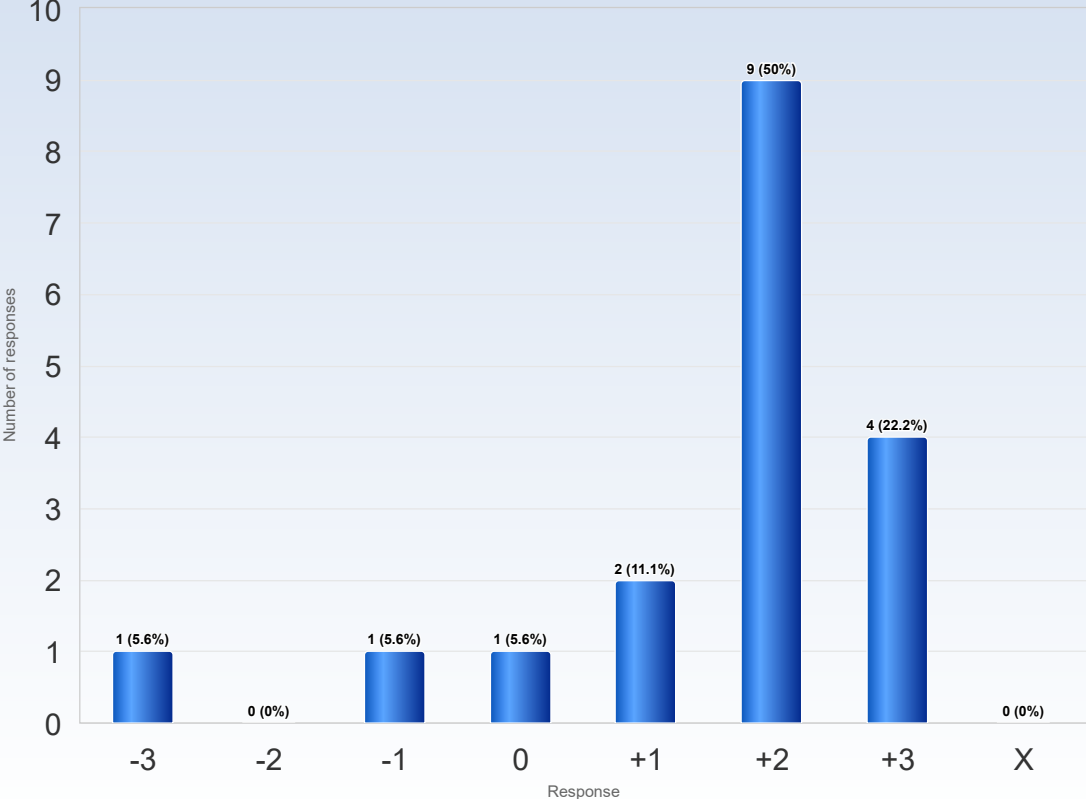
Comments (My response was: +2)

Even if I had not done Signal and system, my epfl background with statistics and fourier in analysis gives me a great knowledge to understand the course and the signal part was intuitive to understand.

