Report - SG2212 - 2019-03-24

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

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

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

Ardeshir Hanifi (hanifi@kth.se) and Philipp Schlatter (pschlatt@mech.kth.se)

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 lectures sessions (25x2 h total, approximately 3x2 to 4x2 hours per week), one exercise session (1h per week), 6 homeworks, and a project (approx. 10 h) at the end. Learning questions are given to the students which cover the topics that are tested at the written (closed-book) exam (focusing on theory), whereas the practical skills are trained via the homeworks and the project. The homeworks and the project give bonus points for the exam (max. 10 out of 60), and a certain minimum is required for getting the credits for the LAB1 part of the course.

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?

The students say that they use quite a significant amount of time for the course, up to 26 h per week (one student even more than 40 h). However, the average is around 20h per week. Subtracting on average 6 hours for the actual lectures give around 14 hours of self-study and homeworks. A course at 7.5 credits would require 200 hours of work. The course is about 8 weeks long, which gives an average required work of 25 hours per week. The averaged work load reported by the students is slightly below that. However, the students feel that the load work is high, mostly due to the work required for the assignments. Despite this, the students seem to appreciate the assignments and their variety, reflecting different subjects taught during the course.

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 similar to those from previous years and are reasonable. Of those who followed the course, about 24% received grade A, 9% grade B, 24% grade C, 22% grade D and 10% grade E.

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 answers are quite consistent. They were in general positive to the lectures, the lecturers, the structure and the content.
As previous years, students found the course demanding and time consuming, which is correct. However, despite the fact that the assignments have been time-consuming they are appreciated and found by students to be meaningful.
The students also realise the need for continuous study during the course, which is reflected in their advices to the future students.
The students have quite different opinion about the pace of the course, from normal to very fast. This different experience can be due to their different background.
It seems some part of course is considered by students to require memorizing rather than understanding the topic.
Some students note that in certain parts of the course mainly the lecture notes with all derivations are written on the board, which is not useful. This is true to some extent and should be improved in next rounds of the course.

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?

nothing specific.

ANSWERS TO OPEN QUESTIONS

What emerges in the students' answers to the open questions? Is there any good advice to future course participants that you want to pass on?

The main outcome is that the course is demanding, but worthwhile spending the time. As mentioned above, most students work a lot, but they seem to see the benefits. They think that the background (communicated prior requirements) usually are sufficient.
It is suggested to extend the course over two periods.

PRIORITIZED COURSE DEVELOPMENT

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

We will work on improving description of assignments and exercise sessions.
There are no books that covers all part of the course. Therefore, we have been using a compendium which we have continuously improved it, this work will continue and material can be modified.

For this course round, the lecture notes for the first part of the course has been typed LaTeX and will be continuously upgraded during the next years. We have also had for the first time a non-compulsive OpenFOAM demonstration (2h).

We will look to the possibility of shortening the introductory part on fluid mechanics and numerical analysis in order to give more time for the CFD part.

OTHER INFORMATION

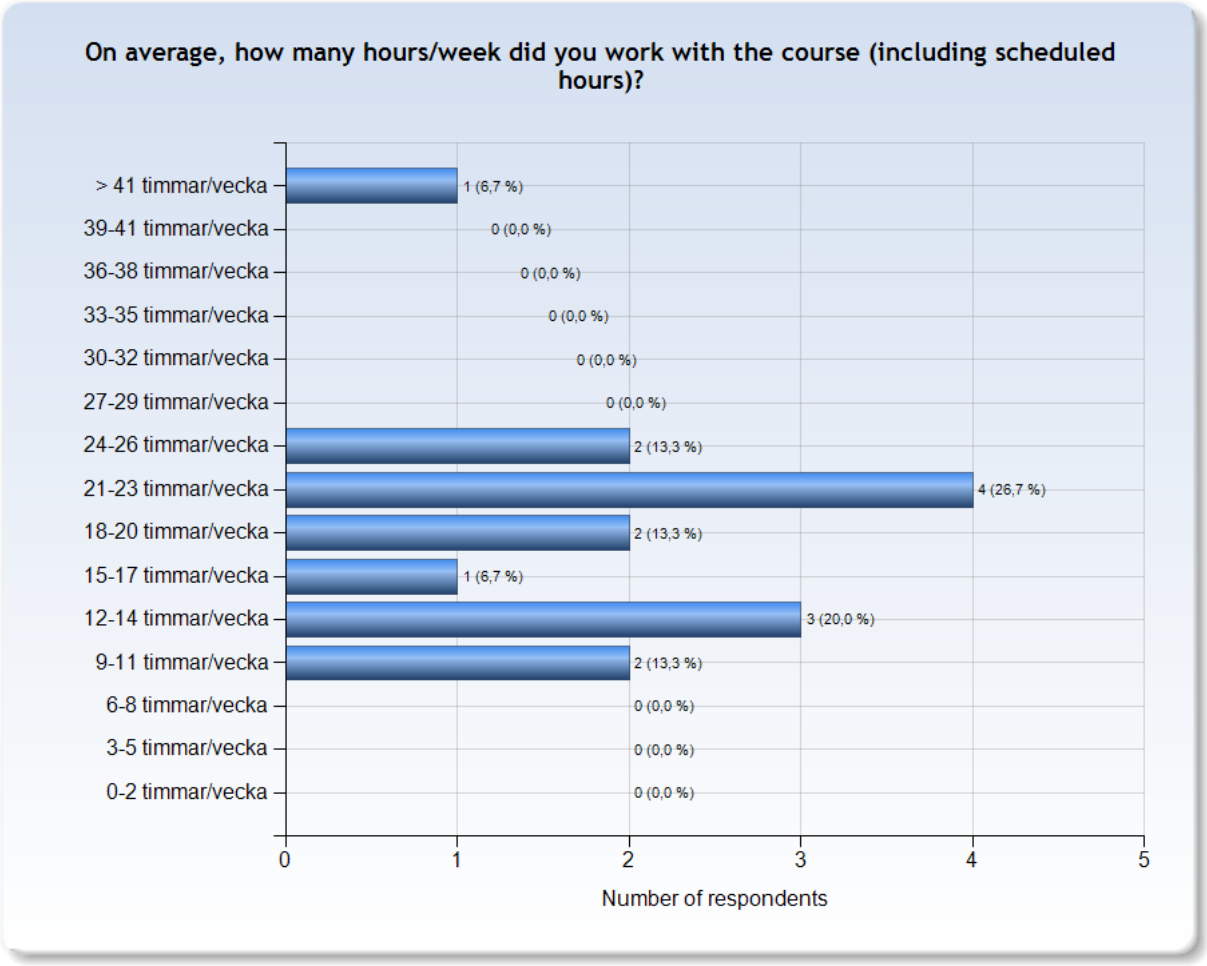
Is there anything else you would like to add?

