COURSE ANALYSIS, graduate course

EECS School, KTH

An asterix (*) denotes non-compulsory data.

Course data

Course name: Music Acoustics
Course ID: DT2212
Credits: 7.5
Credits per module: 7.5
Time period for course: VT2024
Teachers: Bob L. T. Sturm
Examiner: Bob L. T. Sturm
Classroom hours: Almost twice a week for 2 hours each, two labs
Nr of registered students: 21
Examination rate, in %: 100

Goals

Global course goals:
After completing the course students should be able to

- **explain the acoustical function of musical instruments and the singing voice fron basic physical principles**
- **calculate and measure basic acoustical properties of musical sounds and instruments**
- **design and calculate the dimensions of prototypes for string and wind instruments**
- **describe and use different methods for modelling of musical instruments and for synthesis of musical sounds**
- **apply basic laws of room acoustics to calculate sound levels, decay time, and reflection patterns and relate them to the influence of the room on the perception of music**
- **extract and present the main content of a selection of scientific articles on music acoustics**

How the course design helps to fulfill these goals: Lectures, two labs, four written assignments, one final group project

Pedagogical development - I

***Changes made* since previous time course was given:**
This was the first time teaching, but the syllabus by and large followed the previous offering

Course evaluation; comments from students

Based on the anonymous questionnaire.

Evaluation response rate: 8/21 = 38.1%

Overall student view*
The best aspects of the course were:

- **the freedom (projects, handin dates)**
- **variety of topics**
- **assignments and labs were fun**

Things that need improvement:

- **The project should be given more time, clearer expectations, and examples of past projects**
- **Assignments, labs and project should conflict less in the schedule**

- Take more time on explaining theoretical concepts
- The code provided should be explained a little more clearly

Pre-knowledge, comments*: None

Literature, comments:
none

Examination, comments: No exam in this course. Final project and presentation in groups of 2-3.

Particularly interesting* comments:

Course teacher's impressions from the evaluation

Comments: The student observations align with our own as to what changes should be made in the next edition.

Course teacher's summary

Overall view: The course ran smoothly. I made sure to include lots of demonstrations, even learning briefly to play the violin to demonstrate it. Some of the theoretical/mathematical work went too quickly and consisted of too much detail. Overal the schedule did feel cramped.

View on pre-knowledge*: Fine

View on course design*: Fine

View on course material: The material is timely and appropriate for the learning objectives. The labs and assignments provided hands-on experience.

View on examination: The project quality was by and large high, given the time devoted t that portion.

Pedagogical development - II

***Outcome of course changes made* since last time course was given:**

1. **None, since this is the first time for me.**

***Changes to be made* before next time course is given:**

1. **I will provide example projects**
2. **I will split lecture 3 into two: 1) perception and 2) tuning and temperament**
3. **Make connections with the MID lab (Deirdre Tobin) early for projects**
4. **Schedule project start earlier**

