

## Kursanalys

<b>Kurstitel: Applied Gene Technology</b>	
<b>Kurskod: BB2255</b>	<b>Högskolepoäng: 7.5</b>
<b>Kursen ingår i programmet: Medical Biotechnology</b>	
<b>Termin: HT</b>	<b>Läsperiod: 2</b>
<b>Kursansvarig: Afshin Ahmadian, Stefania Giacomello</b>	<b>Examinator: Afshin Ahmadian</b>
<b>Antal registrerade studenter: 81</b>	<b>Antal godkända vid sista kursdatum: 44</b>
<b>Svarsfrekvens kursvärderingsenkät (%): 24%</b>	

### 1. Beskrivning av genomförda förändringar till detta kurstillfälle

Based on what stated in the course analysis from last year, we added the topic of Bioinformatics Reproducibility to be part of one lecture and used the software Docker to create containers that ensure data analysis reproducibility in computer labs.

### 2. Sammanfattning av studenternas kursvärderingar

The course had an overall very positive evaluation by the students:

- I worked with interesting issues: 47.4% gave the highest score possible
- The course was challenging in a stimulating way: 47.4% gave the highest score possible
- I was able to practice and receive feedback without being graded: 52.6% gave the highest score possible
- The assessment on the course was fair and honest: 36.8% gave the highest score possible while nobody gave negative feedback about this aspect.
- I was able to learn by collaborating and discussing with others: 63.2% gave the highest score possible
- I was able to get support if I needed it: 89.5% gave a positive answer to this question. The 10.5% that gave a negative answer to this question is probably due to the computer labs. For how much we improved the assistance by increasing the number of TAs, there are always a few students (2 in this case) that are not fully happy with it.

### 3. Reflektioner kring kursens genomförande och resultat

#### a. Kursens styrkor:

Students were satisfied with the topics presented. They were also very happy about the computer labs and the help received by TAs. In addition, students found the atmosphere of the course inclusive. Since the course was conducted on Zoom, we had Zoom polls and Mentimeter surveys which helped making the atmosphere more relaxed and help the students to realize if they understood the different topics.

#### b. Kursens svagheter:

Overall, it worked quite well since we did not experience any specific major weakness. Some students expressed the wish to have less overlap between the Technology and Bioinformatics lectures while some others were satisfied with the intersection level. We will explain students why there are some overlaps between the two part of the course and at the same time try to reduce some.



**4. Förslag till förändringar för kommande kurstillfälle**

The two teachers will discuss way to reduce overlap between the two course parts.

**5. Övriga synpunkter**

**Bilagor:**

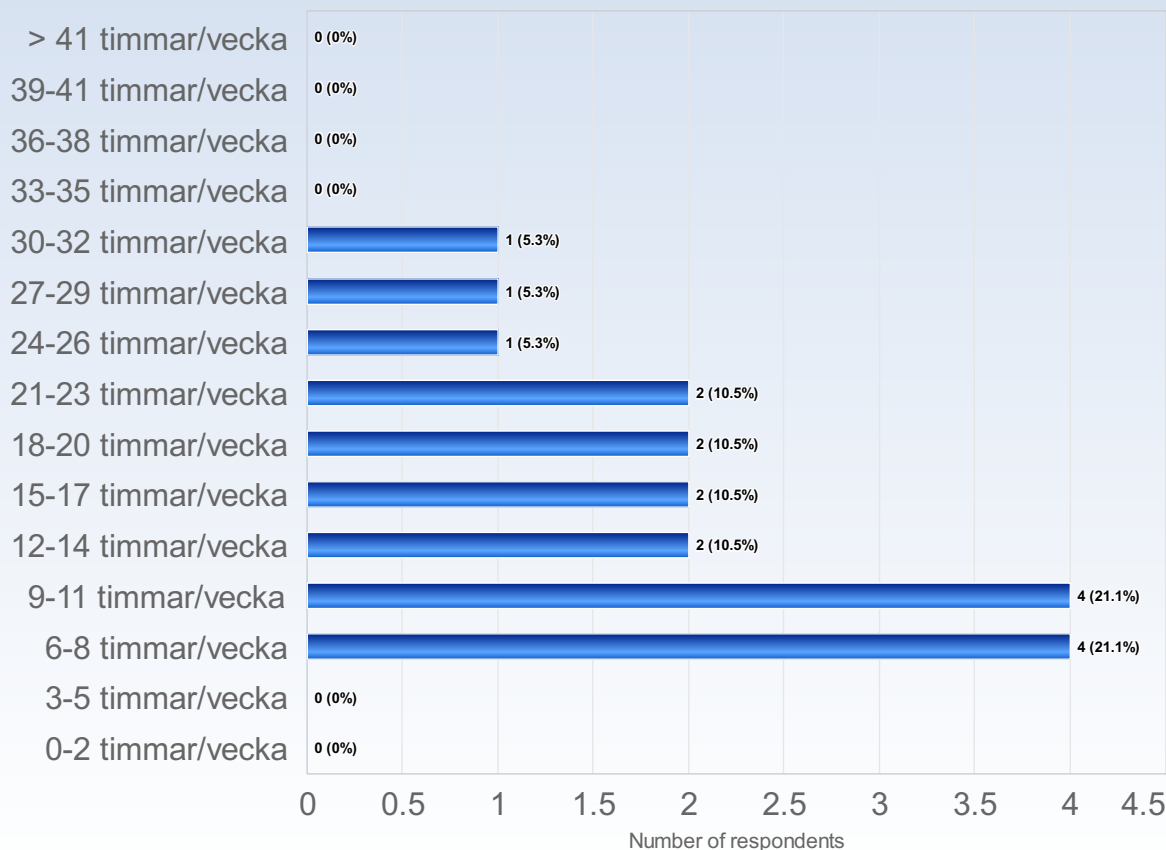
1. Course evaluation

# BB2255 - 2022-01-18

Antal respondenter: 80  
Antal svar: 19  
Svarsfrekvens: 23.75%

## 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)

Easy course.

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

We had mostly 2 lectures a week. However, as preparation we had to watch the actual lecture already beforehand. It felt a bit like double the amount of work. If we had the lecture in person, we would have had the lecture and the discussion in one instead of two parts.

I started very slowly and did more and more as I became more and more stressed because I hadn't done anything yet and were falling behind.

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

Fair amount

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

The workload was fine.

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

Varied a bit, depending on other courses.