Approximately 38% of the students answered, which is quite good compare to other courses. In the most of cases the feedback is consistent providing a good picture of students experience.
It should be mentioned that about 12 hours in the beginning of the course are dedicated to introductory fluid mechanics and numerical analysis. This has been necessary to make sure that all students which have different backgrounds learn the basic knowledge required for the course.

SG2212 - 2019-03-12

Antal respondenter: 42
Antal svar: 16
Svarsfrekvens: 38,10 %

ESTIMATED WORKLOAD



Comments

Comments (I worked: 9-11 timmar/vecka)
The working load was adapted to the level of the course

Comments (I worked: 12-14 timmar/vecka)
Lectures required a few extra hours home to fully understand what was taught. Weekly assignments were also time demanding, but the right amount.

Comments (I worked: 18-20 timmar/vecka)
The combination of lectures, homework, project and studying for the exam took a lot of time.

Comments (I worked: 21-23 timmar/vecka)
It was a particularly high workload compared to other courses with 7.5 Credits. One might consider raising it to 9?
Hw takes a lot of time but are really good, however because of that little to no time is spent on understanding the rest of the material.
Hard homework, but it only take up a small percentage of total grade.
7 hrs lectures week + 14 hrs /week for homework 2-6. Project took 20 hrs in total.

Comments (I worked: 24-26 timmar/vecka)
Workload during the course was fine.
I think the HW schedule was too aggressive to let things sink in, and it felt like I was more interested in finding the equations and rules I needed to solve the problem rather than thinking about the problem and working through it in a more organic manner. Of course, it must be said that this is in part due to a poor schedule combination with SD2155 flow acoustics, which also had weekly HW that were due around the same time, and also took roughly 10-20h per week.

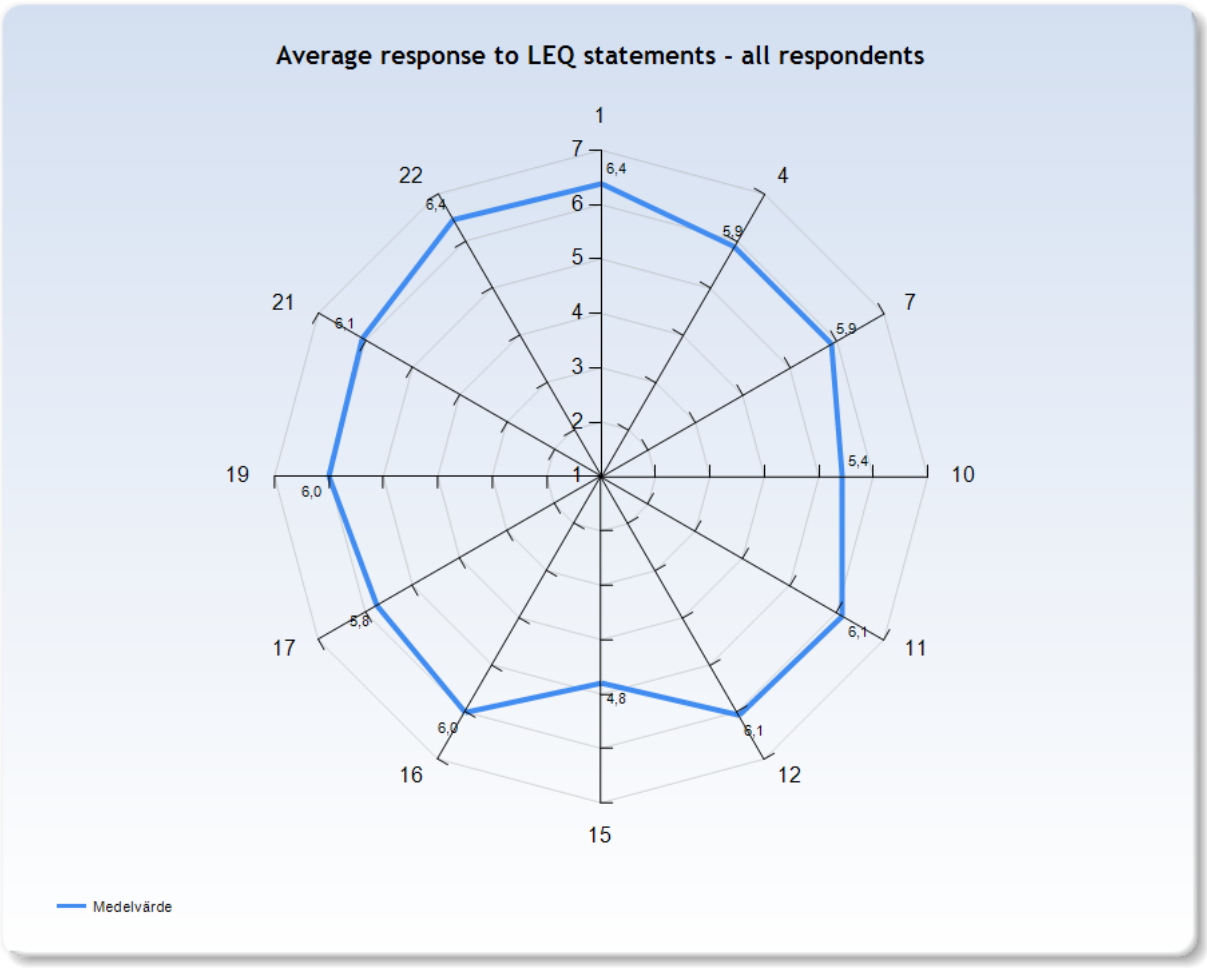
Comments (I worked: > 41 timmar/vecka)
It is very time consuming and difficult especially if one has other courses along with it.

