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## Report - SG2211 - 2020-06-18

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Respondents: 1  
Answer Count: 1  
Answer Frequency: 100.00%

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Please note that there is only one respondent to this form: the person that performs the course analysis.

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**Course analysis carried out by (name, e-mail):**

Alessandro Talamelli. alessandro.talamelli@unibo.it

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**DESCRIPTION OF THE COURSE EVALUATION PROCESS**

**Describe the course evaluation process. Describe how all students have been given the possibility to give their opinions on the course. Describe how aspects regarding gender, and disabled students are investigated.**

The LEQ 12 form (plus 4 extra questions) was sent to all 33 students after the exam. All students had the choice to answer online, with periodic reminders from the system.

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**DESCRIPTION OF MEETINGS WITH STUDENTS**

**Describe which meetings that has been arranged with students during the course and after its completion. (The outcomes of these meetings should be reported under 7, below.)**

The course has been given in on-line form. There were no scheduled meetings with students. The teacher gave the chances to the students to ask him questions after each lecture.

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**COURSE DESIGN**

**Briefly describe the course design (learning activities, examinations) and any changes that have been implemented since the last course offering.**

The course consists of lecture sessions (19x2 h total, approximately 3x2 to 4x2 hours per week), two lecture sessions given by external invited guests, one laboratory works and a project. The laboratory work is focused on a wind tunnel experiment in which the students have the possibility to measure the drag of different car models in different conditions by means of wake analysis. The objective of the project is to review and explore the aerodynamic of a specific category of ground vehicles, an aerodynamic phenomenon or a numerical/experimental procedure used in vehicle aerodynamics.

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**THE STUDENTS' WORKLOAD**

**Does the students' workload correspond to the expected level (40 hours/1.5 credits)? If these is a significant deviation from the expected, what can be the reason?**

Even if one student replied that he/she worked up to 28 hours per week for the course, the average is around 12h per week. Subtracting an average of 4 hours for the actual lectures give around 8 hours of self-study, lab work and project. A course at 6.0 credits would require approximately 160 hours of work. The course, excluding Easter vacations, is about 9 weeks long, which gives an average required work of 18 hours per week. The averaged work load reported by the students is slightly below that. The correct balance of the required workload and the credits have been explicitly declared by a couple of students.

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### THE STUDENTS' RESULTS

**How well have the students succeeded on the course? If there are significant differences compared to previous course offerings, what can be the reason?**

The results are in a statistical sense similar to those from previous years. Of those who followed the course, about 20% received grade A, 20% grade B, 10% grade C, 20% grade D, 20% grade E and less than 10% grade F. The statistics is based on the exam with 28 participants.

### STUDENTS' ANSWERS TO OPEN QUESTIONS

**What does students say in response to the open questions?**

Some of the students seem to like the content, as well as the style, of the course that is considered "simple" but "detailed". Some comments name topics that the student would like to develop more. Unfortunately, there is no clear consensus that might be of help. The students suggest to attend all the lectures and to refer to lecture notes. The opinion concerning the external lectures are of different type. However, it seems that there is a general consensus on their quality and their importance.

The laboratory work suffered from the COVID situation. The fact that the students could not practice the experiment in the lab highlight some small mistakes and inconsistencies between videos and lab instructions. Some students suggest the lecturer to assign homework during the course. Concerning the exam, some students would like to see a larger number of old tests. By means of this course some of the student have been motivated to study more fluid dynamics related course.

### SUMMARY OF STUDENTS' OPINIONS

**Summarize the outcome of the questionnaire, as well as opinions emerging at meetings with students.**

Overall the student seems to like the course, the content and the structure. The highest feedback concerns the fact that one of the main priorities of the course is the understanding of key concepts. Some criticism emerges with respect the assessment. In this case some of the students would prefer to have more old exams available.

### OVERALL IMPRESSION

**Summarize the teachers' overall impressions of the course offering in relation to students' results and their evaluation of the course, as well as in relation to the changes implemented since last course offering.**

The students' answers correspond to most of the teacher's impression. Several changes have been implemented throughout the years trying to satisfy the student requests. Some have been addressed like for instance the production of dedicated lecture notes and structure and content of the projects. These aspects have decreased the overall workload, which seems to be now in good balance. Other comments are difficult to be implemented, e.g. the lab work (which sometimes looks more like a demonstration) and exams. In this case uploading all exam test (with many multiple-choice questions) would offer the student the possibility to learn by heart most of the questions. I believe that the number of tests uploaded in CANVAS is a good compromise in this respect.

### ANALYSIS

**Is it possible to identify stronger and weaker areas in the learning environment based on the information you have gathered during the evaluation and analysis process? What can the reason for these be? Are there significant difference in experience between:**

- students identifying as female and male?
- international and national students?
- students with or without disabilities?

The evaluation form shows a difference between female and male students. Due to the extremely limited number of answers from female students there might be a lack of statistical meaning. Nothing specific related to different student groups.

### PRIORITIZED COURSE DEVELOPMENT

**What aspects of the course should be developed primarily? How can these aspects be developed in short and long term?**

First of all, we will work on setting up homeworks and assignments. Since this has never been done in the past, we will start with a few simple exercises in which the students can test their knowledge in the subject.

Since there are no books that cover all part of the course, we will try to improve the lecture notes (compendium) with examples, which, being similar to exam questions, may be of help for the final assessment, and parts specifically applied to road vehicle aerodynamics.



## SG2211 - 2020-05-13

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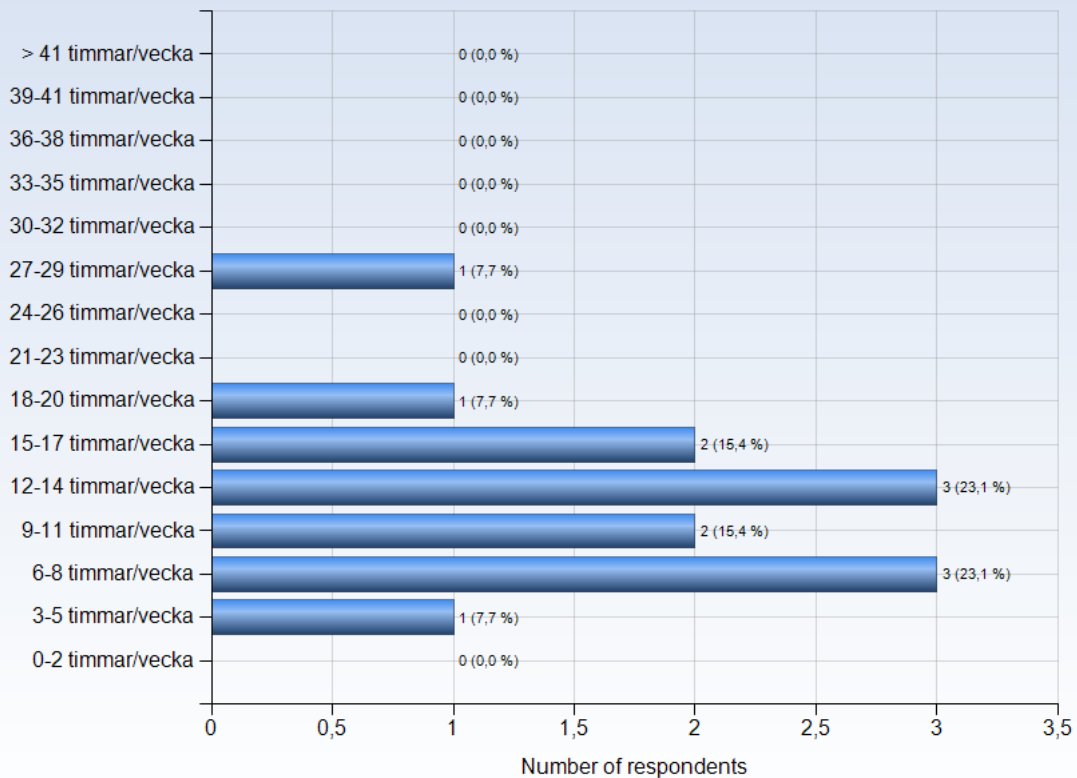
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Antal svar: 14  
Svarsfrekvens: 42,42 %

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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: 6-8 timmar/vecka)

The requests are very balanced with the number of credits. The theory is the perfect amount to comprehend the basics of the subject, and it's a good thing to have the final deadline for project/laboratory after the exam.