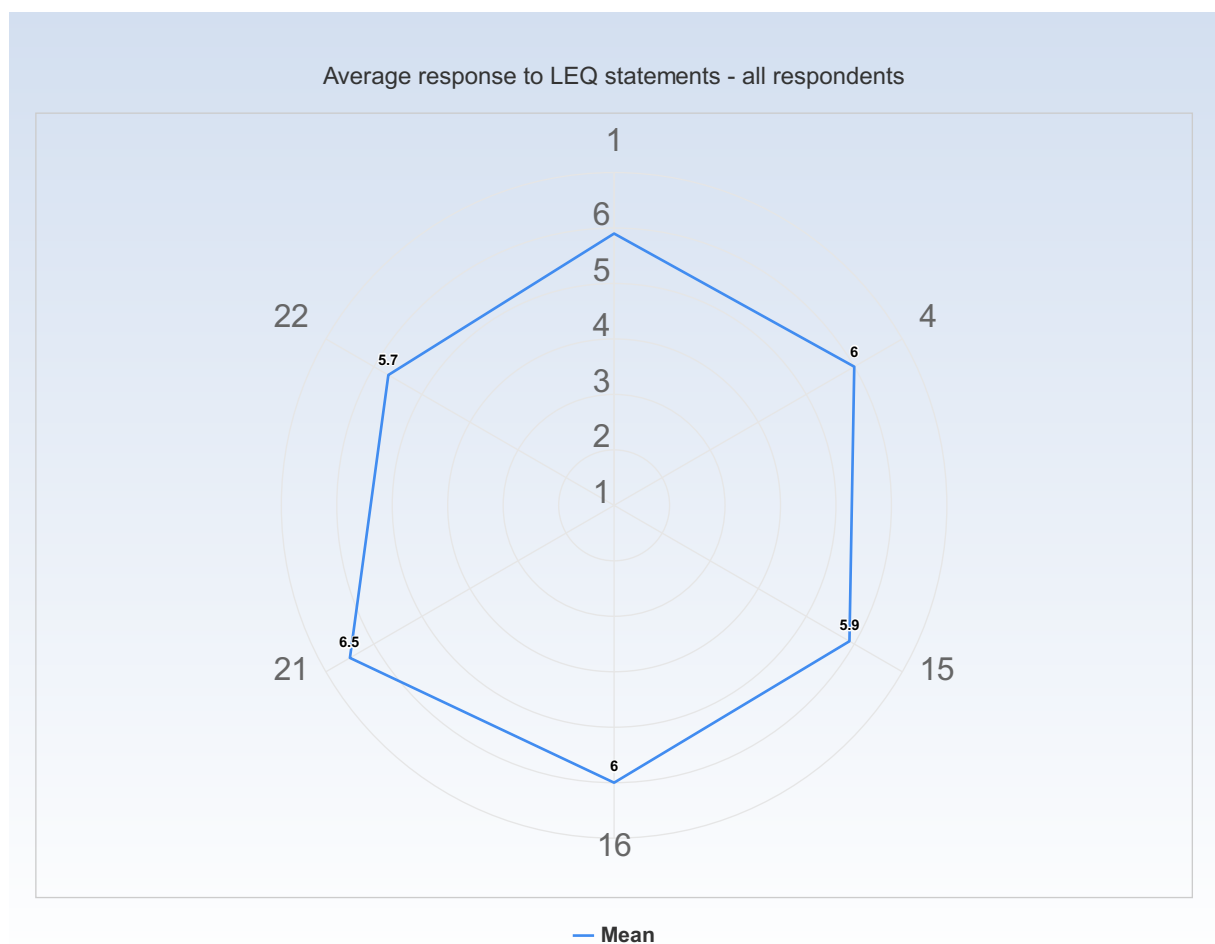
Det var väldigt intensivt i början av kursen när det kom till att försöka lära sig alla processer som togs upp, men tycker att Afshin skötte det på ett bra sätt.

# 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.

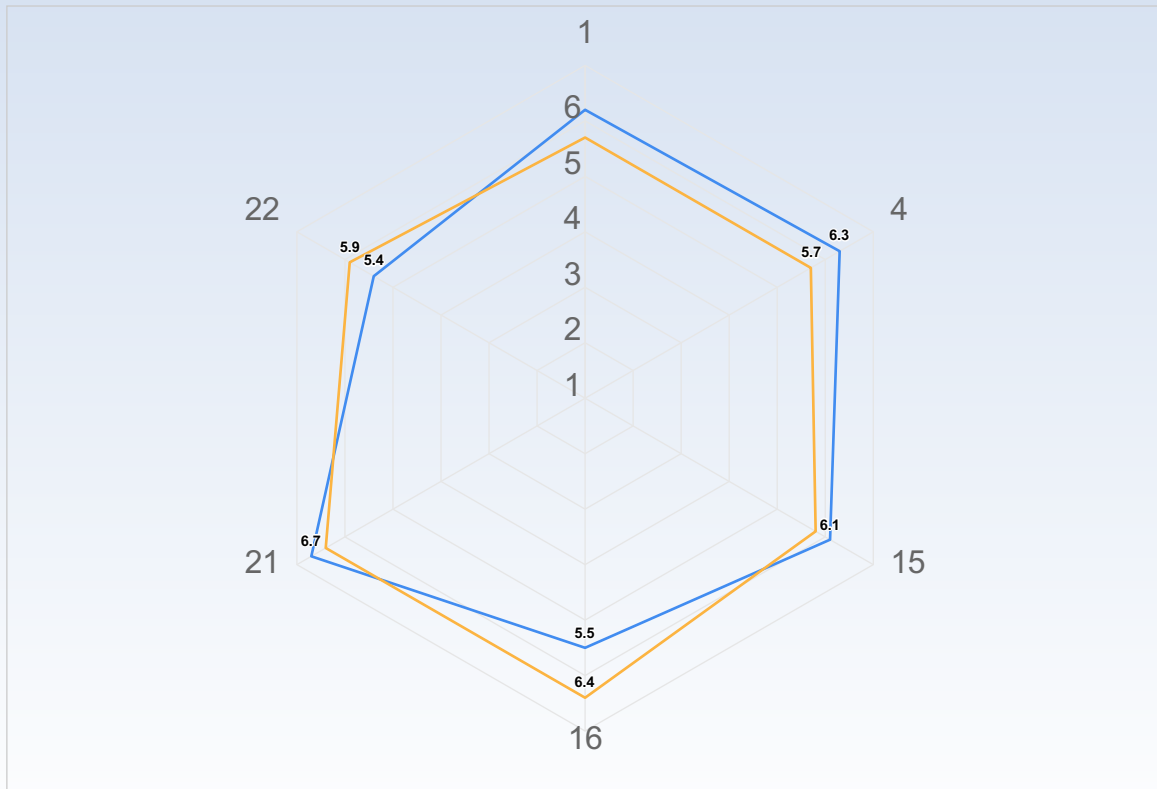
Biggs J. & Tang, C. (2011). *Teaching for Quality Learning at University*, Chapter 6, pp. 95-110. Maidenhead: McGraw Hill.