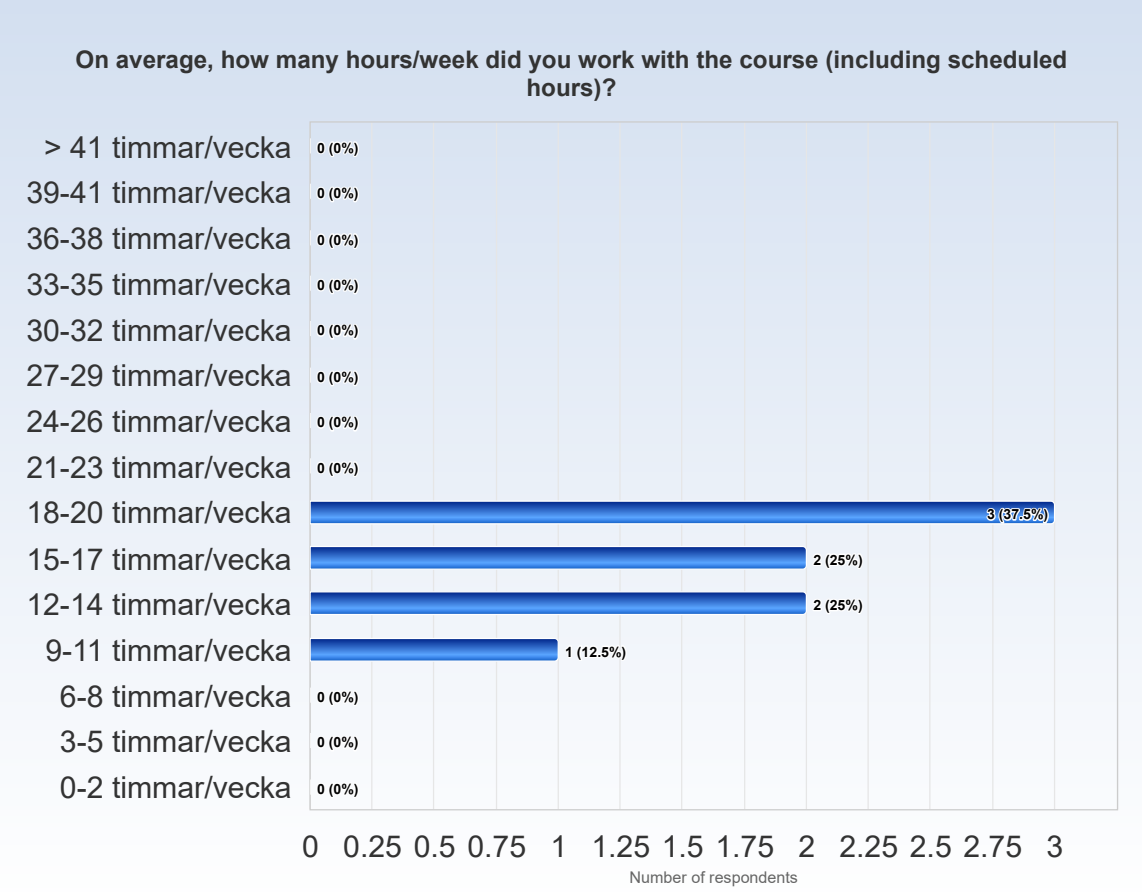
Other

Comments*

DT2212 - 2024-03-05

Antal respondenter: 21
Antal svar: 8
Svarsfrekvens: 38,10 %

ESTIMATED WORKLOAD



Comments

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

The workload from week to week during the course I found a little bigger than expected but I wouldn't say it was problematic. What perhaps is worth mentioning and did drive the hours up was the project. Even if we got I think a whole week extra, it felt kind of intense and I sometimes found it hard to make time for other things I needed to do during the project weeks. I think the project and the course could benefit from the project starting a bit earlier.

Was a bit tougher than expected

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

Not completely sure, but it felt like a lot. The individual assignments were very interesting, but felt like labs that you do in pairs in other courses in difficulty, so pretty extensive for one without much prior experience. Especially when taking multiple courses. It helped that the deadlines were not that strict, so that there was no rush to hand in a subpar assignment submission.

I have no experience with python and Matlab, so I need to spend more time on the code.

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

The work load was fine for the most part but with assignment 2 and both labs so close together some weeks it was more than 20h and others it was closer to 10-15h

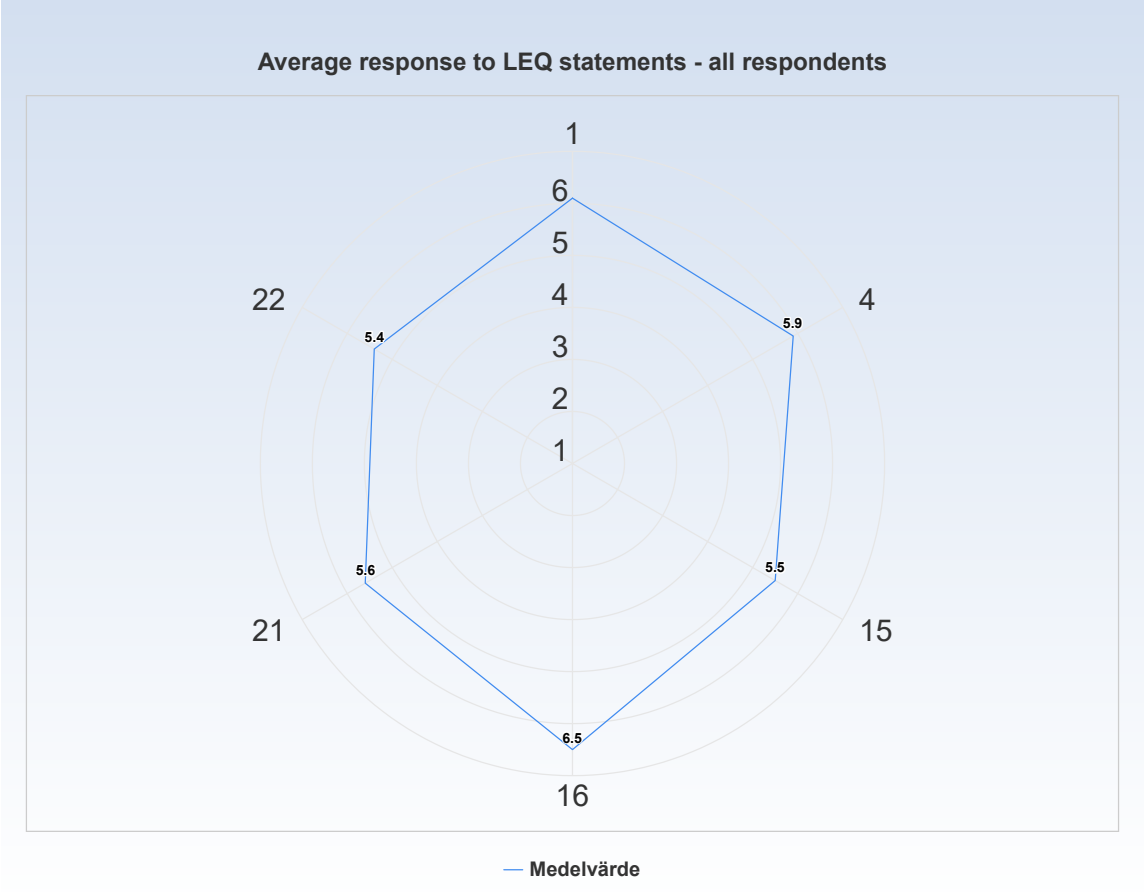
If your mathematical foundation is weak, you will need to spend more time understanding and digesting the theoretical knowledge in the course.