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

Correct amount of workload

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

Workload is disproportionately high in relation to ECTS this course provides (6 ECTS for 2 assignments+exam)



## 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:

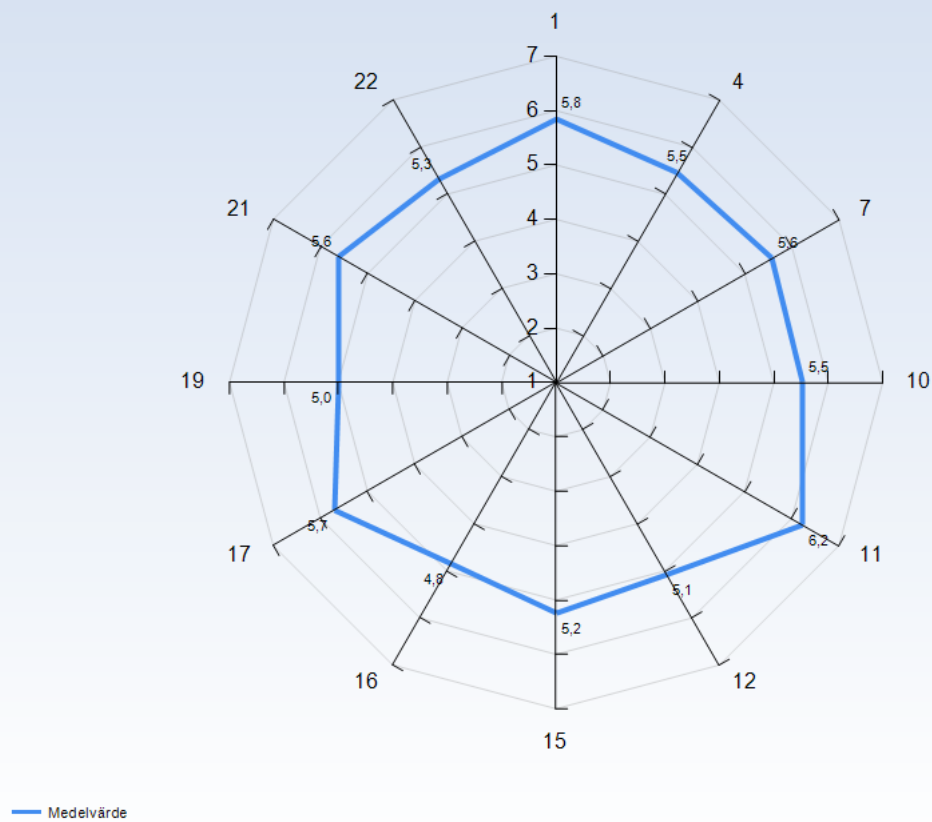
1 = No, I strongly disagree with the statement

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





## **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.

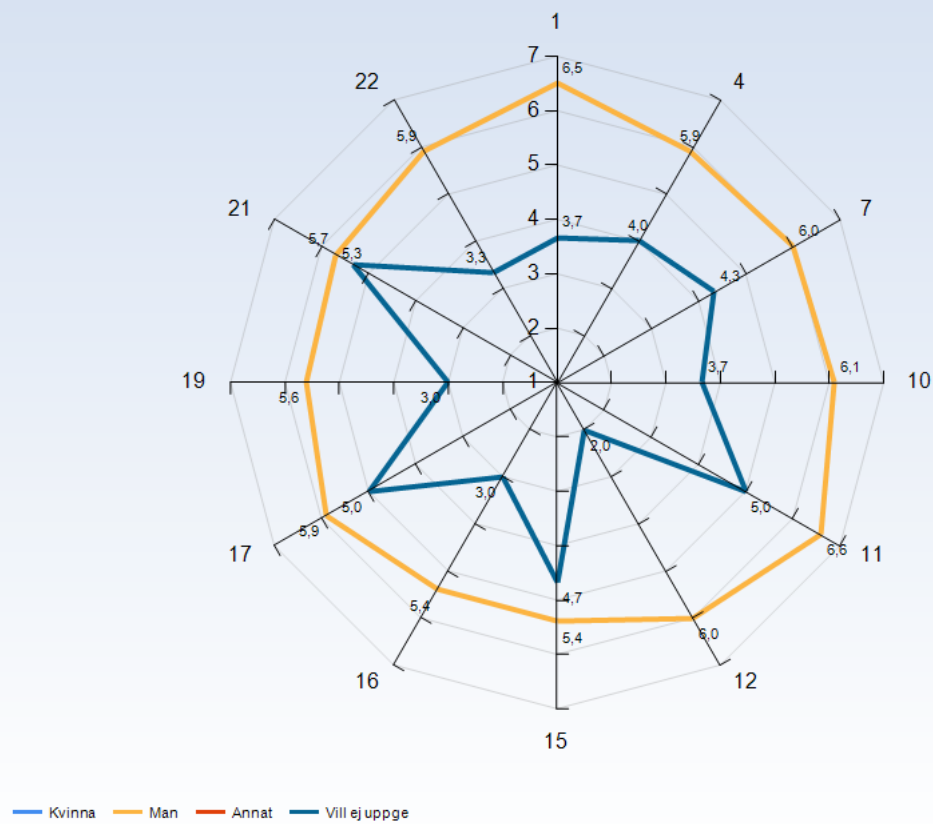
Biggs J. & Tang, C. (2011). *Teaching for Quality Learning at University*, Chapter 6, pp. 95-110. Maidenhead: McGraw Hill.

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.