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

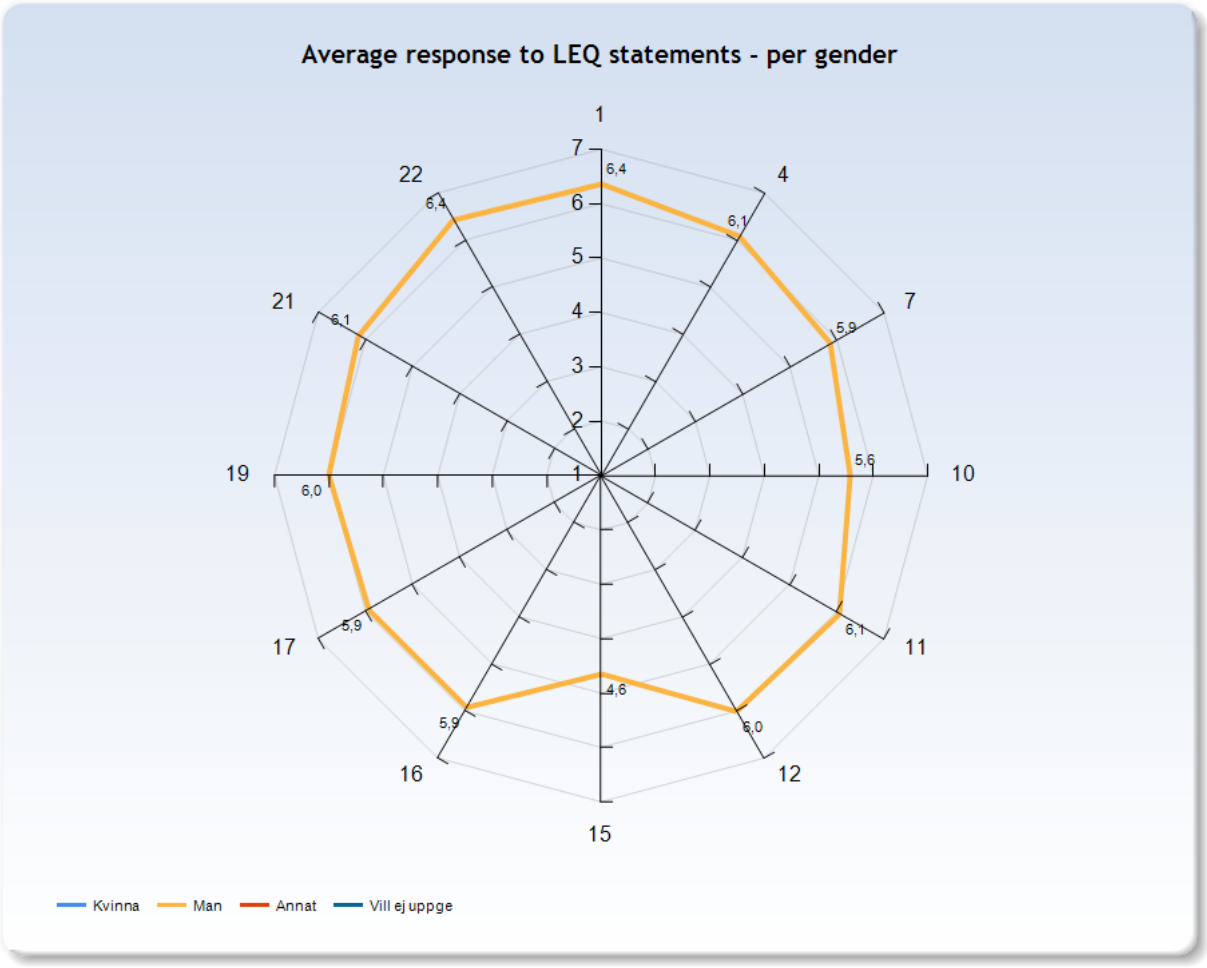
Bain, K. (2004). *What the Best College Teachers Do*, Chapter 5, pp. 98-134. Cambridge: Harvard University Press.

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.