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

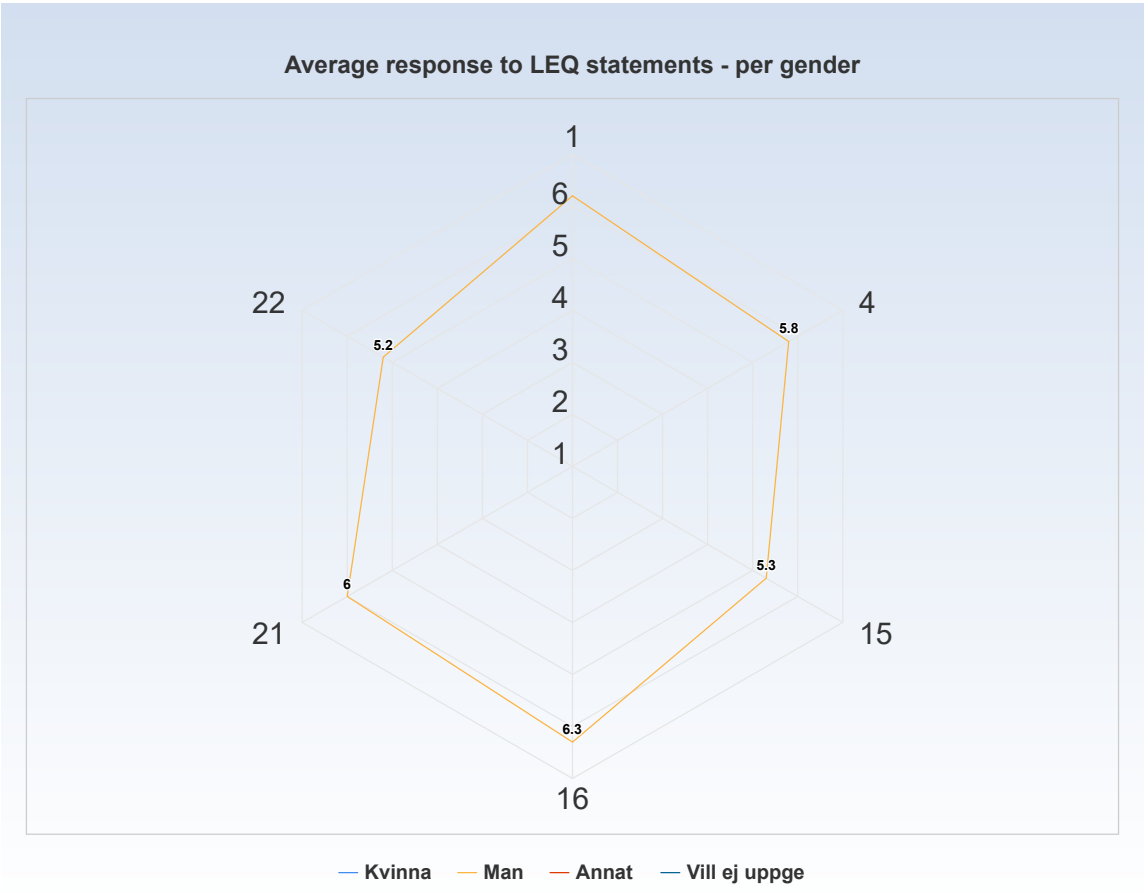
Bain, K. (2004). *What the Best College Teachers Do*, Chapter 5, pp. 98-134. Cambridge: Harvard University Press.

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.

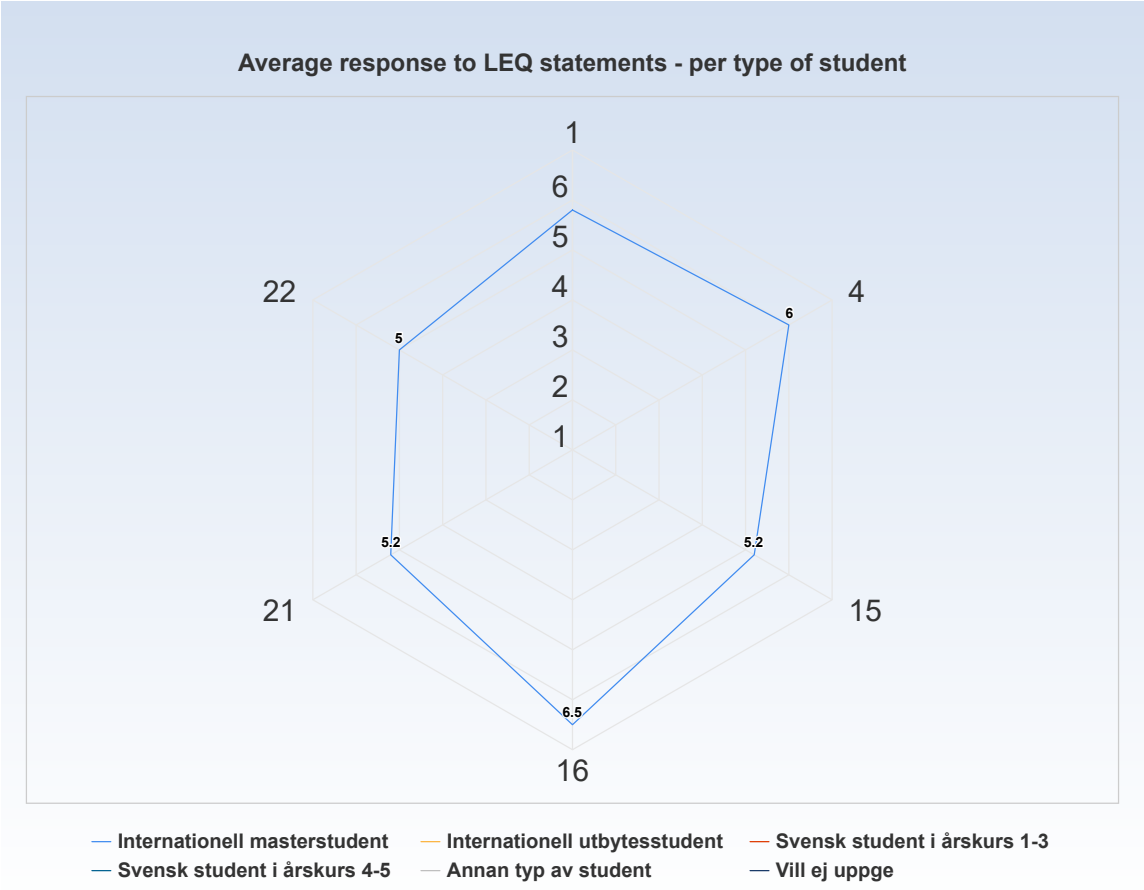
Kember, K. & McNaught, C. (2007). *Enhancing University Teaching: Lessons from Research into Award-Winning Teachers*, Chapter 5, pp. 31-40. Abingdon: Routledge.