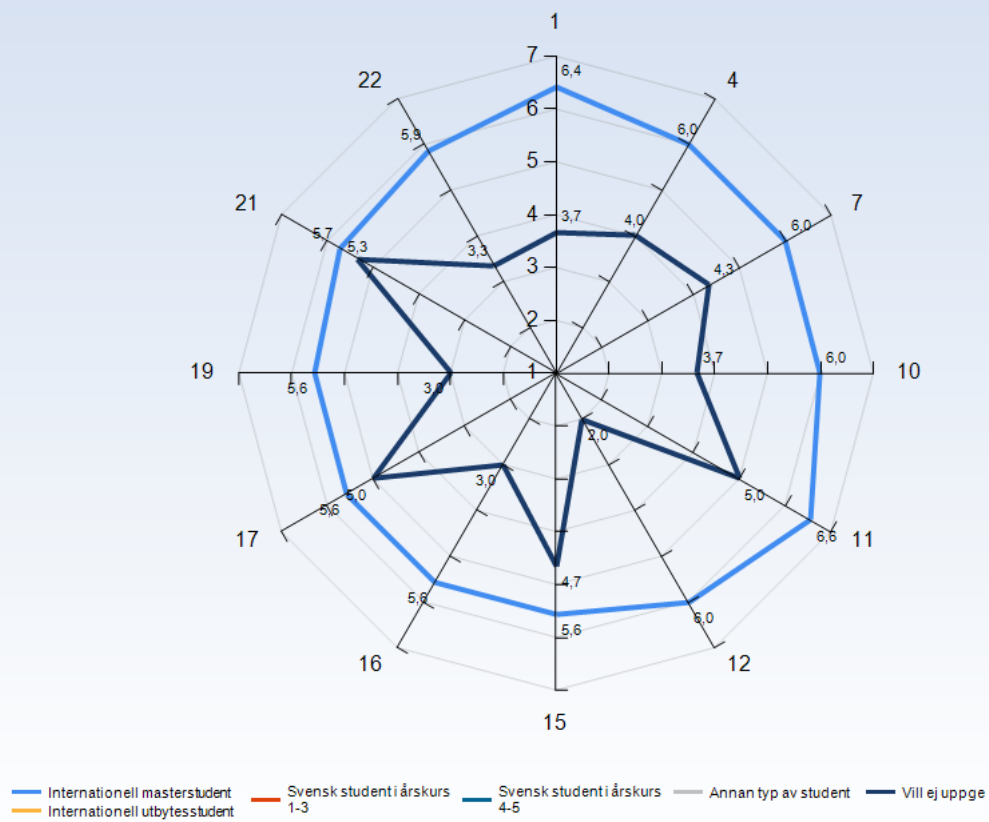
Ramsden, P. (2003). *Learning to Teach in Higher Education*, Chapter 6, pp. 84-105. New York: RoutledgeFalmer.

Average response to LEQ statements - per gender



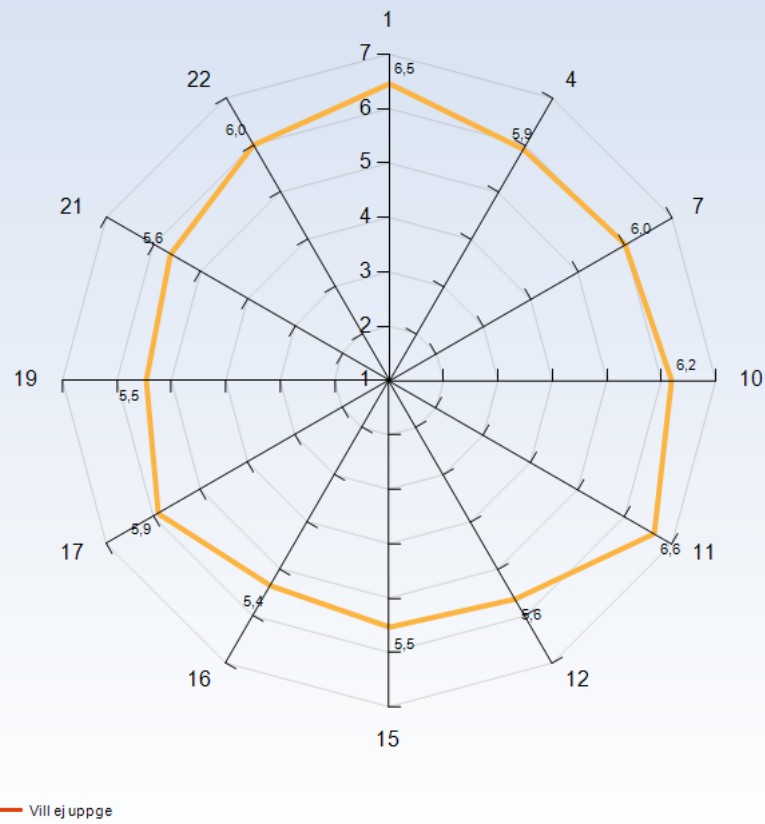
Comments

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



Comments

### Average response to LEQ statements - per disability



Comments



## GENERAL QUESTIONS

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

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

The relevance of the concepts studied to those seen in everyday life.

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

The teacher and his "italian style" during lectures to make us understand things. The contents also, and the fact that we had a lot of time to complete project and laboratory.

I think that is lab. assignment.

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

the lectures are very detailed

The examples on real cases in vehicle aerodynamics

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

The course is kept simple.

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

The literature review.

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### What would you suggest to improve?

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

The teacher sometimes is a little chaotic, as he loses the "red thread" of the lecture. I would suggest to prepare a clear and ordered plan to follow during the lesson.

I would like to improve in homework. Old exam doesn't cover in test. I think you should have some homework to practice.

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

maybe some problems solving assignments are required during regular study period, so that we can have a better understanding on the knowledge.

Maybe the part on 3D and delta wing could have been explained more deeply, but it is something I noticed since I was really interested on it.

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

Some lecture notes about only the topics of this course would be great.

More previous exams to study on and a less time consuming lab

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

If the course is taught online again, make available the recording soon after the lecture, it is useless to have them available just a bit more than a week from the exam, there is no time to revise what was said! Moreover, the PM of the course is not published, the exam rules should be clearly stated in written form with a clear evaluation table.

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

- The presentation format (handwritten notes) was confusing in terms of structure, making it very difficult to extract the necessary information and learn. Same observation for the lecture notes.

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

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

I would love to have another course to study in deep aerodynamics applied to cars, and all the different solutions that can be implemented. This was a basic course, and we had to understand the basics, so it was not always possible to focus on cars.

Group project is the best idea. However, it is not suitable in this situation because another student went back to their country. They don't attend in the project. I have to work my project with myself and lab. assignment also. It is very difficult for me which I have to do everything in same time.

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

it is a good idea to learn the lecture notes well

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

Go to every lecture

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

Study in advance the lecture notes

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

If you do not have any background in fluid mechanics, do not take this course. Solid mechanics and structural dynamics do not work here.



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

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

No, thanks.

No

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

I think the course contains too many assignments for a 6 HP course

## SPECIFIC QUESTIONS

### Laborationen var tydlig och hjälpsam

Laborationen var tydlig och hjälpsam

yes

It was helpful to a certain extent.

No

A little bit, mostly it was nice to understand how the wind tunnel works.

The lab is ok. The project is quite useless, I understand that it is important to know how to do a literature review, but this is a course of vehicle aerodynamics, not a course in how to write reports or similar. In addition, the instructions about how to write a literature review are the ones used actually for a full thesis, which is a different type of work.

It was a bit difficult to understand the data sheet,

Yes

The lab instructions were unclear and full of mistakes: the reference system was changing throughout the paper, the experimental setup described in the instructions was not fully coherent with the video.

Yes, exactly.

The experiment itself was interesting and beneficial. However, the laboratory handout had some errors in it, like stating a contradicting amount of pressure tubes and conflicting reference frames in the body of the handout and the appendix.

The lab was conducted the best possible in the situation. However, virtual labs in comparison to real ones are still different. Some more explanations on why the  $C_D$  does not decrease with a high angle of the back in the ahmed body could have been provided at least after the deadline.

### De externa föreläsningarna var stimulerande och hjälpte mig att lära mig mer

De externa föreläsningarna var stimulerande och hjälpte mig att lära mig mer

yes

No

Yes, especially the one on bicycle aerodynamics. Unluckily, we were not able to have the lecture on race car aerodynamics.

It would be nice to organise again the road aerodynamics since probably most of the people were interested more in that one, instead of in bicycles and trains. Anyway all external lectures were nice.

They were interesting but placing them near the exam made it feel a bit stressful

The one regarding trains it was well done. The one on bicycles ended up being a list of hard values and CFD results very difficult to follow: it would have been more effective to focus on the main concepts and maybe show some videos to better understand the phenomena.