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



— Kvinna — Man — Annat — Vill ej uppge

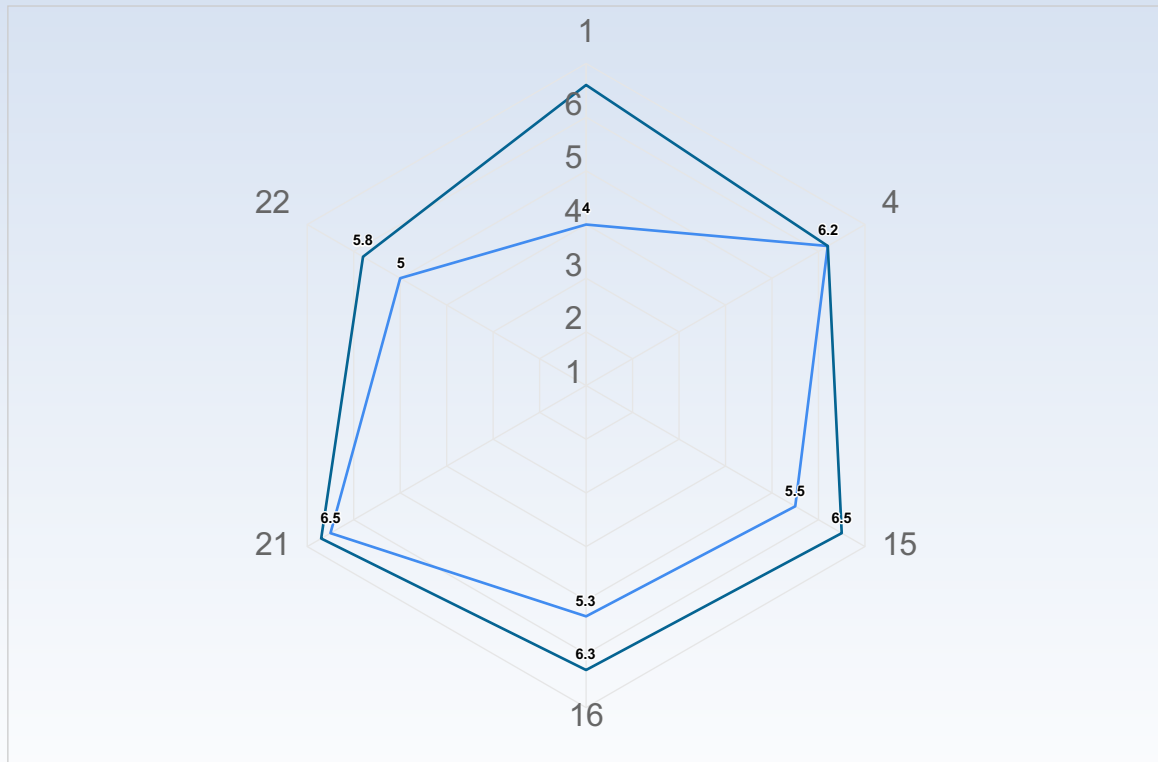
Comments

Comments (I am: Man)

no comment

I don't understand how this is would change depending on my gender.

Average response to LEQ statements - per type of student



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

Comments

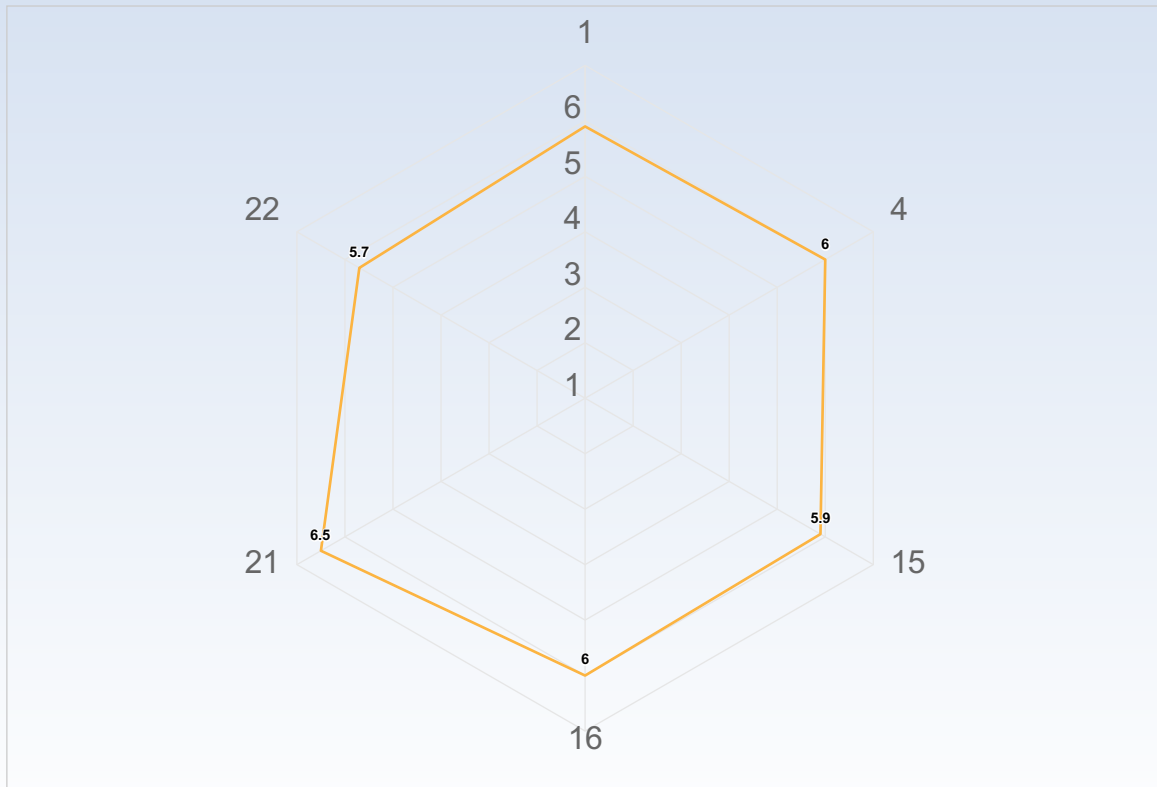
Comments (I am: Internationell masterstudent)

no comment

Comments (I am: Svensk student i årskurs 4-5)

The knowledge was on a expected level of a master course

Average response to LEQ statements - per disability



— Ja — Nej — Vill ej uppge

Comments

Comments (My response was: Nej)  
no comment

# GENERAL QUESTIONS

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What was the best aspect of the course?

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

The seminar discussions

Diversity of methods studied

I thought the way that techniques were explained in such a way that they seemed really simple but clever made the content more approachable.