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



Comments

Comments (I am: Man)
Good.
Good.

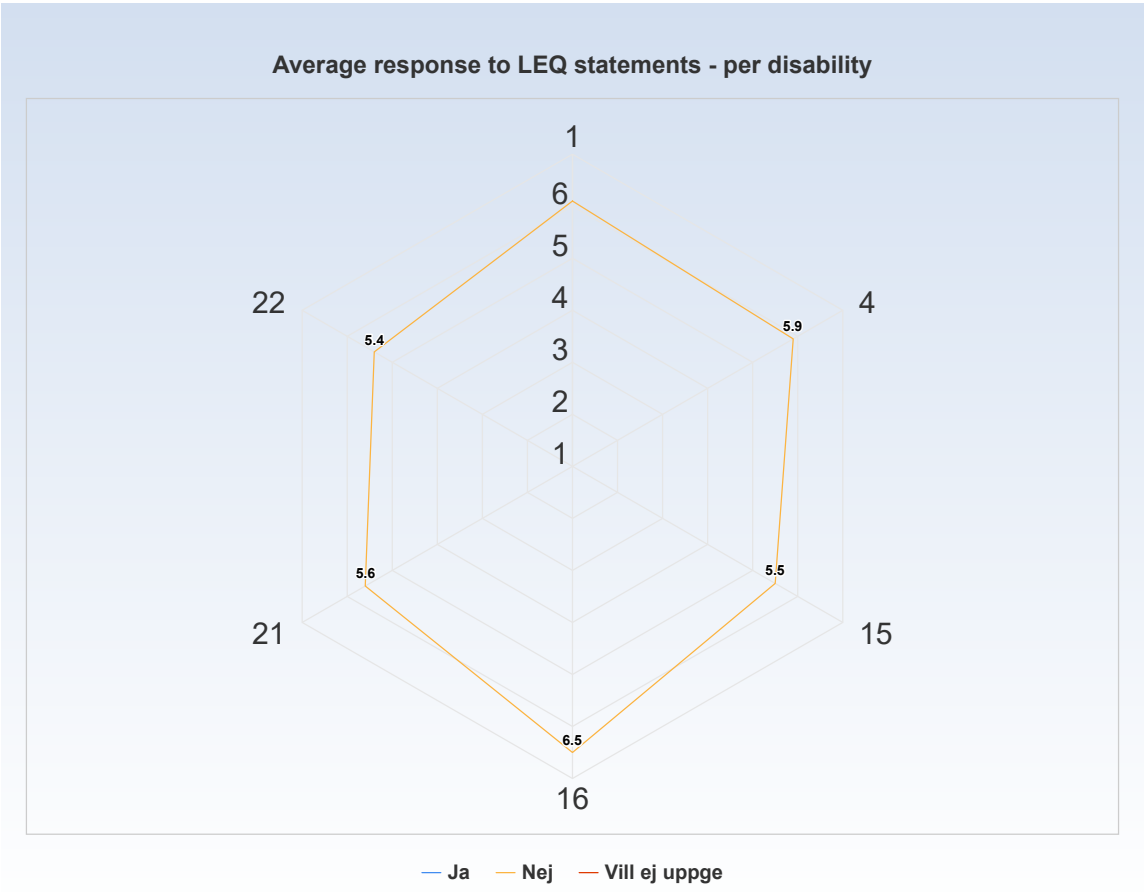


Comments

Comments (I am: Internationell masterstudent)
Some unfamiliar professional terms sometimes make it difficult for me to follow the course.

Comments (I am: Svensk student i årskurs 1-3)
Good, some programming related things I wasn't super comfortable with in the beginning but it quickly caught on.

Comments (I am: Svensk student i årskurs 4-5)
Good. But I needed a refresher in some of the physics since we don't have any of that in the computer science program.



Comments

Comments (My response was: Nej)
Maybe ADD, but it didn't affect other than that I can have trouble focusing on a whole lecture, and in that way miss some information.

GENERAL QUESTIONS

What was the best aspect of the course?

What was the best aspect of the course? (I worked: 12-14 timmar/vecka)
A good amount of freedom throughout the course assignments and especially the project to kind of tailor it to your specific interests within the course.
The different topics, although brief, gave a very nice outlook into the physics of instruments.

What was the best aspect of the course? (I worked: 15-17 timmar/vecka)
Interesting subject, and knowledge that can actually be used practically. I was glad I took the course.
We were given enough instructions and equipment for the assignments and had the option to use Python or Matlab. The lectures covered a variety of topics and each lecture was very interesting!

What was the best aspect of the course? (I worked: 18-20 timmar/vecka)
Getting to learn how to synthesis and working on things practically on the lab and project.
The assignments designed to be very closely related to the course, and the instructions are very clear. After completing the assignments, your understanding of the theory will be greatly improved.
Interesting topic for me!

What would you suggest to improve?

What would you suggest to improve? (I worked: 12-14 timmar/vecka)
Longer project time, just a little. Perhaps more structure around the project presentations and what they are expected to cover.
The code could be made more clear, breaking down the code into smaller parts could help with understanding. I still do not fully grasp some concepts too as I was focused on making things work rather than learning.

What would you suggest to improve? (I worked: 15-17 timmar/vecka)
Maybe to give more informations about how the code in pyton works before synthesizing sounds in assignment 2. Also give more knowledge about how filters work before assignment 3.
It would be better to show more examples of projects that we can learn from, such as previous year's projects or other small projects that are easy to start with.