I think not yet.

The lectures on bicycle and train aerodynamics were indeed very useful and attention-grabbing.

Very interesting, especially the one of bicycle aerodynamics!



**Efter denna kurs har jag blivit mer motiverad att studera strömningsmekanik**

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yes

No.

No

I was motivated before the course, but definitely now I am even more. Plan for the summer is also to read a couple of books on car aerodynamics. Thank you Alessandro!

not really, but it was really interesting to understand the basics.

I think it is an interesting field, but right now I don't want to continue study anything

No

Sure, it was an inspiration Let me want to do a project about aerodynamics and vehicle.

I was already very motivated, but this one I really liked for its practical approach



## RESPONSE DATA

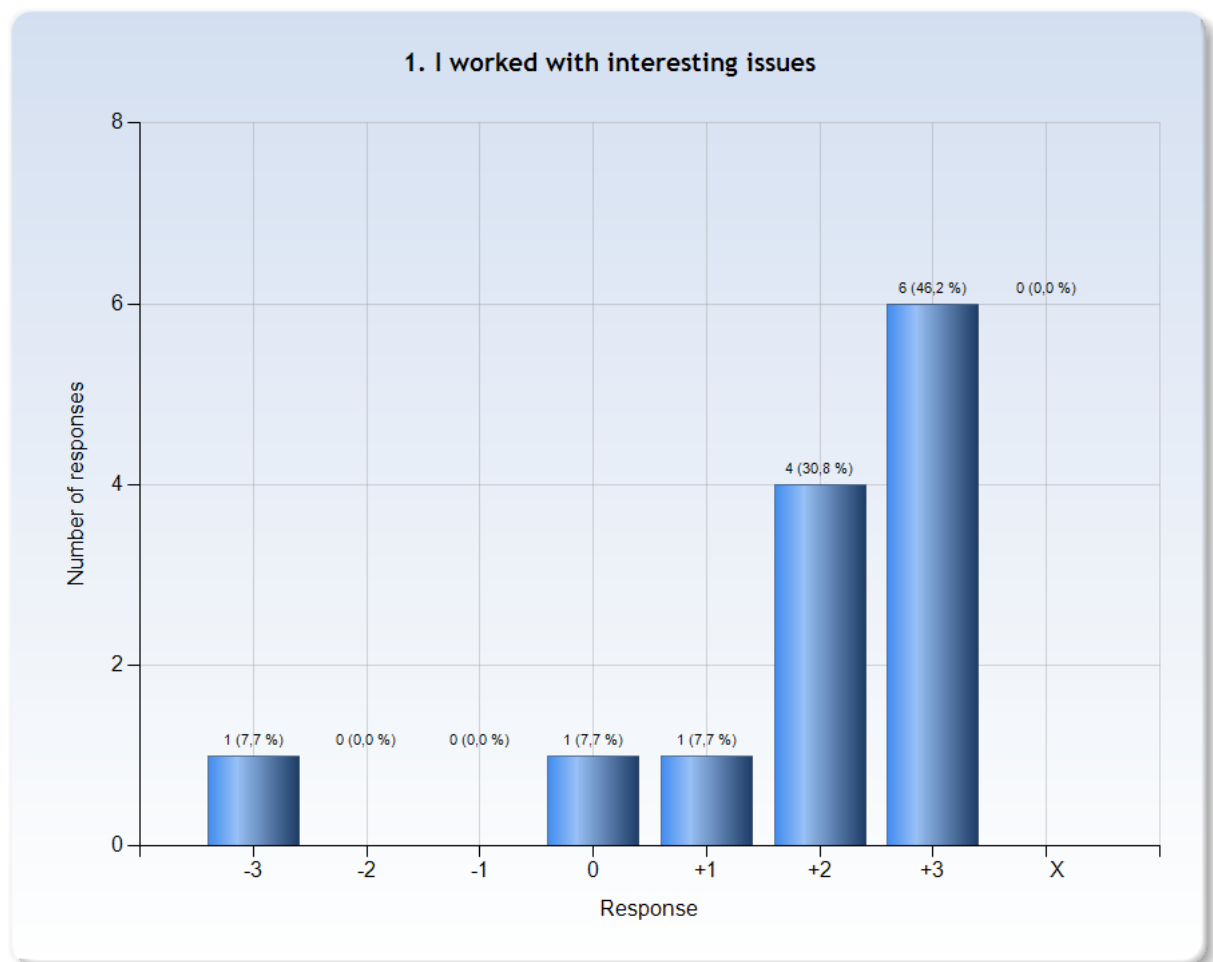
The diagrams below show the detailed response to the LEQ statements. The response scale is defined by:

-3 = No, I strongly disagree with the statement

0 = I am neutral to the statement

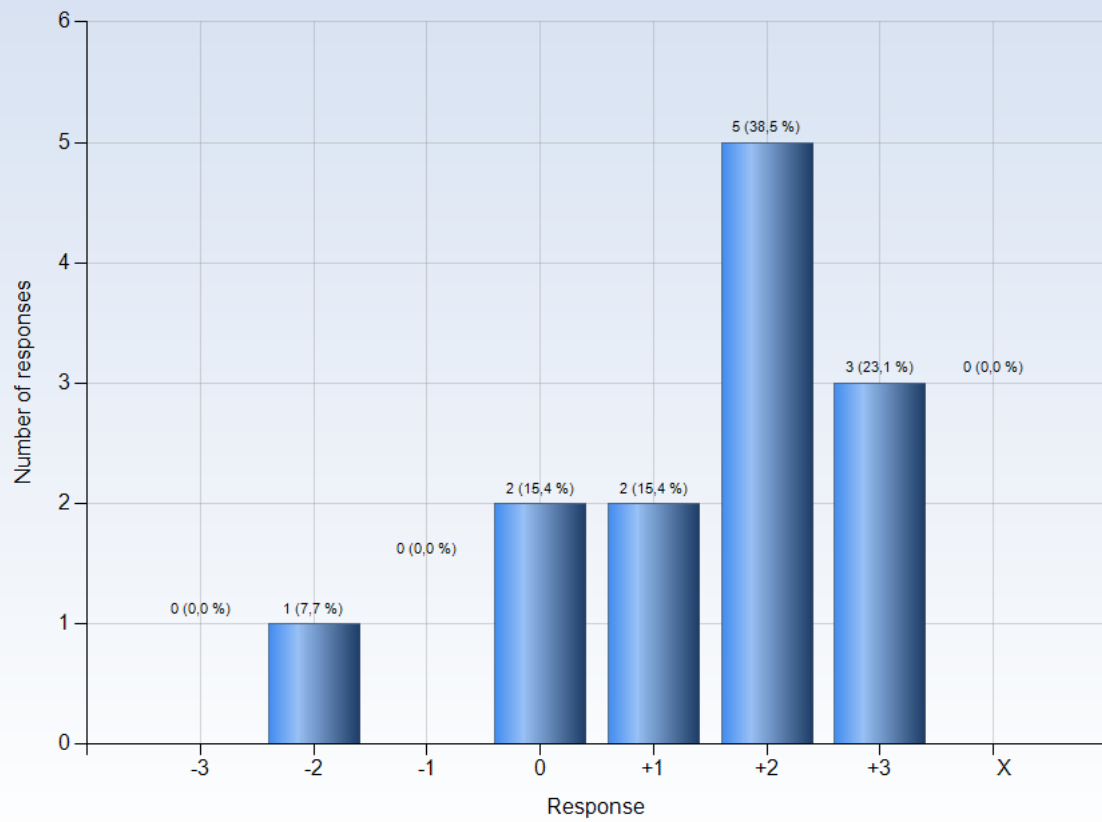
+3 = Yes, I strongly agree with the statement