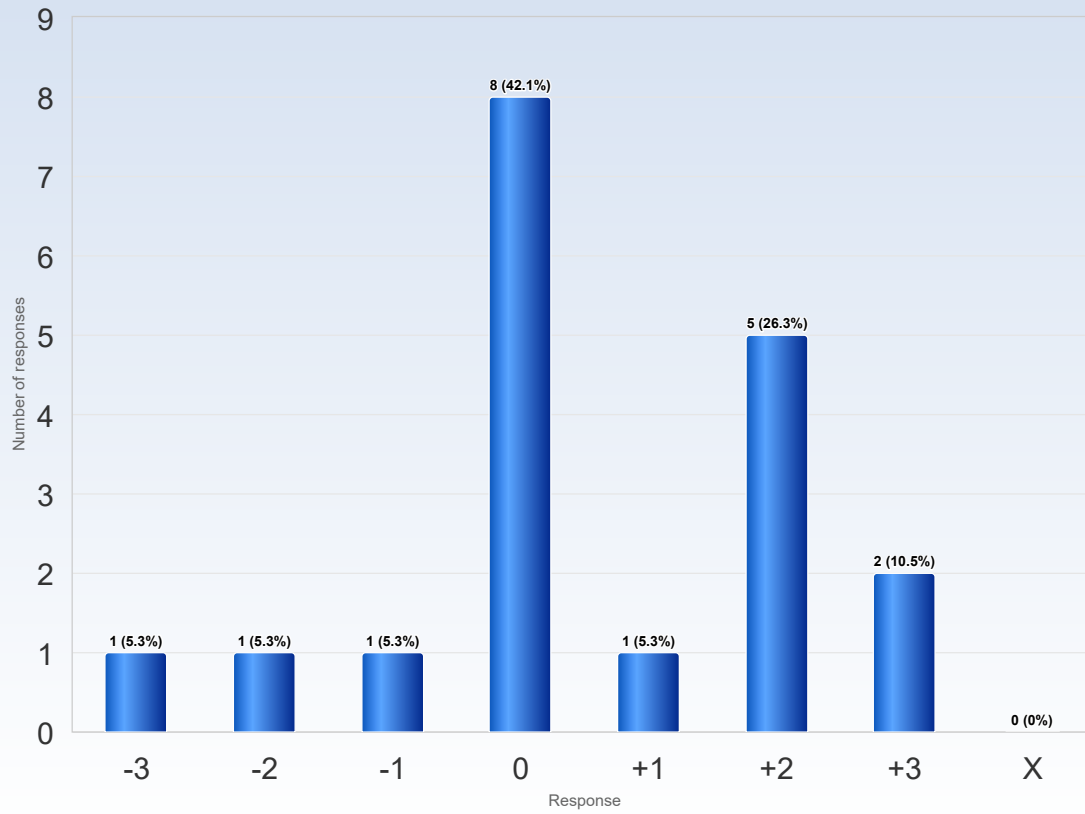
18. I regularly spent time to reflect on what I learned



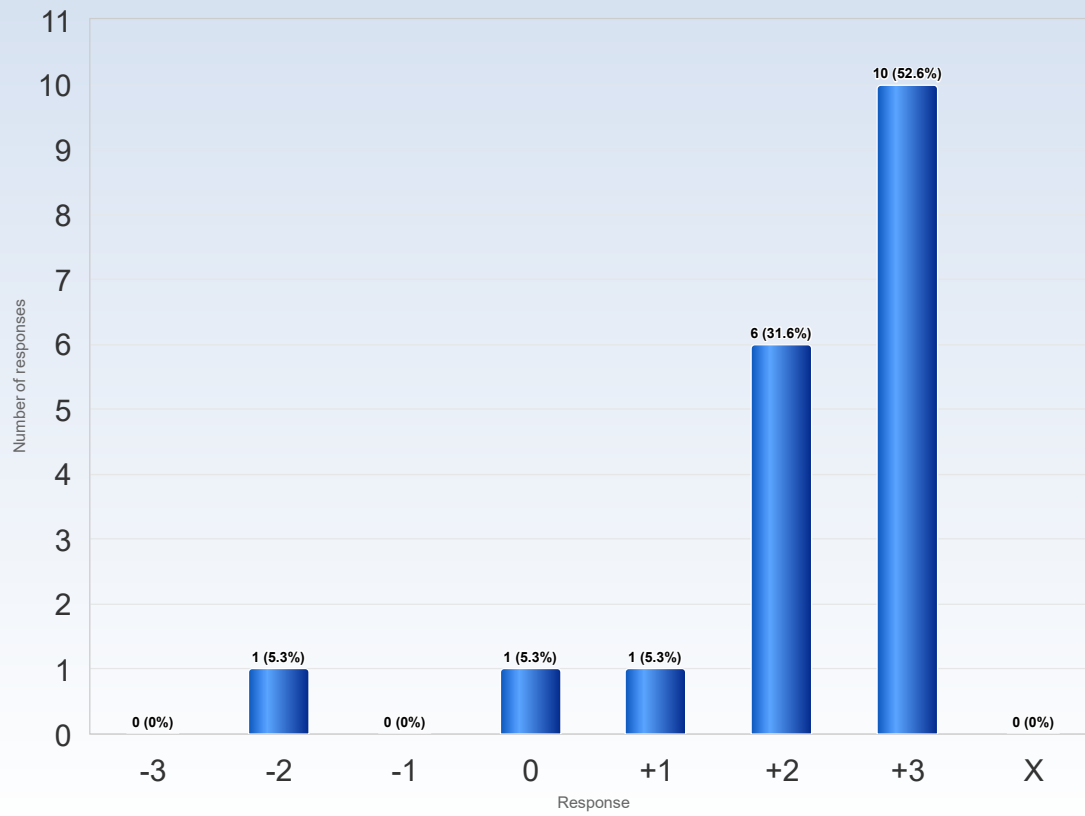
19. The course activities enabled me to learn in different ways