Very applicable to "real research" and gave insight on new biotech companies who develop the techniques covered.

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

Interesting topics and you really learned a lot.

The computer labs and the project presentation

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

The bioinformatics lab were really good and kind of challenging.

For the technology part, I liked the part where we had to discuss aspects in breakout rooms.

The discussion sessions during the lectures

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

That everything was available through Canvas, such as whiteboard notes + lectures + instructions.

It was also very great to combine the knowledge from the lectures with the project topics.

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

It was nice with prerecorded videos, you could go back if you didn't understand something. Also nice to have the articles about every technique available, that also helped a lot when studying.

Många ingående förklaringar och bra uppstrukturerat när det gäller själva teknologidelen. Tycker det var bra att vi hade chans att diskutera under Q/Asessionerna, och det kändes som att man kunde lära sig väldigt mycket. Gällande datalabbarna så var labbassarna till största del hjälpsamma och hade skrivit bra dokumentation om laborationerna.

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

Interesting subjects.

I really liked the lab course.

Several Q&A sessions were organized, really necessary.

What was the best aspect of the course? (I worked: 24-26 timmar/vecka)

Interesting to learn about all methods

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

That everything was pre-recorded.

What was the best aspect of the course? (I worked: 30-32 timmar/vecka)

That the lectures were pre-recorded, therefore we can watch them in our own pace and be able to go back to parts that were hard, which makes the learning easier.

## What would you suggest to improve?

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

The first installation lecture of the computer lab was confusing. The bioinformatics lectures repeated a lot of what the previous lectures' content. Therefore, did not use the time slot efficiently.

Upload the live lectures and answers to the questions on canvas

I thought it was a bit of a hassle to install RStudio. Feel as though a simpler method of installation likely exists.

The exam felt very stressed and I felt that I could have answered more thoroughly and drawn more descriptive pictures if the exam time was an hour longer. It was also very hard to know the "depth"/level necessary in an answer since we didn't receive any suggestion answers to previous years exams.

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

Maybe more planned out lecture discussion sessions.

We should not have to watch the lecture (of around an hour) and in addition have another lecture which is just a discussion (another 1,5 hours). Either holding the lecture in person and include the discussion (as well as shortening it. Most of the times we had more time than we needed) or shortening the live Fidschi on session.

The pre recorded lectures and the discussion can be done in a better way

Incentivise learning and keeping pace. I would make the chunks of tasks more obviously divisible into smaller pieces. The labs did this great as you could do something very small which still seemed like a part of the whole and therefore made me feel like I had accomplished something even if it was a very minor part in the grand scheme of things.

Ask yourselves if it's possible to divide each lecture into sequences of 15 minutes. You don't need to give each lecture in piecemeal like this but if it's possible to divide the lectures into smaller pieces make this obvious to the students

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

I would suggest to improve the bioinformatics lectures. It really overlapped with the technology part and we could have studied more "analytical" methods regarding the data we get with the R-lab.

Integrate the bioinformatics part better into the whole course, as they felt very separate.

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

The bioinformatics part could be extended a bit more.

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

If you were't able to attend all the lectures, the discussion questions were sometimes a bit hard to completely figure out yourself. You didn't always get all the different aspects of it, if you missed that session. So something to make up for that, otherwise the arrangement of the course was good.

Stefanias del kändes, för att tala klartext, onödig. Det var till största del repetition av vad Afshin redan hade tagit upp på hans lektioner, samt också väldigt grundläggande förklaring av vad tex mRNA är, vilket jag anser INTE hör hemma på en kurs på mastersnivå, det är kunskap som alla mer eller mindre bör ha vid detta lag. När det kommer till datalaborationerna så är det för mig oförklarligt att man ska tvingas installera Docker och programmera i R, ett språk som flera av labbassarna inte använt innan kursen, och det är då för mig väldigt konstigt att man ska ta upp detta i en kurs om man sedan aldrig kommer att använda det. Dessutom var Docker något som inte var kompatibelt med alla datorer, vilket skapade en hel del frustration, och det är en så stor applikation att det i många fall fick datorn att krascha (att installera något som tar upp 20 GB av data är inte rimligt). Dessutom försvann en del av hjälpen från en av assarna nu på slutet, vilket gjorde att den sista labben blev färdigställd långt in på terminen vilket inte är ok, då det genererar en hel del stress. Bioinformatiken saknade bioinformatik, tyvärr. Jag saknade också livelektioner under teknologidelen. Inspelningar är bra absolut, men jag tycker att undervisningen generellt sett alltid är bättre på livelektioner.

Tiden på tentamen var också för kort för att hinna med att svara på alla frågor, vilket inte ger en rättvis examination.

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

The exam was too stressful, it would be better with either more time or fewer questions. However, it was a really good exam apart from the lack of time.

It was quite difficult to watch and understand everything with the recorded videos. It took really long time to understand everything and remember it. Therefore a quick recap on what was in the recorded lectures before seminars sessions could be really useful.

Something to improve would also to insist on what technologies are used for more precisely, which applications and how it is possible to combine these technologies. It was not clear at all.

### What would you suggest to improve? (I worked: 24-26 timmar/vecka)

Better email communication

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

I think in general it was a good course.

### What would you suggest to improve? (I worked: 30-32 timmar/vecka)

The zoom sessions were too long. First watching the lectures and then having zoom sessions takes twice the time than scheduled. Therefore, I simply did not have the time to attend the zoom sessions. It would be better to just be given the answer to the discussion questions than discussing it.



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)

Do the the seminar discussions

Same as always, keep pace with the course material, don't leave everything until the end, even if it worked out for me.

Try to be engaged early on.

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

Watch lectures beforehand so you are ready for the lecture discussion.

Trying to make an overview of all the methods in advance. It is very easy to lose track.

It's okay to slack off as long as you make sure you have the time to pick up the slack later. If you're uncertain of how much time you have do something small today.

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

Learn basic R by yourself before the lab.

Write down essential elements + a drawing for each method on 1 page. It will be useful to study the exam.

Follow the discussions in class, they were really helpful

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

Pay extra attention to the figures to memorise the methods.

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

Read the articles, attend discussion sessions because some information was further elaborated there.

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

You need to have a strong background in biology. And don't hesitate to ask questions when you don't understand something.

What advice would you like to give to future participants? (I worked: 24-26 timmar/vecka)

Take your time to actually understand the concepts once, and then you Will know them for a life time.

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

Make proper notes of the first few lectures because then you'll easier understand the last ones about the specific projects.

Is there anything else you would like to add?

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

Good course

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

A small introduction about the package used in the lab could be done in the beginning of each lab session.

I would have liked to visit SciLifeLab facilities.

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

Thank you for an interesting course!