X = I decline to take a position on the statement



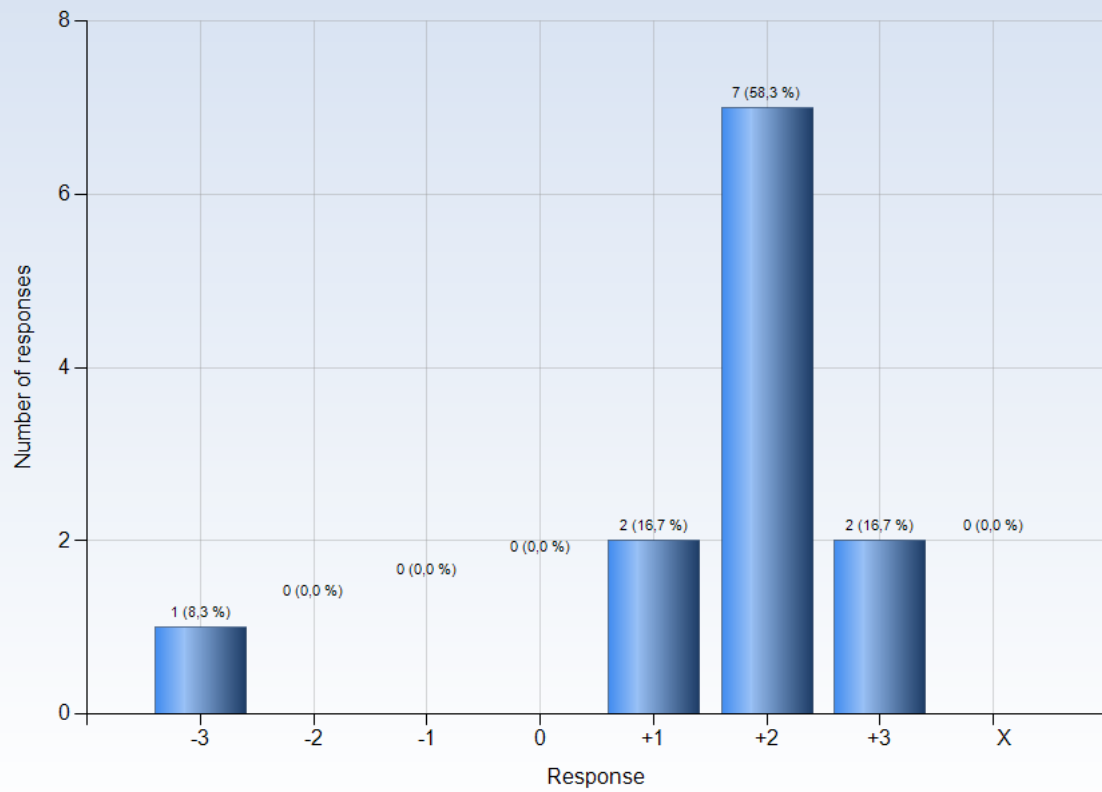
Comments

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



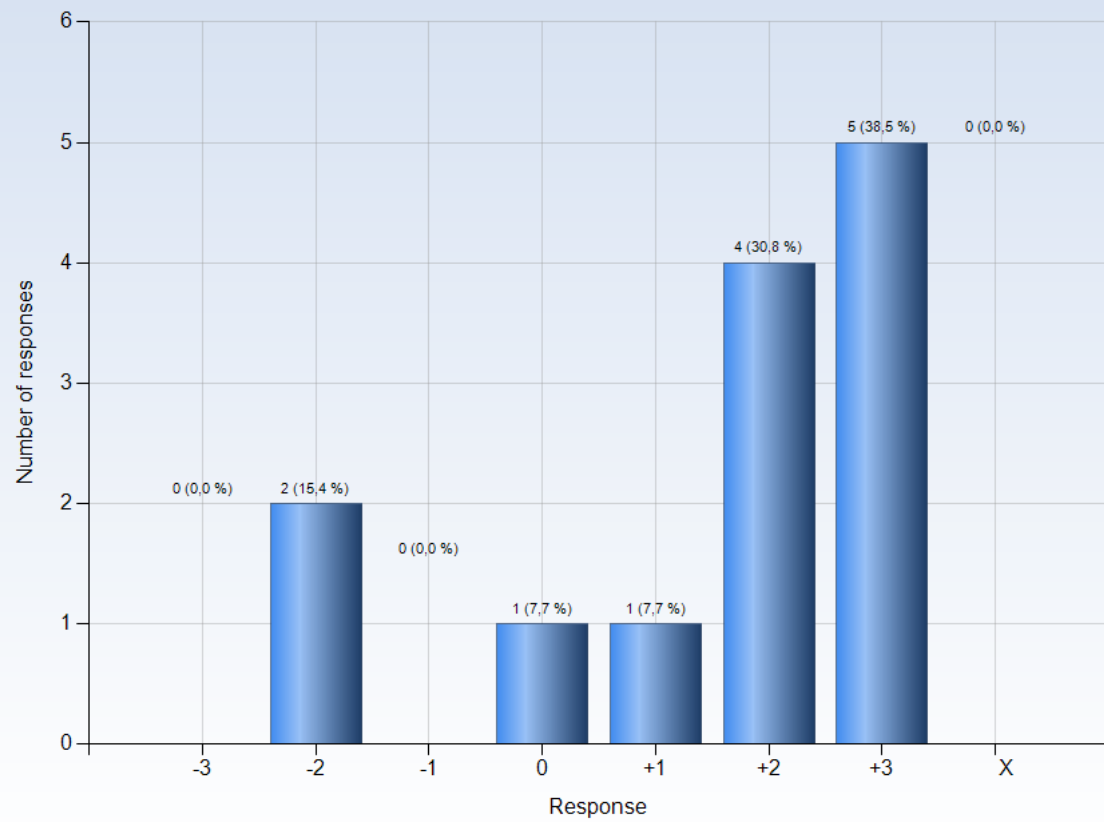
Comments

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



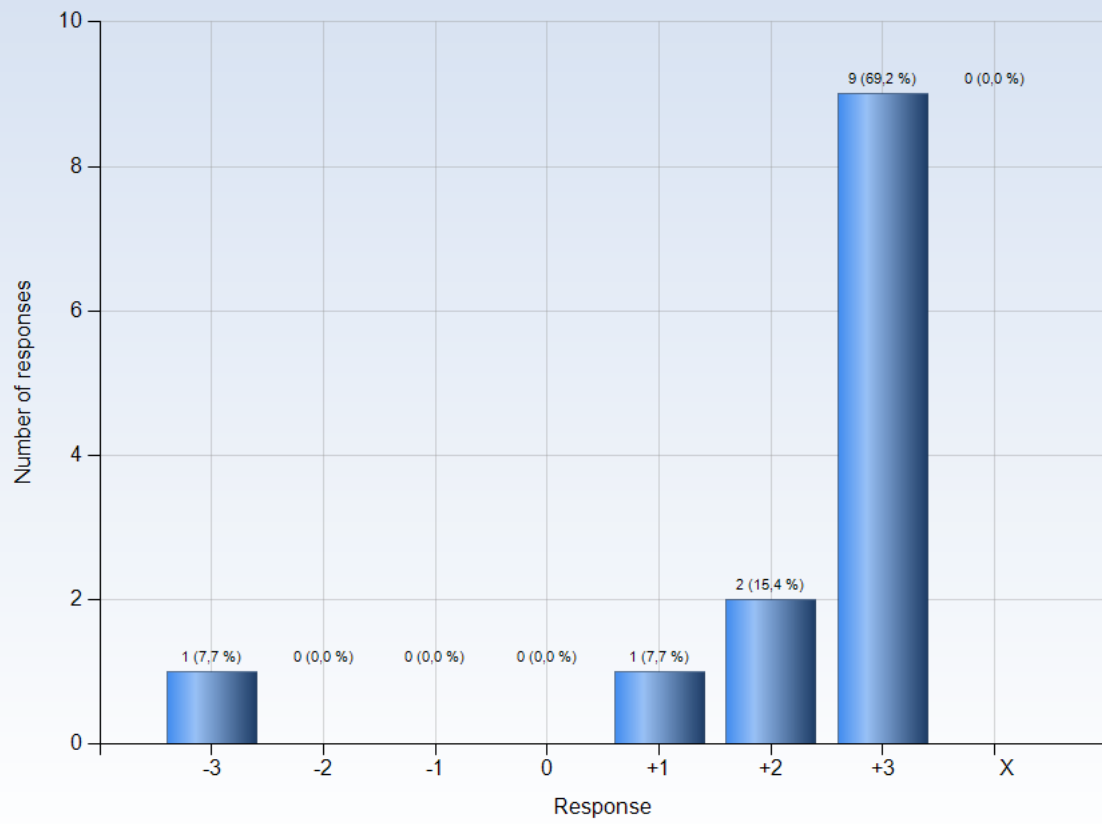
Comments