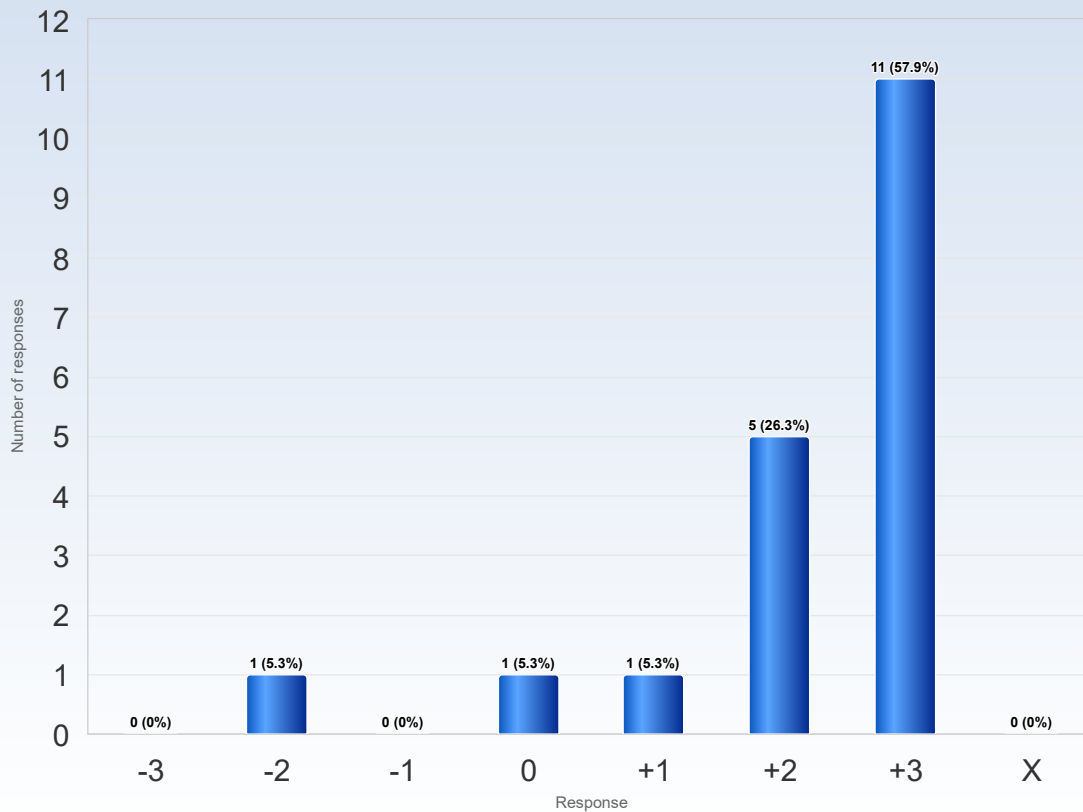
20. I had opportunities to influence the course activities



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



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



SPECIFIKA FRÅGOR

How was your learning experience watching the recorded online lectures?

SPECIFIKA FRÅGOR

How was your learning experience watching the recorded online lectures?

- Good. Recorded lectures are suitable for self-paced learning, allowing me to set my own study schedule.
- Good experience! But I think the recorded online lectures could include more detailed aspects related to textbook.
- Not bad. But I do not like it.
- That is perfect. Because I'm an international student, I sometimes get stuck in recognising and understanding English, so the online lectures enable me to pause at any time to think and to re-listen to anything if I don't understand.
- They did not improve my understanding
- Perfect. Watching the recorded online lectures allows me to make a schedule more flexibly.
- Good
- The videos are in Youtube which have ad and I think it interrupt my thinking.
- not bad
- Good. The recorded lectures were explicit.
- Sometimes the concept need to be explained in a not theoretical way. The videos are good.
- fine
- It's useful for me.
- not good as working on tutorial problems

How did the discussions in the reflection lectures clarify concepts and details?

How did the discussions in the reflection lectures clarify concepts and details?

not so well

Yes

Good but I occasionally overlook certain nuances within the transition from theory to practice.