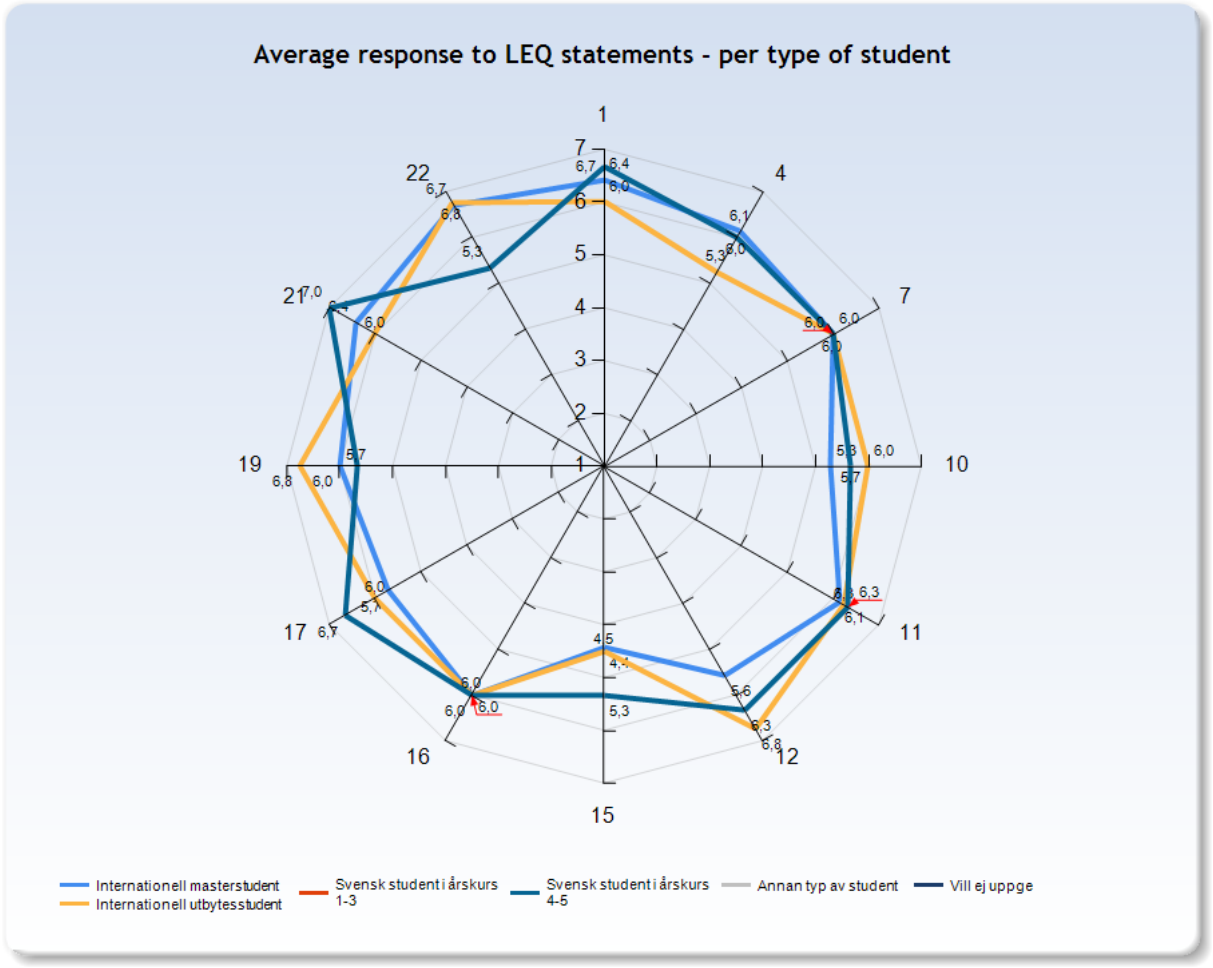
Kember, K. & McNaught, C. (2007). *Enhancing University Teaching: Lessons from Research into Award-Winning Teachers*, Chapter 5, pp. 31-40. Abingdon: Routledge.