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



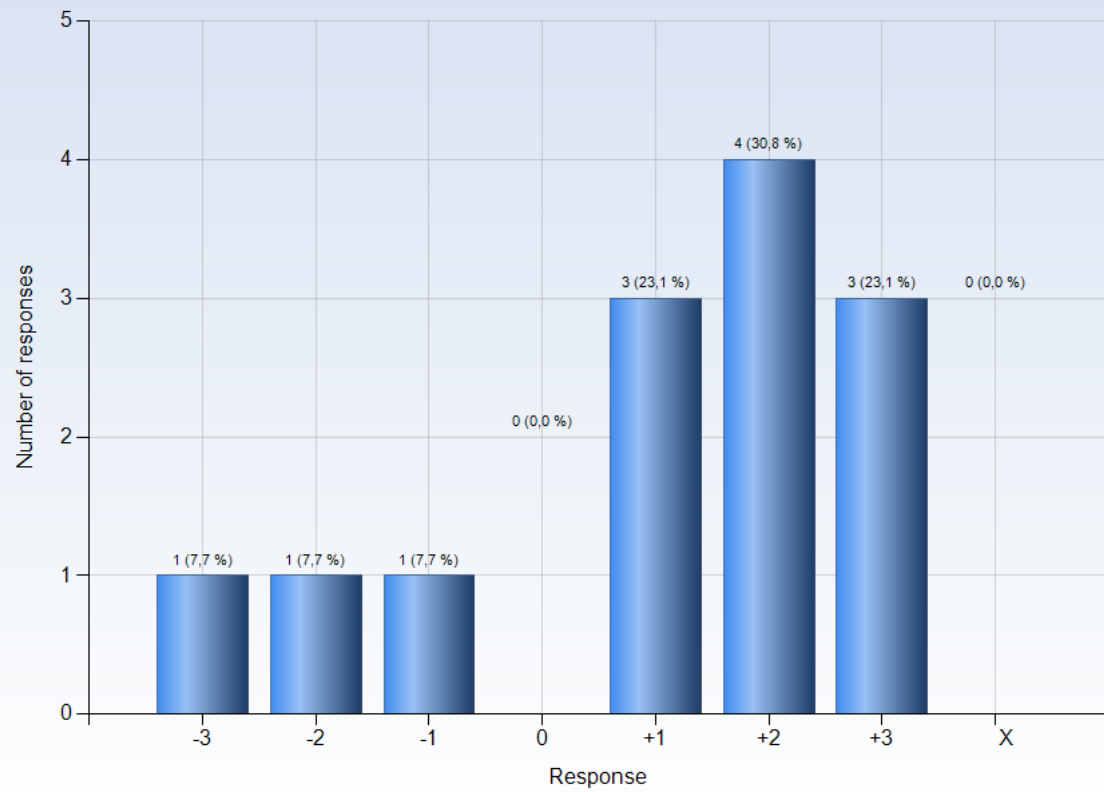
Comments

### 11. Understanding of key concepts had high priority



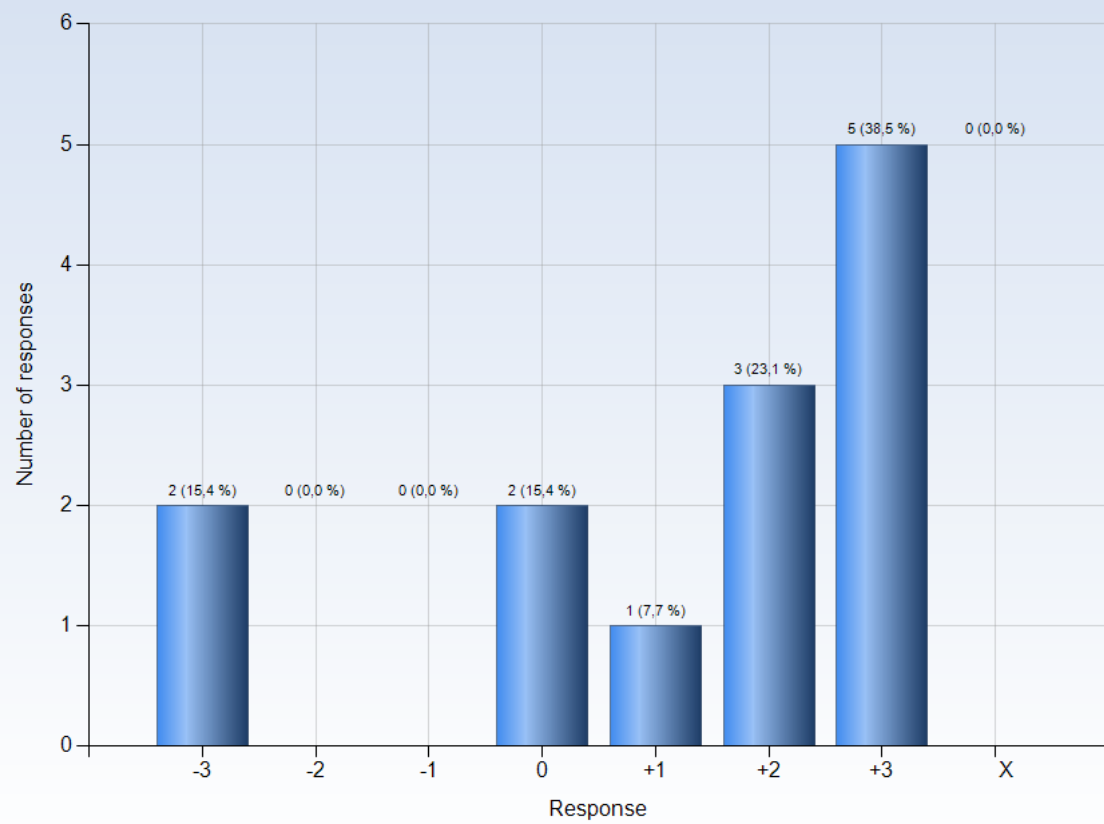
Comments

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



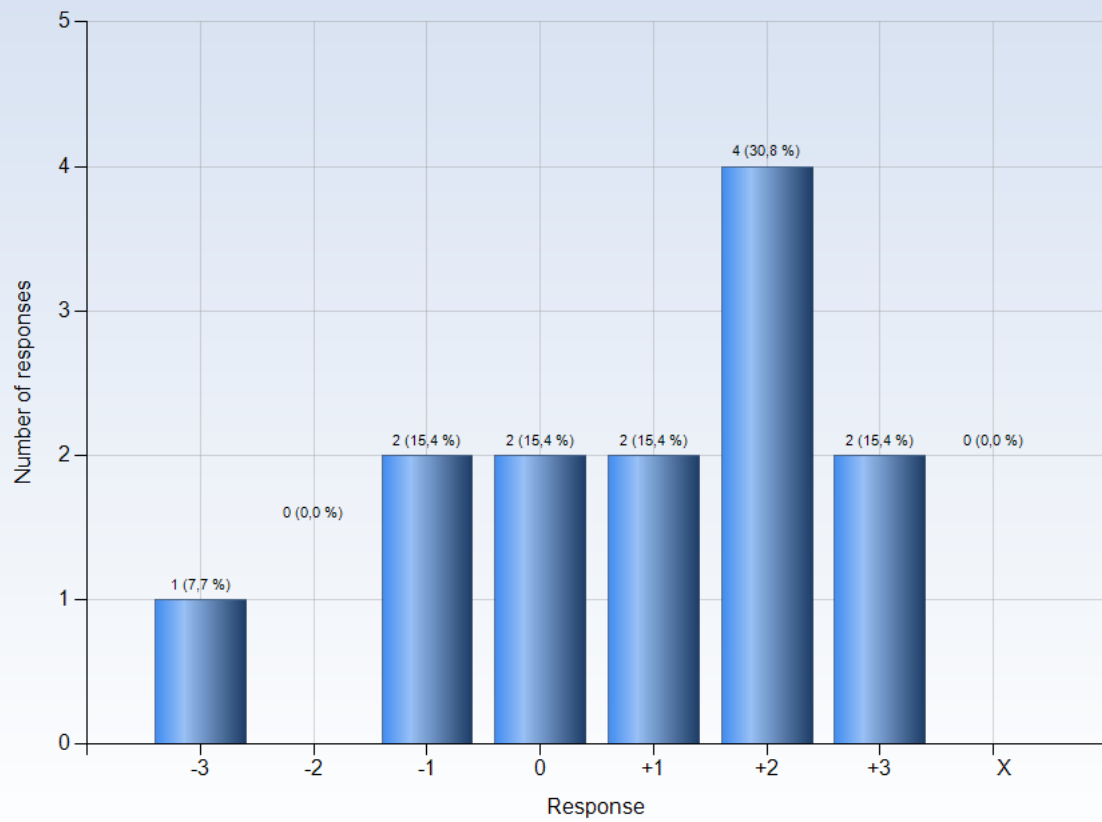