## SPECIFIC QUESTIONS

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## RESPONSE DATA

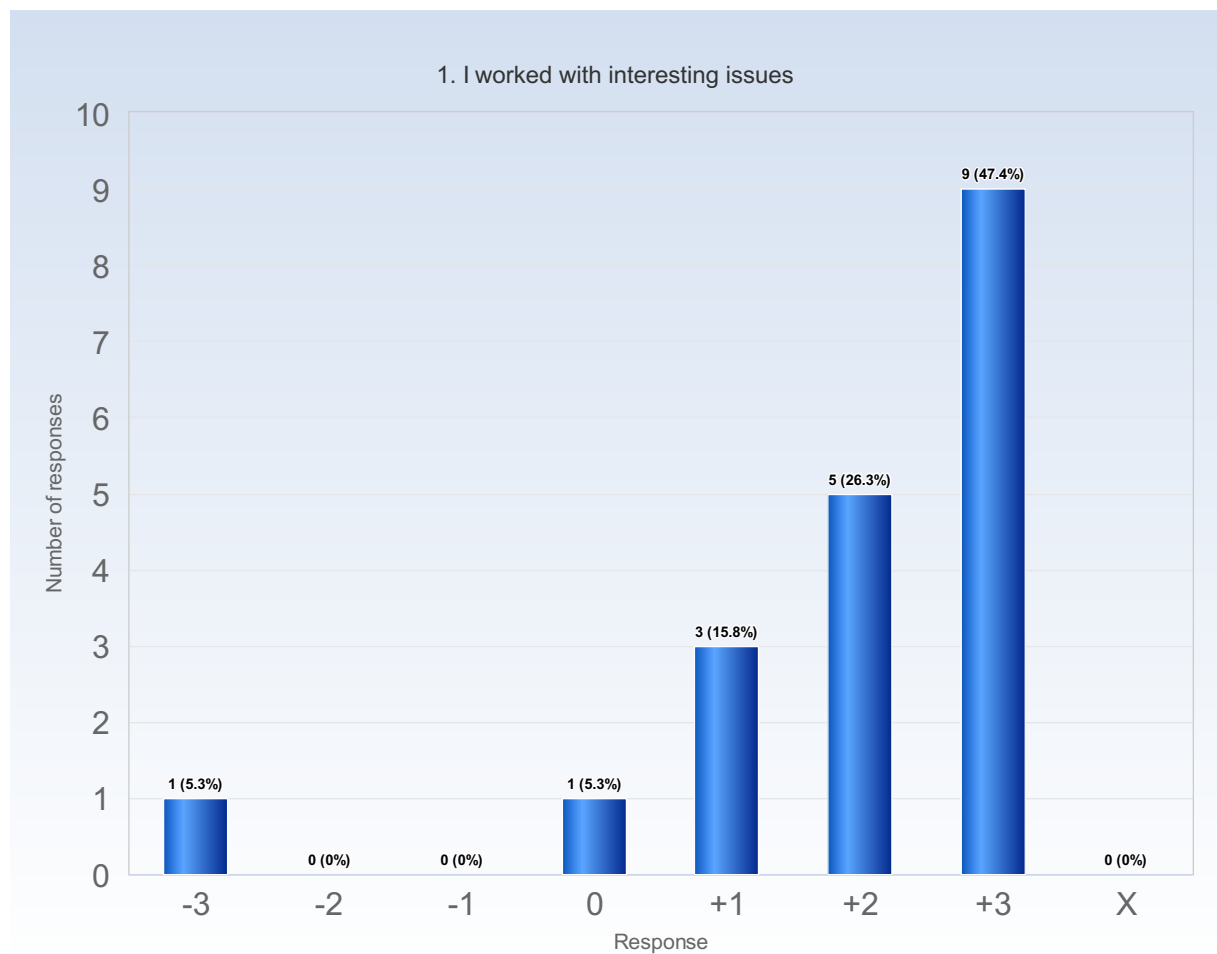
The diagrams below show the detailed response to the LEQ statements. The response scale is defined by:

-3 = No, I strongly disagree with the statement

0 = I am neutral to the statement

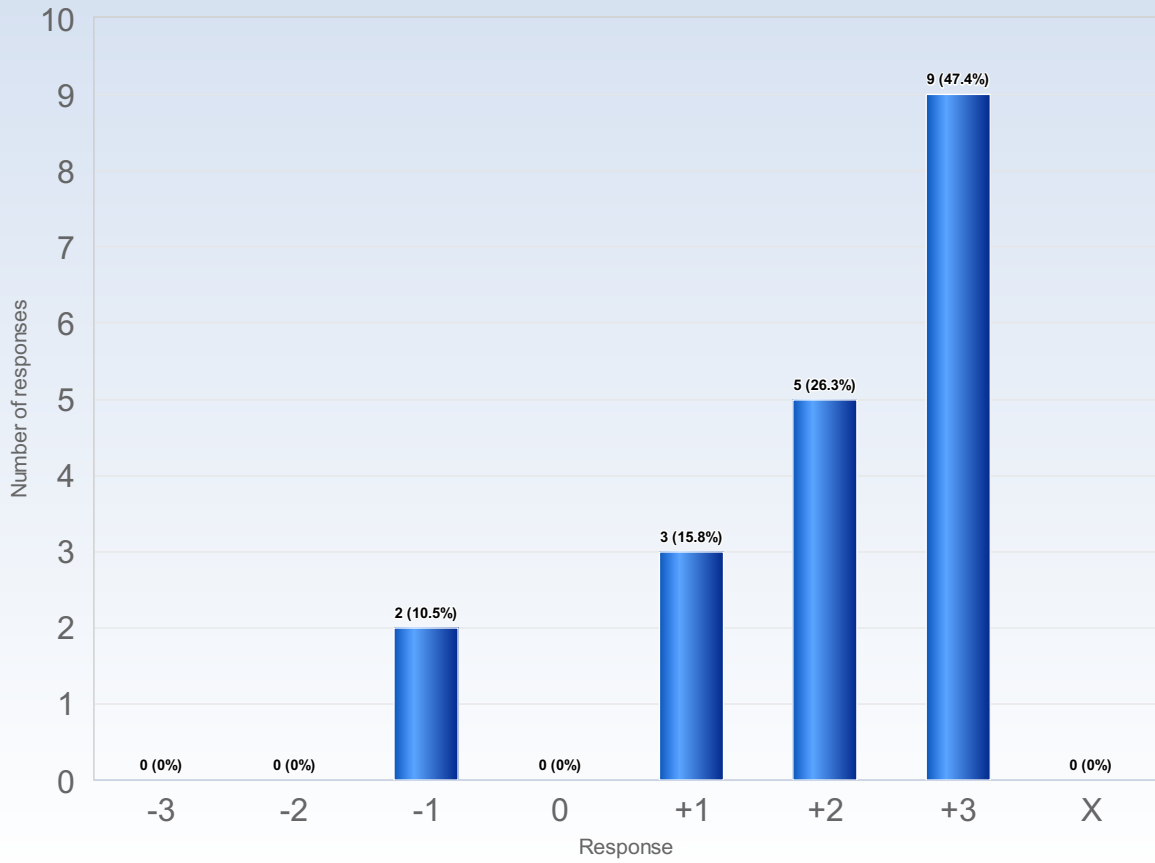
+3 = Yes, I strongly agree with the statement