What would you suggest to improve? (I worked: 18-20 timmar/vecka)
Mostly the layout of the assignments and labs, it became really hard to finish the assignment and the preparatory exercises for lab 1 due to the time for it.
I hope that slides can be provided before class to help prepare class content in advance. Sometimes the theoretical content is taught too fast and it is difficult to follow.

What advice would you like to give to future participants?

What advice would you like to give to future participants? (I worked: 12-14 timmar/vecka)
The course literature is surprisingly well encompassing
Focusing more on background theory will help immensely, otherwise starting earlier on assignments is advisable.

What advice would you like to give to future participants? (I worked: 15-17 timmar/vecka)
Begin with the assignments in time.
Be well prepared before each lab

What advice would you like to give to future participants? (I worked: 18-20 timmar/vecka)
Schedule your time each week for the assignments and what needs to be done. But have fun, it is an interesting course for those interested in how instruments work.
Prepare and review knowledge of trigonometric functions in advance lol.

Is there anything else you would like to add?

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

Is there anything else you would like to add? (I worked: 18-20 timmar/vecka)
It has been fun thank you!
This was a great class that allowed me to learn the physics and theory of sound and music from scratch. I learned a lot of useful things from this course.
I was excpecitng the course to consist of less physics and more synthesising

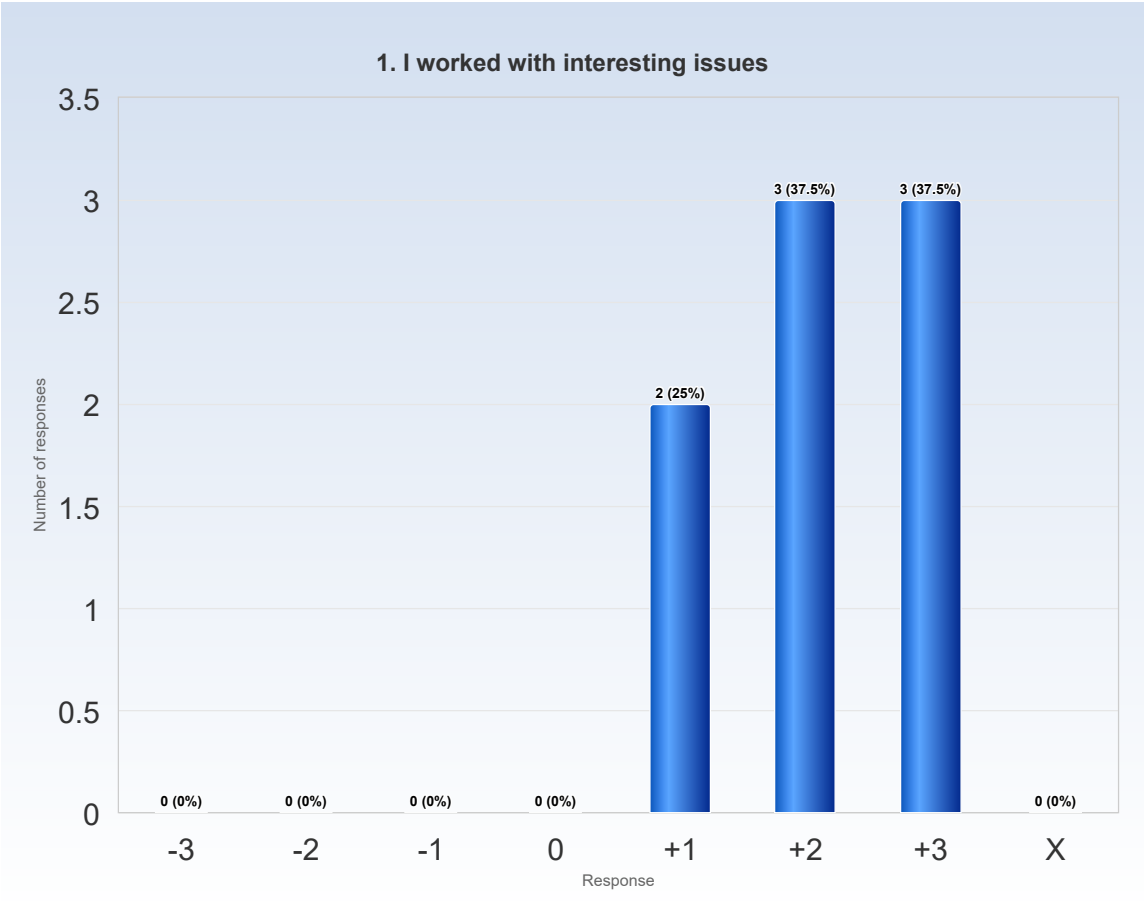
SPECIFIC QUESTIONS

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



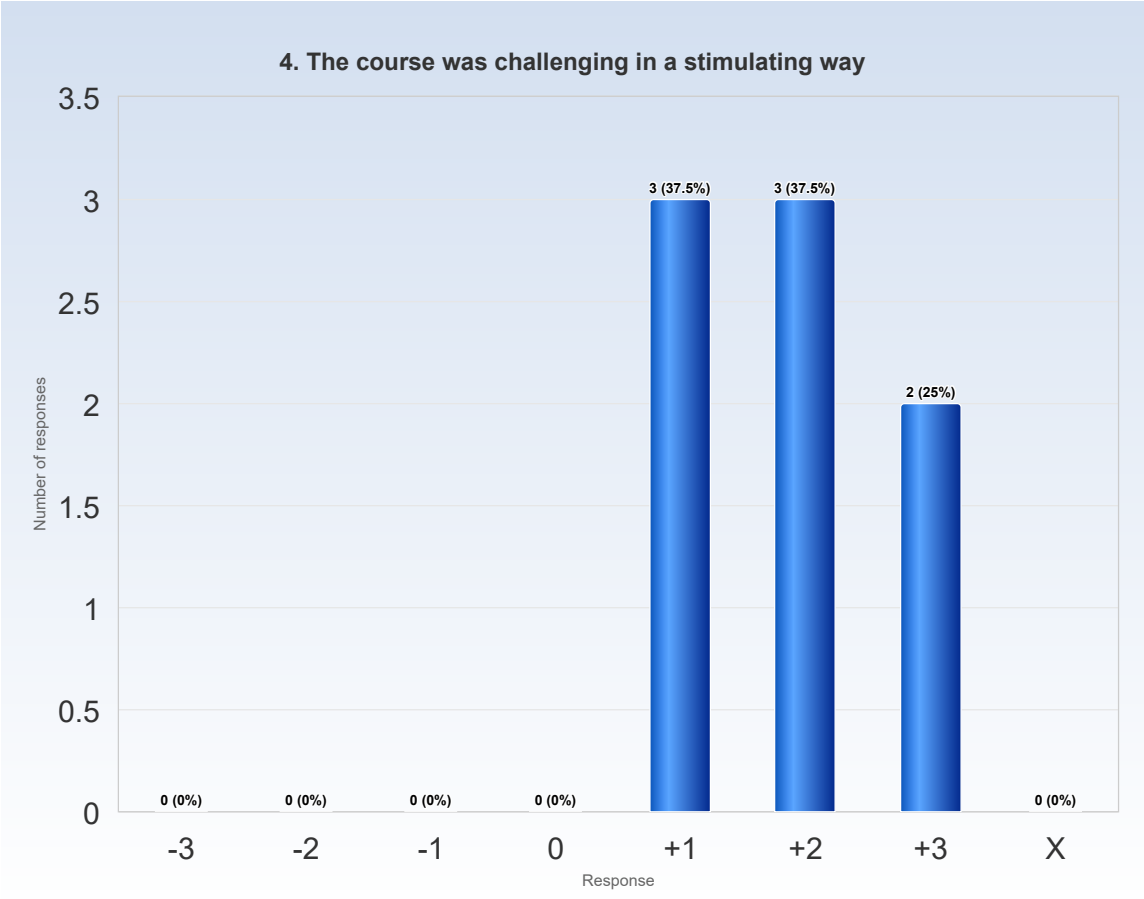
Comments

Comments (My response was: +2)

Each assignment makes me feel like I've gained some new skill that makes me feel accomplished.

Comments (My response was: +3)

As I am interested in music and how instrument works it was interesting to me.



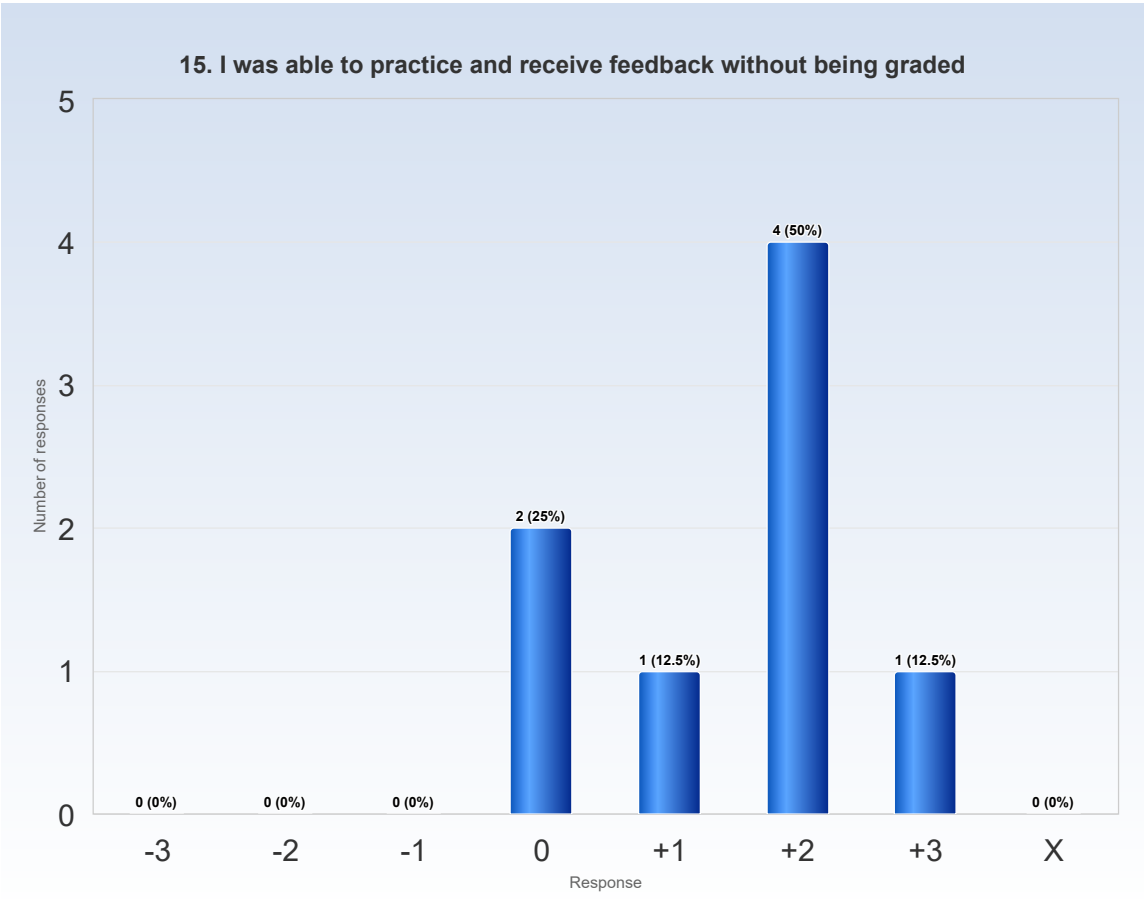
Comments

Comments (My response was: +1)

It was at some points but for me my other courses took away so much time it became a race to finish the assignments as fast as possible sadly.