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



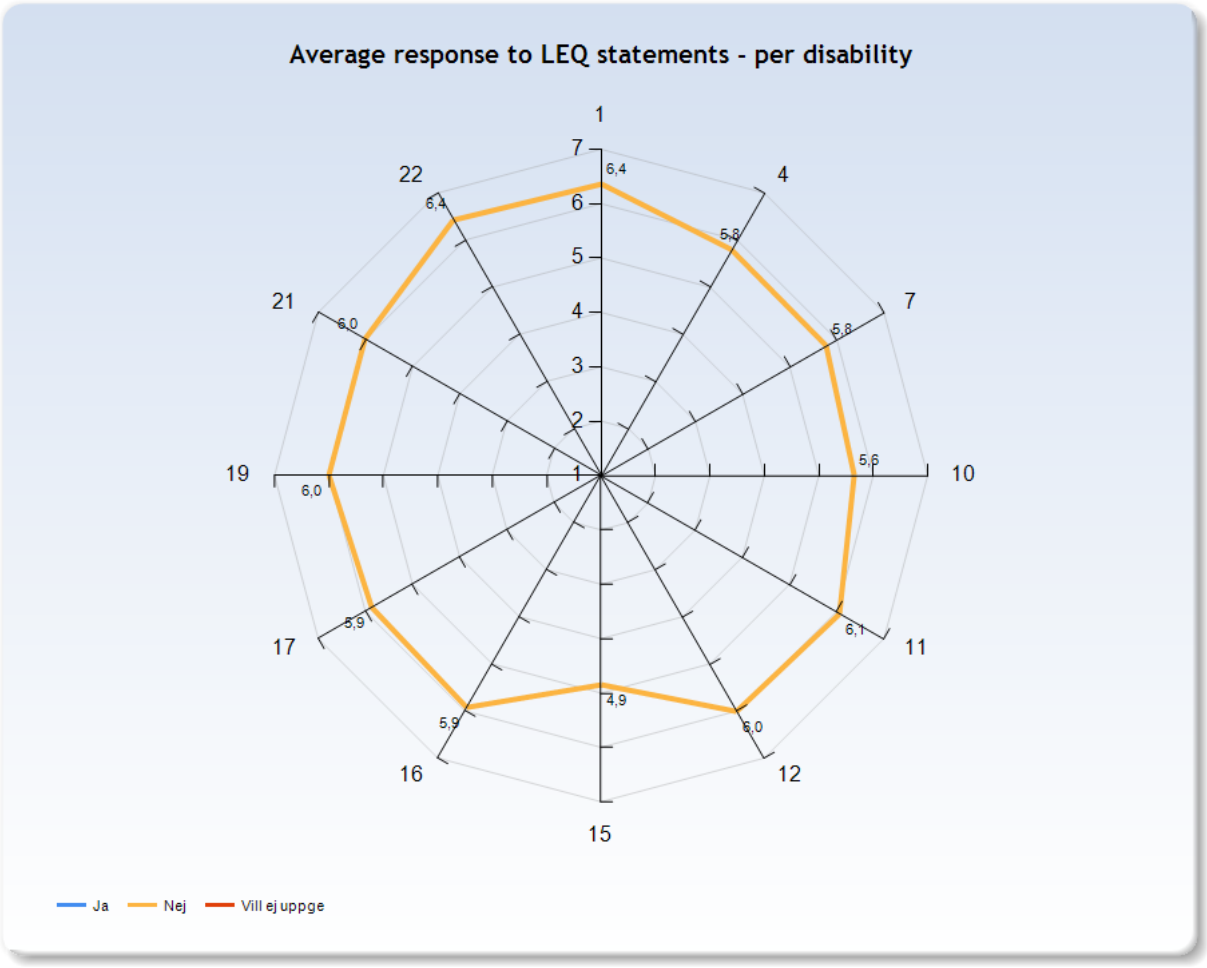
Comments

Comments (I am: Man)
No comment.



Comments

Comments (I am: Svensk student i årskurs 4-5)
No comment, but I heard from a few exchange student that they found it difficult.



Comments

Comments (My response was: Nej)

No comment.

GENERAL QUESTIONS

What was the best aspect of the course?

What was the best aspect of the course? (I worked: 9-11 timmar/vecka)
I liked the weekly assignments, where you could concretely apply the learnt material

What was the best aspect of the course? (I worked: 12-14 timmar/vecka)
Good quality and interesting assignments.
writing Matlab codes

What was the best aspect of the course? (I worked: 18-20 timmar/vecka)
The Assignments were challenging in a very stimulating way, but I wished they were worth more than 3 bonus points, given the amount of time they require, especially if compared to the workload to get bonus points in other courses
The homework with the concluding project really helps to understand the theories and methods.

What was the best aspect of the course? (I worked: 21-23 timmar/vecka)
When the theoretical lectures were followed by concrete examples so that one could remember the theories by something.
That the information (lecture notes) where good
Teachers are really good at teaching and explaining knowledge.
Challenging and interesting course. Learnt alot by doing homeworks and from lectures.

What was the best aspect of the course? (I worked: 24-26 timmar/vecka)
The course material was interesting and the teachers were pedagogical.
The initial portions on finite differences, numerics, and stability were very well taught and quite engaging.

What would you suggest to improve?

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

Maybe insist on the fact that the exam requires to learn all the model, not only the simplest one, by heart as nothing is given.

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

Doing some assignment using CFD software like fluent or OpeanFOAM.

More percentage of homework. Six homeworks are 3 points in total. The project contains 7 though.

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

In the lecture notes sometimes "A-stability" and "Absolute stability" are used interchangebly, other times they are not, and this can be quite confusing.

The instructions in the homeworks were sometimes not so clear.

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

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The last part of the course is diffuse hand hard to understand and relate to. The examination of that part is also more memory than understanding.

The second part of exam is nothing but memorizing lot of things, with one question, you need to copy all of the lecture notes of a single class, which will waste lots of time for students to prepare the exam but not helpful to understand the knowledge. The lectures are perfect, but exam is a chaos.

Most office hours were partly during lectures. Add 1 scheduled session per week before the hw deadline where students can ask questions or work with the homework.

This is by far the most time consuming course I have ever read proportional to its credits.

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

Less "hand-waving" in the lecture notes, perhaps it's not possible to explain everything rigorously, but a lot of things were so unclear (at least to me) and briefly discussed that they had to just be memorized for the exam. Many things were explained fine but some pretty advanced and non-trivial things were left without much explanation. This made it hard to fully understand everything for the exam.

I genuinely think the course is too ambitious for a single period. As someone with no background in numerics at all, I think I would have gotten far more out of the course if there was one period on stability and different schemes and those related topics (Philipp's portion), followed by a second period on actually implementing them on grids and solving real PDE problems (Aerdeshir's portion). Perhaps it is a preference when it comes to instruction style, but for the most part, the section on grids and iterative methods consisted of the instructor simply copying out notes onto the board without much explanation. And due to the rather tedious nature of the note-taking it usually felt like a race to write things down rather than understand them. This leads to my criticism of the exam, which (as stated previously) seemed to be more of a test of memorisation than actual understanding/ ability to derive solutions.

What would you suggest to improve? (I worked: > 41 timmar/vecka)

I would suggest the following:

1. Since this program demands extensive use of Matlab, it should be mentioned on course website that this course requires students to be proficient in matlab/C/Python programming.

2. For HW, I would suggest that some practice examples similar to HWs to be performed in class before HW is being given since it becomes very difficult for a student to directly attempt the HW.

3. There are a lot of components of the course to be completed in order to pass the course. I would suggest to reduce those components because it justs pressurize aa student. 6 HWs, 1 Project, 1 examination and criteria's for passing each component is too much.

4. There are a lot of derivations to be remembered and I would suggest that teachers should narrow down some derivations for the examination since it becomes very difficult to remember all of them

What advice would you like to give to future participants?