X = I decline to take a position on the statement



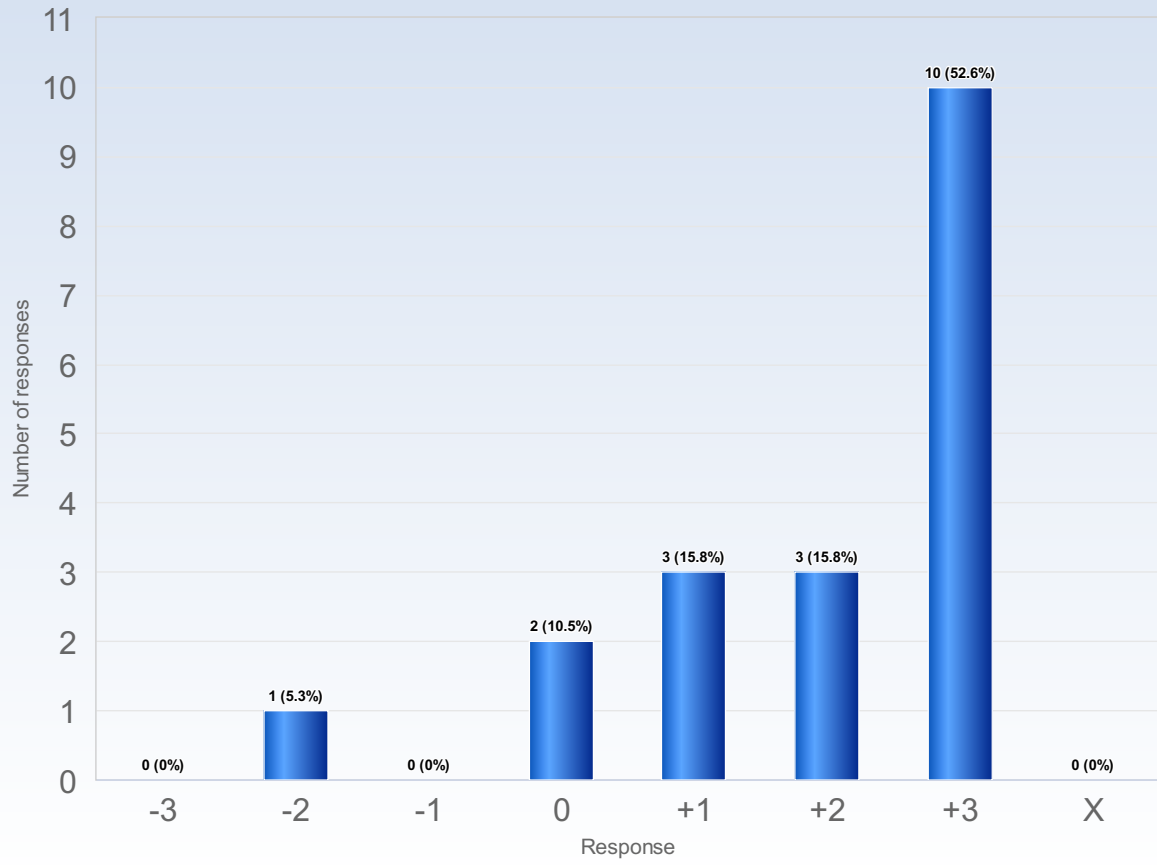
Comments

4. The course was challenging in a stimulating way



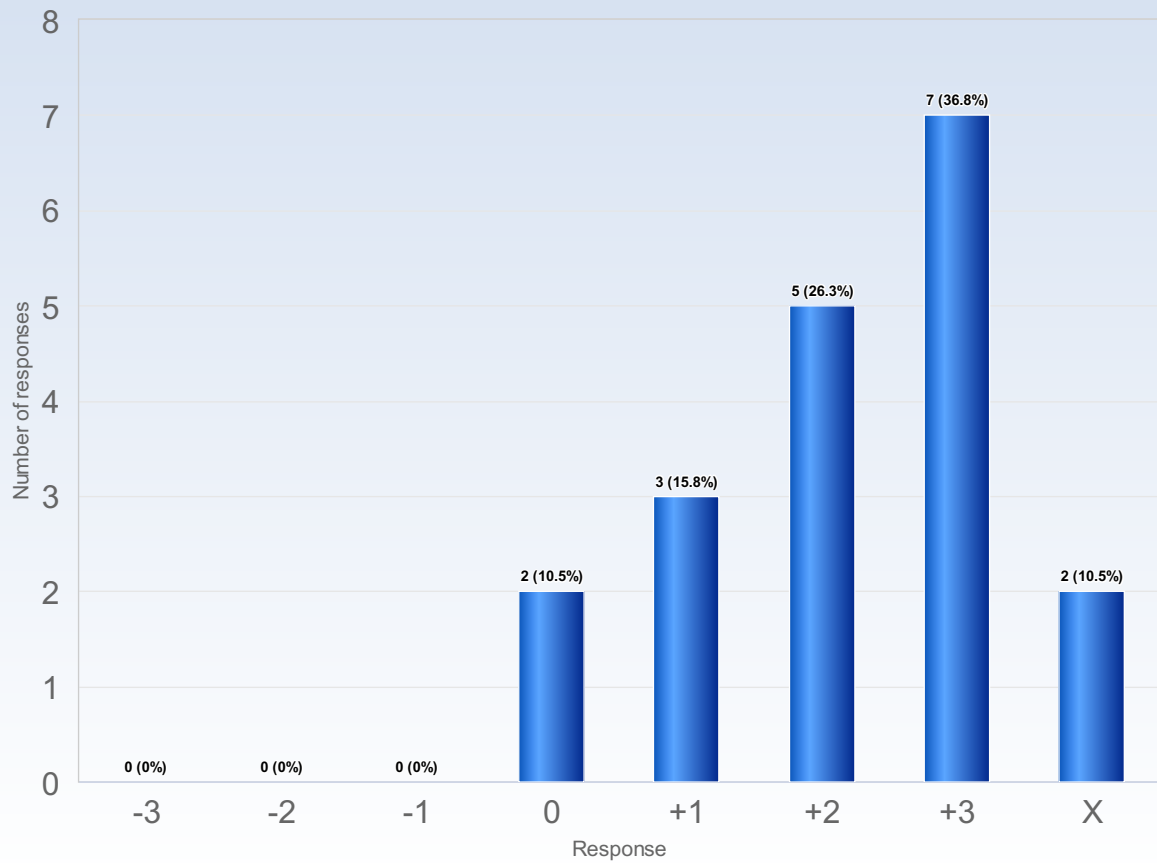
Comments

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



Comments

16. The assessment on the course was fair and honest



Comments

Comments (My response was: +1)