Comments

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



Comments

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



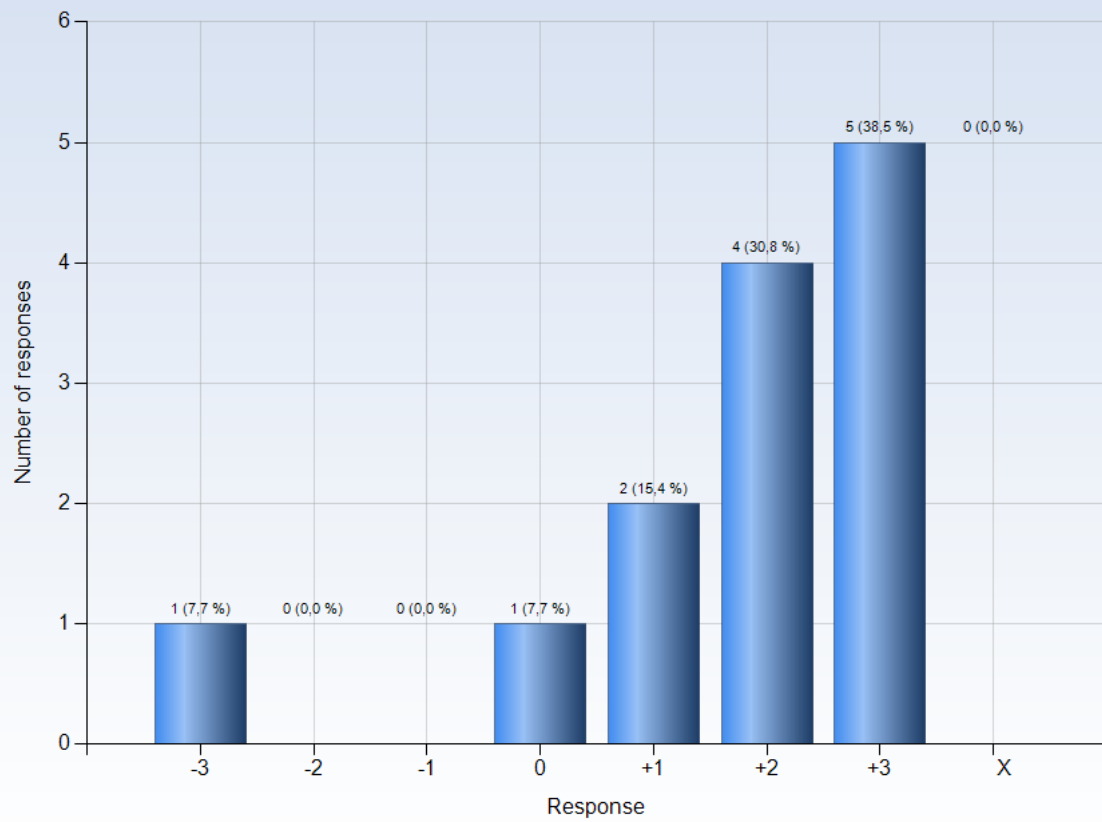
#### Comments

Comments (My response was: -3)

No clear goals, for example, the old exams that was given did not at all portray our exam