What advice would you like to give to future participants? (I worked: 9-11 timmar/vecka)
Learn by heart all the models

What advice would you like to give to future participants? (I worked: 12-14 timmar/vecka)
To work early on assignments and project, and to fully understand what was taught in every lecture.
Start to do the study questions early

What advice would you like to give to future participants? (I worked: 21-23 timmar/vecka)
I would like to warn them that this course can be very time consuming, so that they know what they're in for.
Use Study Questions from the beginning and learn to prioritize during the exam period. Last part of SQ takes more time than it gives use.
Careful, a course with hard exam.
Go to the lectures, do the homeworks and start with the study questions as early as possible.

What advice would you like to give to future participants? (I worked: > 41 timmar/vecka)
Be well versed with MATLAB and be prepared to devote time to this subject.

Is there anything else you would like to add?

Is there anything else you would like to add? (I worked: 12-14 timmar/vecka)
I enjoyed the course. Thanks!

Is there anything else you would like to add? (I worked: 21-23 timmar/vecka)
This course was one of my most challenging courses to date, but in retrospect fun nevertheless.
no
Interesting and great course in general.

Is there anything else you would like to add? (I worked: 24-26 timmar/vecka)
I really think this course should be split into two/spread over a whole semester. I think it would be significantly more instructive to students with no background in CFD or numerics.

SPECIFIC QUESTIONS

How many of the lectures and exercises did you attend (in %)?

How many of the lectures and exercises did you attend (in %)?
70%
90%
95
95%
75%
80
80
100%
95
>80%
95%
85 %
95%
>90 %

Was your background adequate for this course (mathematics, programming, physics)?

Was your background adequate for this course (mathematics, programming, physics)?
My programming background was not at all adequate for this course.
Completely adequate.
The characteristics section was really difficult to understand, and very briefly explained, never seen that concept before in our previous mathematics courses. Programming skills sufficient.
Basics course in numerics 3 years ago, a few courses in fluid mechanics. The maths was not difficult to grasp.
Mathematics - mostly yes, I was a bit weak on the linear algebra, but that's a personal failure more than anything else Programming - mostly yes, using MATLAB made it very accessible I think, and it's a good idea Physics - I study fluid mechanics so if I said no, that would be bad Numerics - no, I did not have any
Yes. It was difficult for me at the beginning.
yes,
yes
Yes
Numerical mathematics, Fluid Dznamics and Numerical Simulation Theories
Yes
As a mechanical engineer student from KTH I would say the background was adequate enough.

What did you think about the difficulty/speed of the course in general?

What did you think about the difficulty/speed of the course in general?
Speed is very fast and it becomes difficult to cope up with the subject. Difficulty is also high .
Normal pace, not too fast not too slow.
Again, the parts that were explained well(in detail) were reasonably easy to follow, but many other things were hard to grasp. Speed was fine.
It's high pace. The assignments proceed in parallel with the lectures so it's important not to remain behind.
Steady pace throughout the course, but slightly difficult.
I think the course is very fast paced and tries to do too much in too little time. It's like combining a class on numerics and FD with a mini-course on implementing grids and iterative methods.
It was a bit fast.
hard but not to hard
Hard and quick pace.
The pace was fine
Difficulty and speed were quite high, but reasonable (a lot content to learn)
It's ok
Too few credits compared to the hours read, at least if you compare it to other KTH courses. The course was not too difficult though, just time consuming.

What did you think about the lectures (teachers, organisation, explanations, course handouts)?

What did you think about the lectures (teachers, organisation, explanations, course handouts)?
Handouts very complete. Lectures following them strictly.
All teachers were good. Course literature already discussed.
If more material was provided, like reference to some specific chapters of the book and lecture recordings, then it'd be great!:)
it is better to have one than two lectures, less confusion
Exam is mess.
Ok
All fine.
The lecture notes were good and so were the lectures.

What did you think about the homework sessions and the project (organisation, explanations, literature)?