Exam was really long

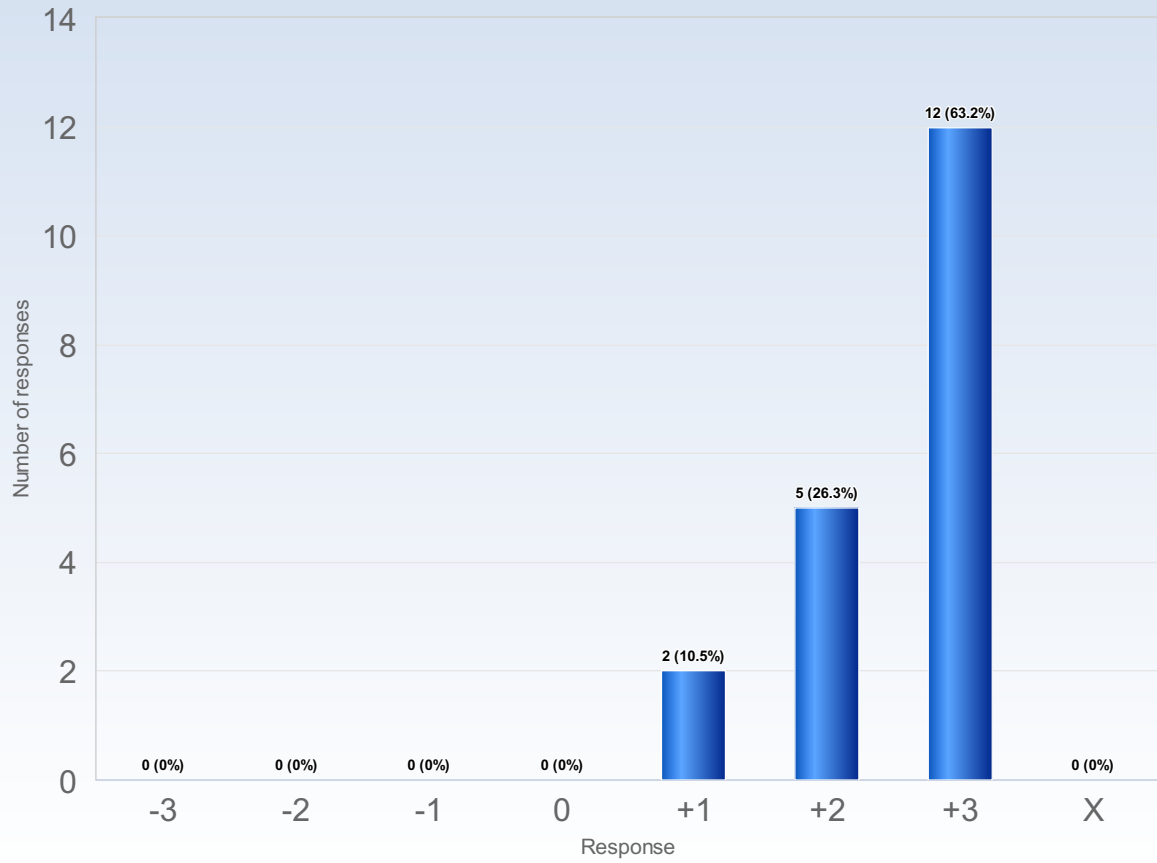
Comments (My response was: +2)

The questions on the exams were fair and they reflected the course. However, there was too many questions for the time we had. I knew what to write on all questions, and wrote non-stop the entire exam and still did not have time to write everything i wanted.

Comments (My response was: +3)

So far yes

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

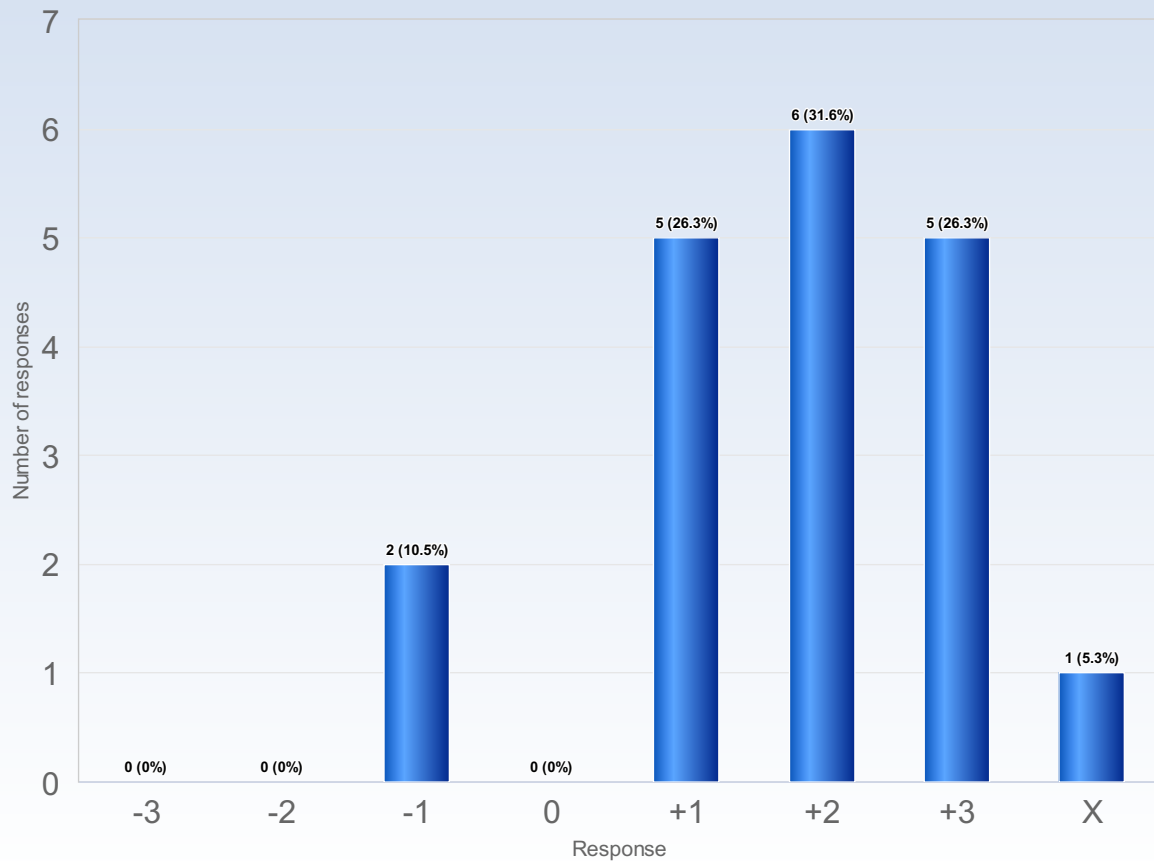


Comments

Comments (My response was: +2)

It was sometimes hard to get a discussion going in the "lectures".