Comments (My response was: +3)

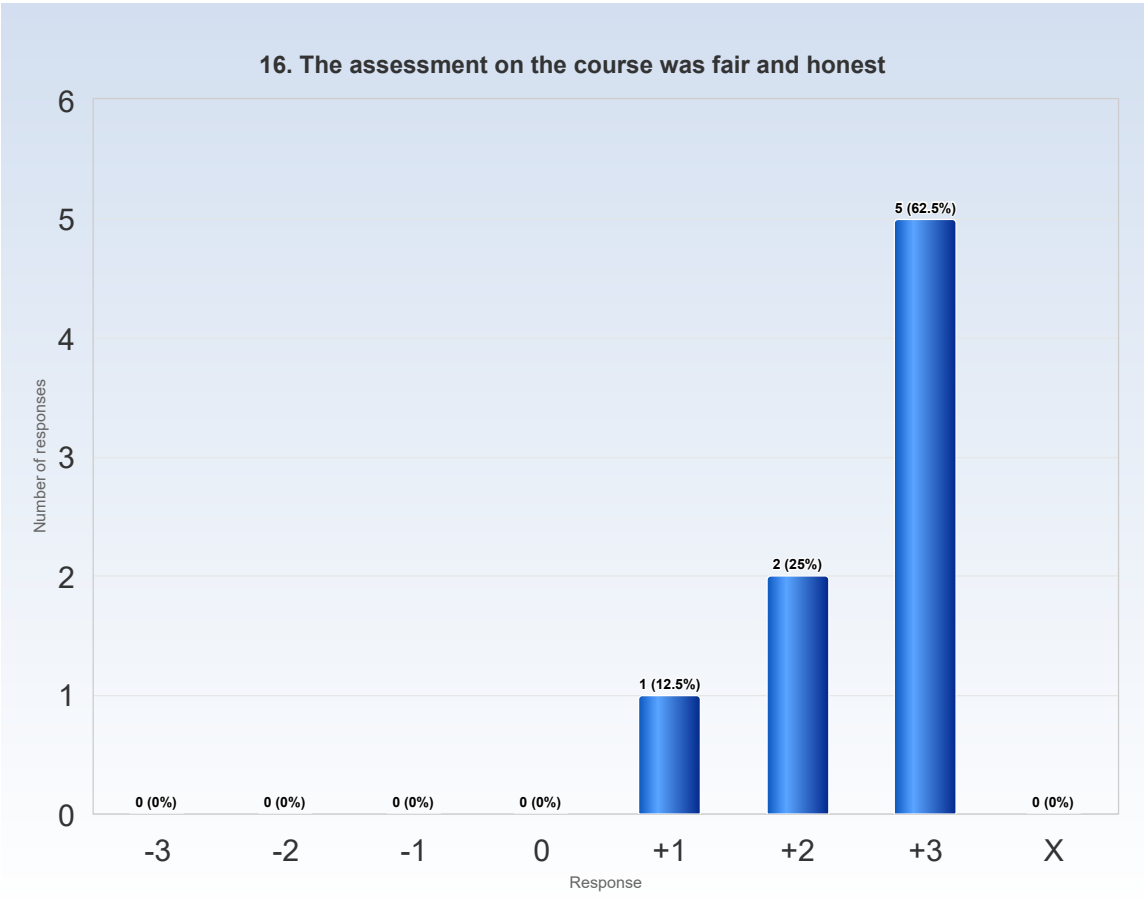
In the assignments, we need to combine different knowledge including principles of sound production, spectrum analysis, etc. to solve the problem. Most of the assignments were done by writing code.