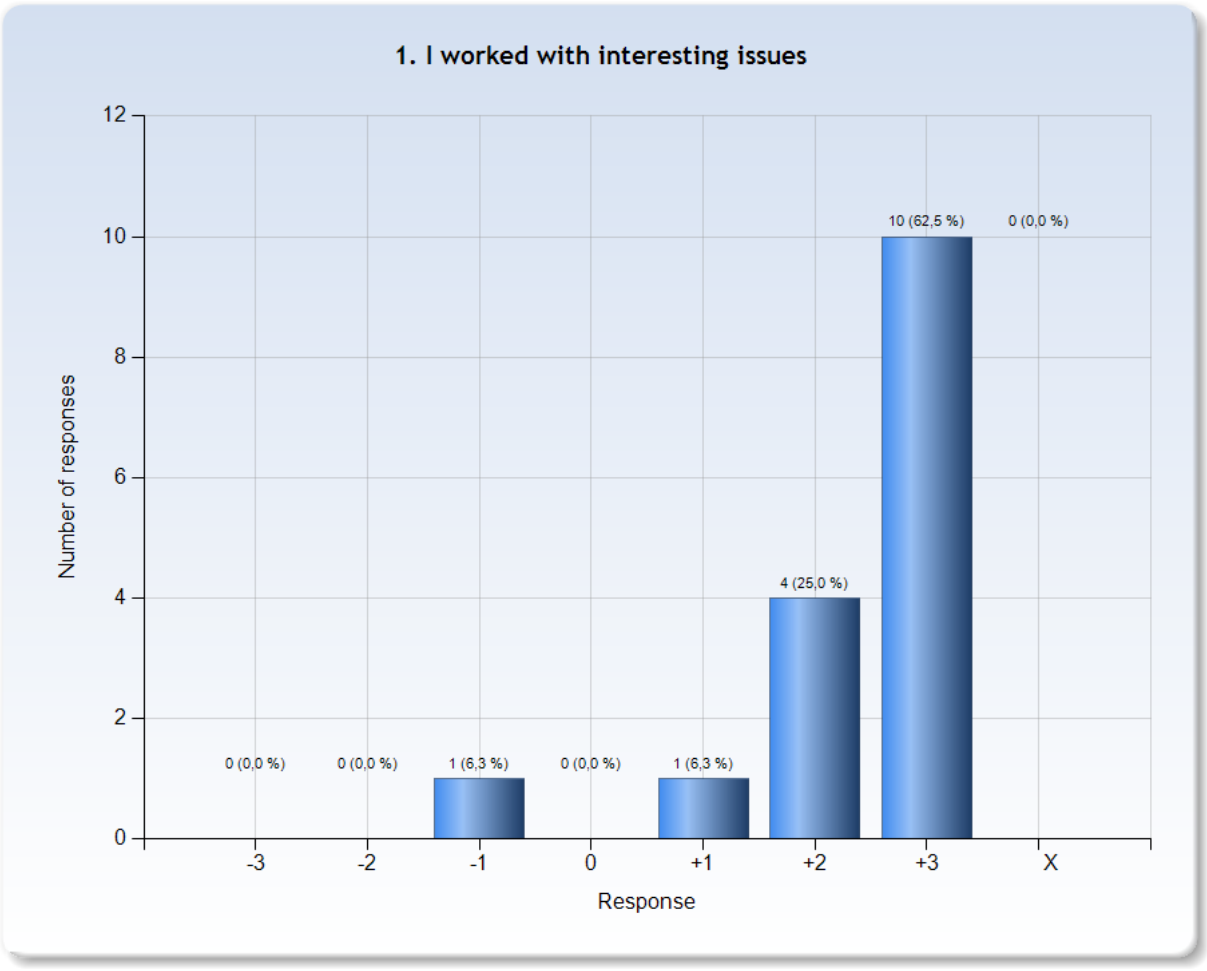
What did you think about the homework sessions and the project (organisation, explanations, literature)?
Homework sessions must also include discussion about MATLAB codes
interesting assignments/homework and also project.
Homeworks were good, not done with project yet but seems fine.
I think the homeworks had good instructions except for the fourth one where the order of the instructions were kind of jumbled, so I began by trying to "correct" the code but I hadn't read how to do it which came in the "questions" part if that makes any sense.
I think 1 HW per week is very aggressive, but htis has been explained already. For the project, I think a helpful way to structure it would have been to make it be something of a wrap-up of the homeworks. The idea being that each homework would require us to write a script or a method that is essential for the project to work, but ideally doesn't take too long to do. That way we are building up to the project while learning. It also leaves room to eliminate templates or make them less complex, and help us learn more rather than simply try to use what we are given without too much understanding.
ok
Nice and nice. If something can make it better, maybe the can arrange the expression of the homework in a better way, as it can be hard for us to understand what they want in the report.
Ok
Applying the learned contents in the homeworks and project motivated and helped to understand how CFD programming is done.
The work of project for master students are not much. However, the project contains much more points than homeworks.
Add 1 homework session before the homework deadline.