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



Comments

Comments (My response was: -1)

Hard to come into contact via e-mail, which would be needed during christmas

Comments (My response was: +1)

It would have helped if it was possible to ask questions via email and not only during the discussions.

Comments (My response was: +3)

Maybe? Didn't really ask for it

**SPECIFIKA FRÅGOR**

**SPECIFIKA FRÅGOR**

Game changing

It was very great

That was a nice way to have more interactive lectures afterwards.

It worked really well.

It was good.

Very good! It really helps that they are pre-recorded, because then I can watch it in my own pace and go back if something was hard to understand.

A bit long and sometimes not easily understandable. Not enough explanation on the slides.

That worked out really well, it was useful to be able to go back to them later on.

That's really great

Very good. You could watch them whenever you wanted, as many times as you wanted and you could pause or rewind if you needed to.

Did not enjoy that and was sometimes unclear

I thought it was helpful, as I could watch them on my own terms and was able to rewatch them as needed.

I liked having recordings because it enables you to rewatch, pause and think etc.

Good! Nice to be able to pause the video

Very good

Very good

A good added bonus to understand the content  
Personally, I didn't feel the need to participate the discussion sessions, since I used extensive Googling to get more in-depth details. However, we are all different, and I'm sure that a lot of students have benefited these sessions.  
I appreciated that. I would even ask more questions (for personal study).  
I would have liked more examples by the teacher to really understand when each methods are mostly used.  
It all depends on the students. Some discussion sessions were really good, but sometimes you ended up in a breakout room where you are the only one talking and then it did not give anything. Further, it could sometimes be really confusing what was the correct answers and what was not correct.  
I think that the lectures should not be entirely discussion sessions but maybe a short summary of the lecture and afterwards the discussion.  
It was not a good idea, because they take really long time. Two hours to discuss one or two questions is too long. I rather get the answers in the pre-recorded lectures, this would really be more efficient. The discussion sessions makes the work load twice as big because you also need to watch the pre-recorded lectures.  
It was interesting but it takes a lot of time to watch pre-recorded videos so it is not always possible to watch them and understand. The main problem was that only few people were participating in breakout rooms, and always the same persons. It was really annoying to do the work alone.  
That was a really good idea.  
Ok, but it was sometimes hard to get a good discussion going.  
Some lectures need to be discussion sessions, but not all  
I didn't go to the discussion sessions.  
The discussion sessions have potential but gave some added stress to finish lectures before hand.  
Alright, did not attend them since it takes very long for me to watch, write, and understand the lectures. I did not finish them in time in order to attend the discussions  
Good even though I didn't attend that many, it was a nice option to have  
A good idea and an good way of doing it. It would benefit from having a greater incentive to attend as it felt like everything you needed to know was in the pre recorded lectures, making the discussion sessions feel obsolete for people how understood the concepts and techniques (or thought they did at least). I would make something like a auto-correcting quiz for every week that you could devote maybe 15-20 minutes of the sessions explaining what each question asks or if you go through them after the quiz has closed why you asked these questions and dive a little deeper into one of them.

Good!  
Same opinion as for the discussion sessions.  
They were too early in the schedule. I didn't have time for specific questions.  
They were good.  
Good opportunity to get answers to questions.  
Really necessary thank you ! But it would be nice to write answers on the slides and not only the questions!  
The Q&A sessions were useful although not that engaging, maybe because the questions covered the whole course and the sessions didn't have much discussion  
Very good. For me, questions usually doesn't come up until later.  
Very good! The teacher took a lot of time off to answer all the questions. In addition, he scheduled them nicely  
They were helpful  
I thought it was a good idea to help clear up the material when needed.  
Good with easy way to ask questions about the theory.  
Very Good and well needed  
Same answer as the previous question  
Don't know, didn't attend but was surely helpful to the people how asked questions.

4  
5  
5  
5  
5  
4  
5. The teachers were very competent  
4 The lectures were great  
5  
3  
5, I enjoyed this more  
3  
2  
4  
4

2  
5  
1  
2  
5  
5  
3  
4  
2 Sometimes repeats of the first part of the course, and sometimes I didnt really understand the utility of what were discussed  
4  
2  
5 Yes, their way of teaching was certainly great  
3  
4  
2  
3  
3, show repetition from the genetchnolgy lectures felt unnessecary, otherwise yes.



3
4
2
5
5
5
5
5
4 Yes, really great and makes it possible to get focused again on the lecture
5
Very helpful, 5
3
3
2
5
5
3
4
5
5, it was a fun way to learn.
5
5
5
3
5
Yes, very much. 5
3
5
2
5
5
2
5
1
No, because what was done in the lab, we did not see it during previous lecture. It was brand new.
The lab were really good though!!!
5
The computer labs were really good! However, sometimes the feedback on a task was "this works but it is not a good idea to do this" and I felt like we were never really taught what to do and what not to do. We were just given the tasks and had to figure out how to solve them. We were able to solve everything but we never really knew what was good practice and what was really bad to do.
4
5
2
3. The computer labs felt a bit out of place in the course and big parts of the labs were not even done by us.
2 Sometimes too hard
4
3
Yes, they were fun to do. 4
4
5
1
5
4 - It was a little abstract what we wanted from the data and why but the theoretical knowledge of how to analyse data was definitivly put in practice.
5
5
1
Only the technique was understandable.
We didn't really analyze anything with the lab.
Yes and no. I understood the content but since we never had a lecture about how to write in R, or what different commands do, I felt like I did not understand everything I programmed. I could write something that worked, but I didn't really understand what I did and why it worked.
3, the programming was quite difficult so maybe that part can be explained more.
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3
5
2 Not always
2
3
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4
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1
4
X - Maybe, wasn't great at paying attention or attending but the knowledge I got was good.

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4
5
5
Really good. Thanks to all of them for their time and effort.
5
5, They were very good support.
5
4
5
3 Really great but sometimes it really takes a long time to get help
5
5. They really did a good job and always helped us out!
5 They were very supportive
5
5
3
5
5

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