Good, but sometimes the explanations are not understandable.

I think it can add something just like an exercise or an example after each statement.

Pretty good. The reflection lectures perfectly clarified the concepts, especially the "threshold concepts"

They did clarify some things, but I think they can be improved.

Professor should always clearly indicate which choice is correct.

Yes, and clarifying the concepts is extremely important in this course. But if professor can put the answer on the canvas, then it will be best.

make judgements on the concepts

That's not good. Because some people, including me, don't understand the specific theory, so the discussion doesn't work.

They were not that useful, tutorial were better in that way, with a good recap of the course.

Great.

How did the bonus points motivate you to study and participate in the course activities?

How did the bonus points motivate you to study and participate in the course activities?

I participated in every activity.

Very much

They are a big motivation to come to every tutorials

motivate me to finish the reflective problems and participant in tutorials

nice

Yes, very good point.

actually, it really motivate me to participate in the course activities.

It's the main motivation for me to participate in the tutorial courses.

Bonus points allow me to pass Part A of the exam, which means I can spend more time answering the questions in Part B.

To me disciplined

The bonus points motivated me to complete all assignments and participate in each tutorial. They helped me revise regularly.

Yes, it helps me a lot.

Actually I would still participate in the course activities even without the bonus points.

greatly

How as your learning experience in the tutorials?

How as your learning experience in the tutorials?

The tutorials helped me a lot. I learned a lot from the discussion with my fellows and from the detailed explanation of TAs.

Effective, but I still require some time for independent reflection on the problems after class.

good

GOOD, the TAs are very helpful.

The most important part of the course I think

That is fantastic. I learnt a lot from the tutorials. Discussions with my classmates strengthened my logical thinking skills and made me understand why the question was answered in this way.

The group was also well distributed, which allowed me to discuss the questions with some native English speakers and strengthened my speaking skills.

In addition, the presence of the Chinese teaching assistant allowed me to speak directly to him in Chinese when I encountered difficulties that I had difficulty describing in English (perhaps not a good habit, but it made it easier for me to understand).

Good. The selected problems were useful in terms of learning how to apply the theorems and formulas learnt recently.

That's good. The solution that the TA gave can be more concise, then more questions can be solved in class.

everytime it ends, i am looking forward to do more exercise, so that i can be more confident in final exam.

fruitful

great

Really great!

I learned a lot during those.

I felt that I was actually a member of a group and willing to take part in the group work.

How was your learning experience doing the projects?

How was your learning experience doing the projects?

Not bad. The math deduction was really challenging and did help understanding the knowledge. But Sometimes the project manual may be not explicit enough.

That's good. By solving specific problems, we learn in more depth.

Interesting.

It is one of my favorite learning method.

quite hard, need to spend more time on them

Good

Good, but the connection between the lecture content and the project problems is not obvious for me.

They are interesting and a good practice to apply my knowledge.

Very hard but interesting. Most important, it can improve my understanding.

It was a little stressing but also spurred me to read materials more effectively.

great

I did not gain much knowledge from the first project. The second was fun to do, but I think I would have learned the same in shorter time by studying the structure of solving problems by Wiener filtering in the lecture. The projects are ahead of the class, which did not make sense to me.

What was most interesting with the industry lecture?

What was most interesting with the industry lecture?

Learning something about automatic control theory and knowing that it actually works in industry.
I have another course at the same time
How important automatic control is for different industries.
I have learned how the signal theory can apply in the industry area in the guest lecture.
To gain a practical understanding of how theories are applied to real-world problems.
introduction of the real project
To see how learned theories are expressed in real industrial applications.
Is it the class of the guest and professor?
Give me insight to industry.
the auto-control systems

How was your learning experience overall?

How was your learning experience overall?

Not bad.
great
I did learn a lot about signal theory.
It's perfect. My favourite part is the tutorials and doing the project. I like to learn from the discussions with my classmates.
Good course that can help me in future
Good, but I might need some extra time to thoroughly grasp the entire lecture."
Good!
The course is difficult but useful and beneficial.
I am not sure whether I understand the basic concepts. :(
Good.
It is nice to learn the course, but the exam questions look a little difficult.
not bad
7/10

Please find the exam info at <https://people.kth.se/~oech/examinfo23.pdf>

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Very useful!
Great
Thank you :)
tack