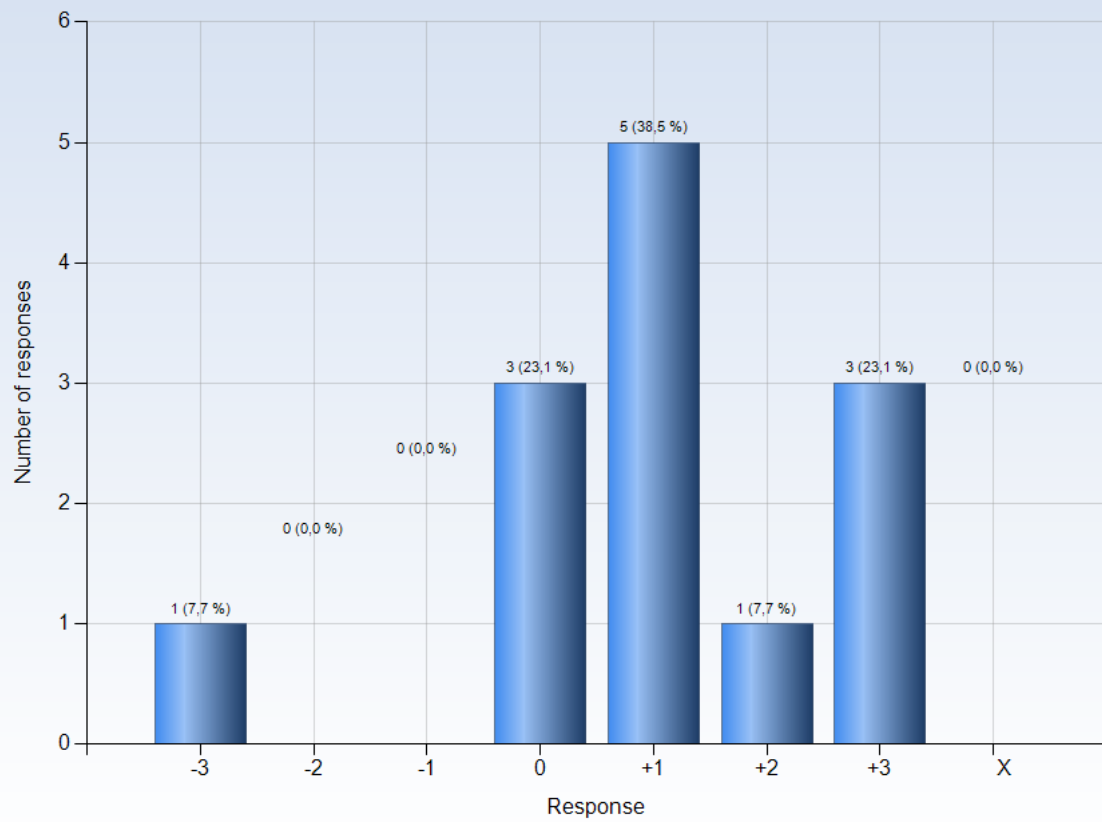


17. My background knowledge was sufficient to follow the course



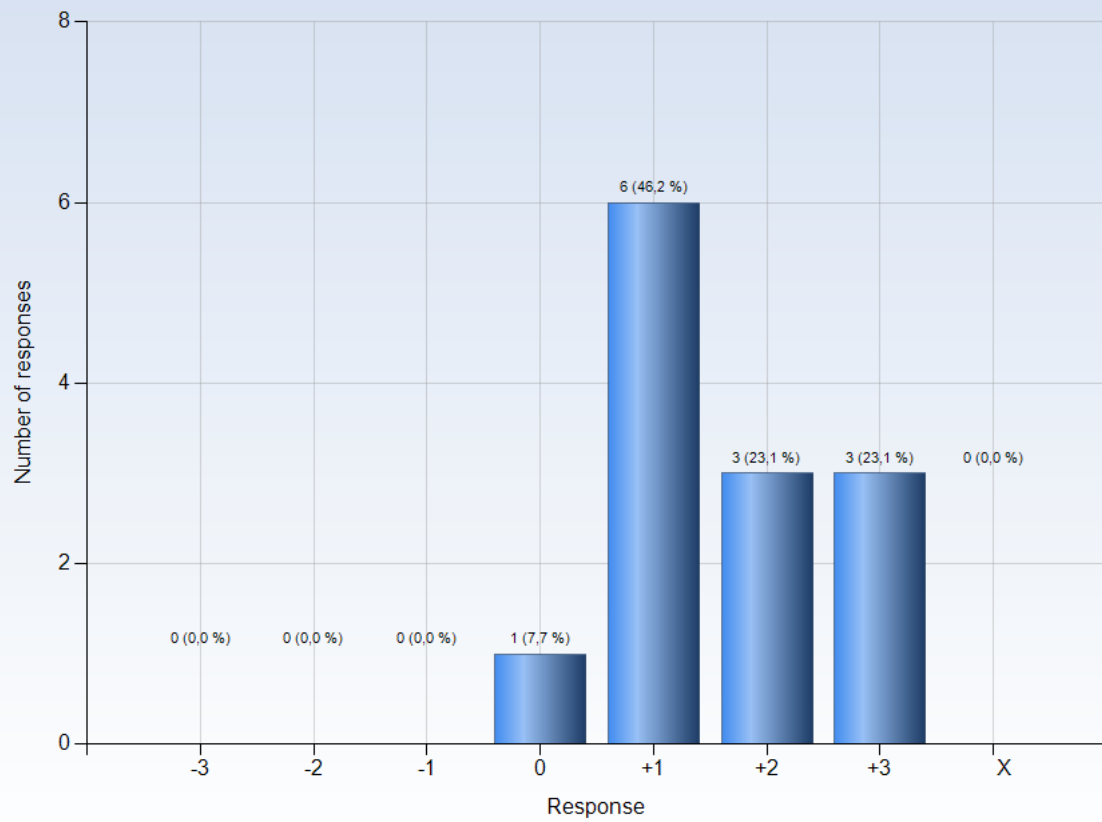
Comments

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



Comments

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

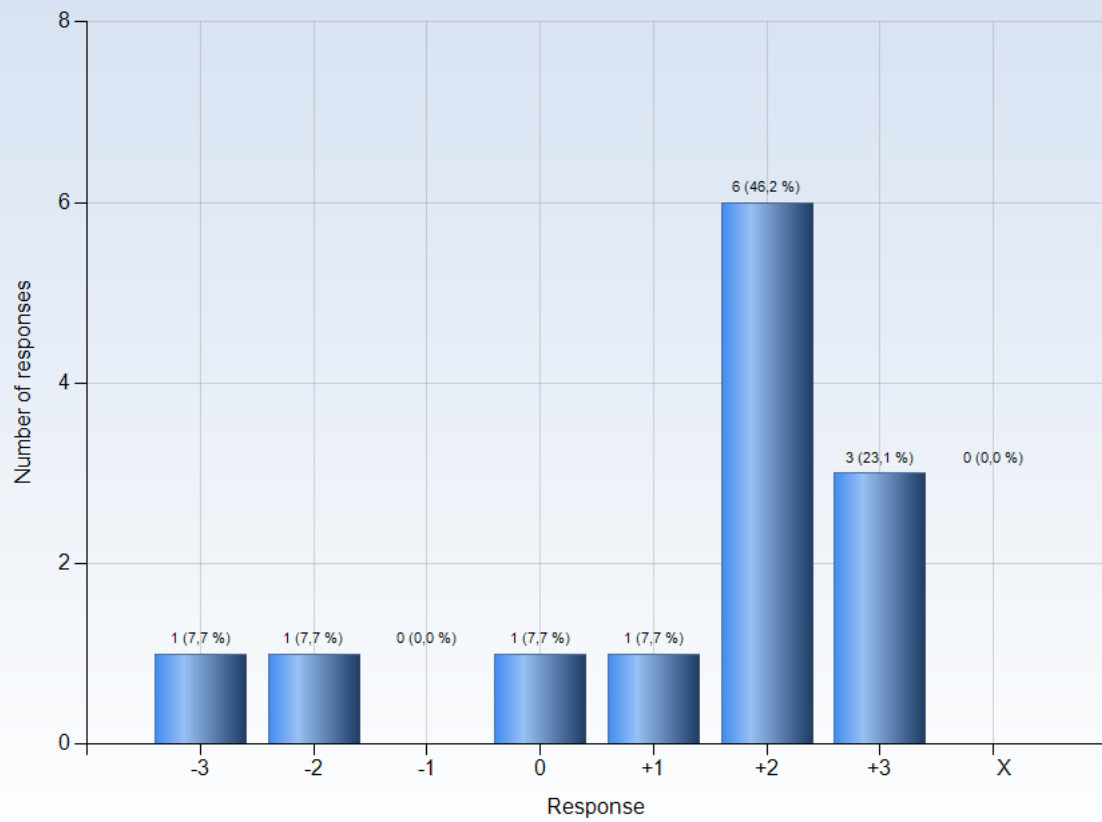


### Comments

Comments (My response was: +2)

Only way to learn something for this course

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



Comments