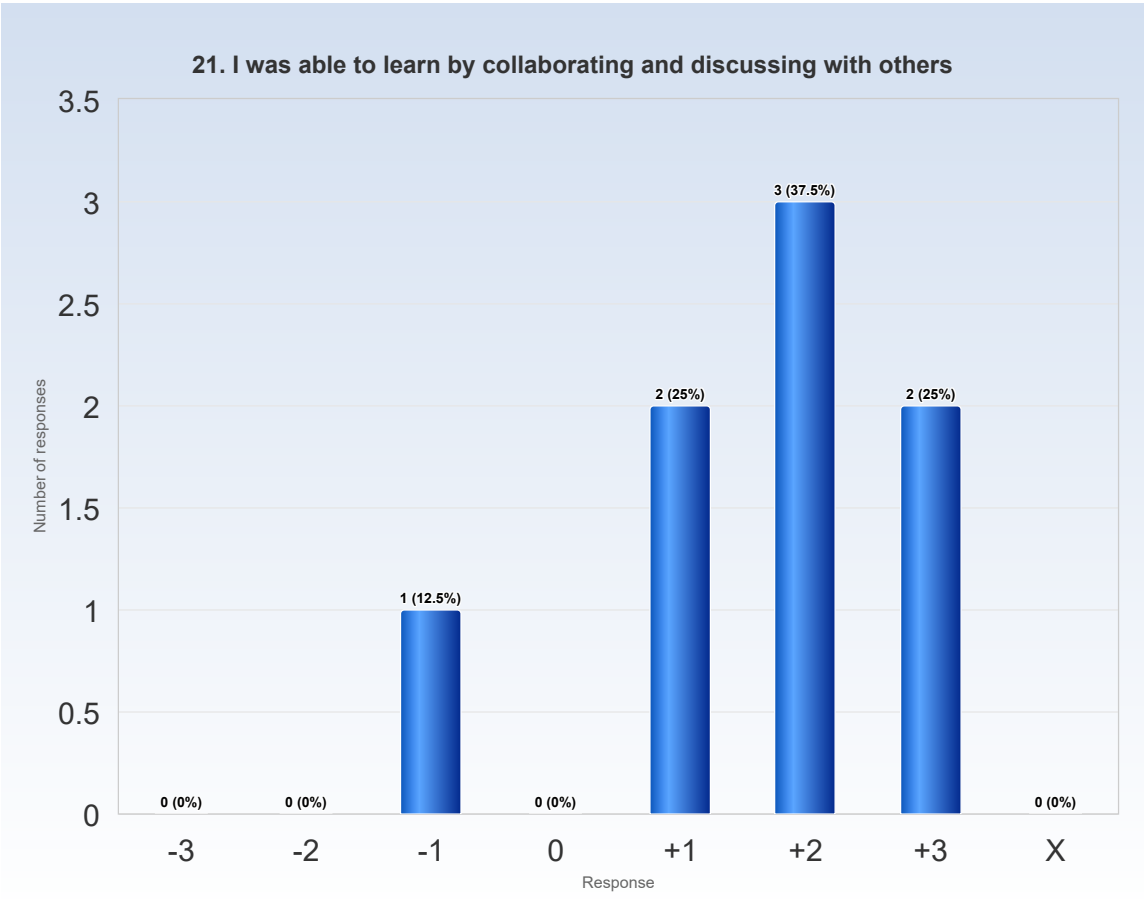


Comments

Comments (My response was: 0)
Didn't really explore the options however made one second hand in of assignment 2 where I implemented some feedback but never heard back about it. Dont know how that was supposed to be handled though so

Comments (My response was: +2)
The lab assignment was P/F and I learnt a lot by doing the tasks in the lab. TA explained every detail to us, which helped us a lot.

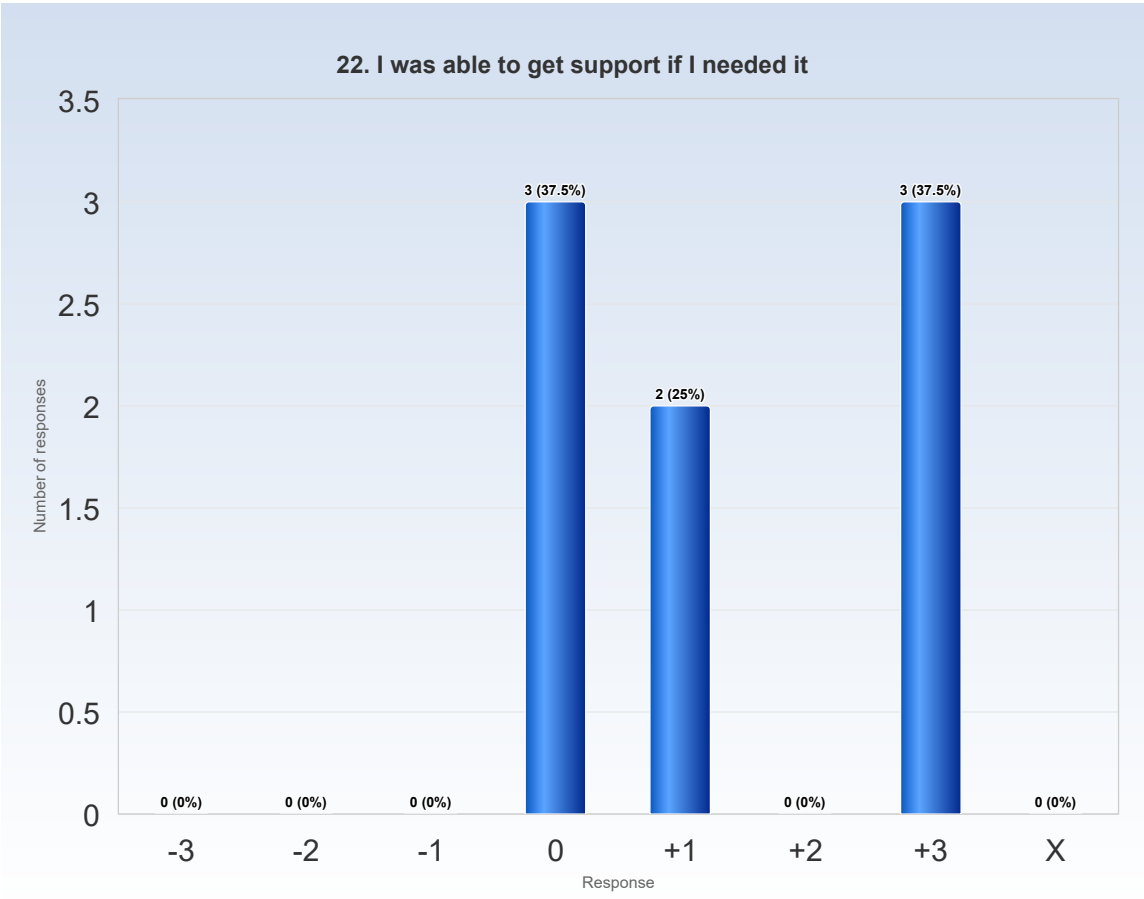

16. The assessment on the course was fair and honest
Number of responses
6
5
4
3
2
1
0
0 (0%)
0 (0%)
0 (0%)
0 (0%)
1 (12.5%)
2 (25%)
5 (62.5%)
0 (0%)
-3
-2
-1
0
+1
+2
+3
X
Response



Comments

Comments (My response was: +1)
Not in the assignments

Comments (My response was: +3)
Yes both the labs and project was collaborative



Comments

Comments (My response was: +3)
Yes the teacher was easy to talk to and ask for help if needed
The lab equipment is avaliable to us, which was a great help to our project.