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



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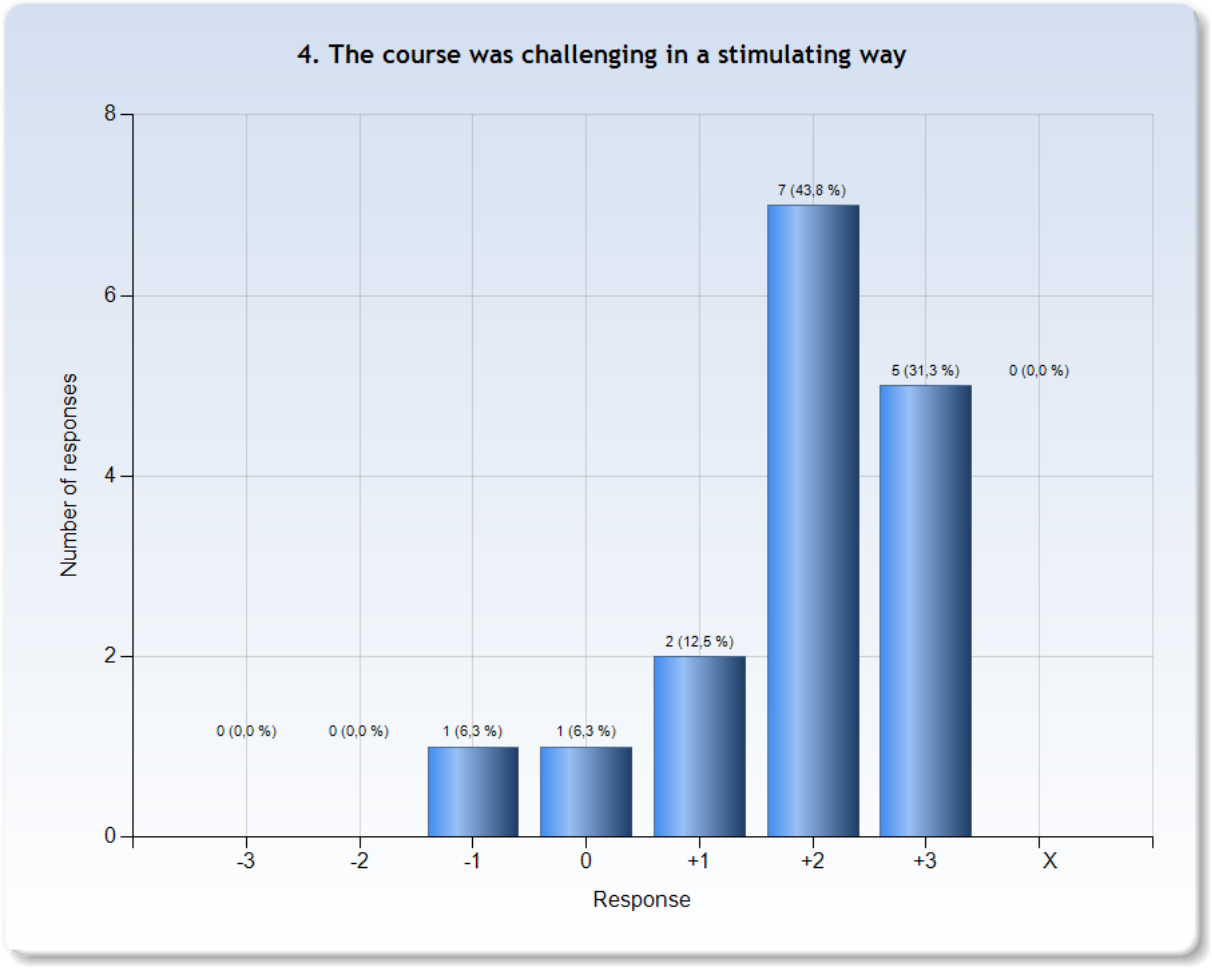
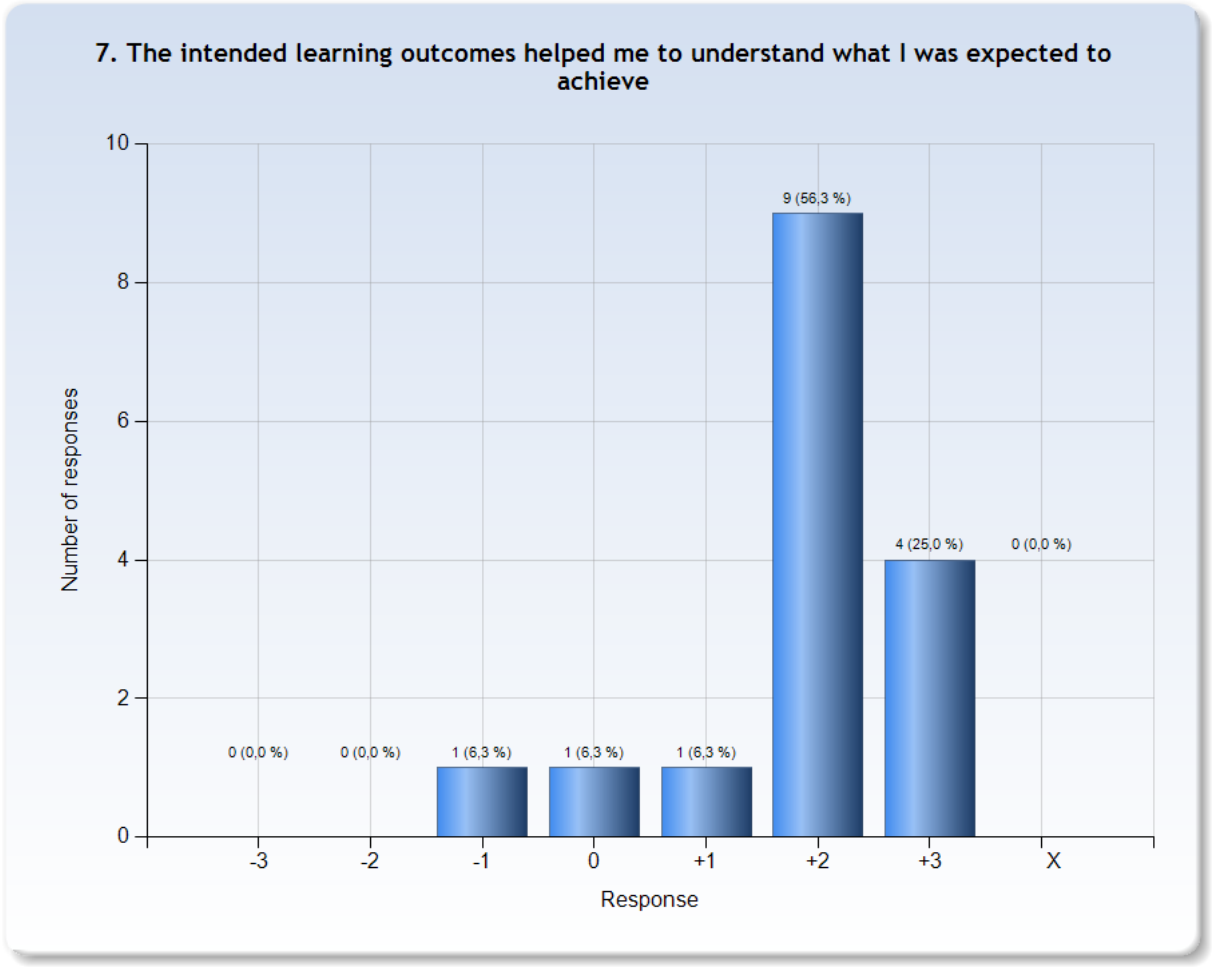

4. The course was challenging in a stimulating way
Number of responses
Response
0
2
4
6
8
-3
-2
-1
0
+1
+2
+3
X
0 (0,0 %)
0 (0,0 %)
1 (6,3 %)
1 (6,3 %)
2 (12,5 %)
7 (43,8 %)
5 (31,3 %)
0 (0,0 %)

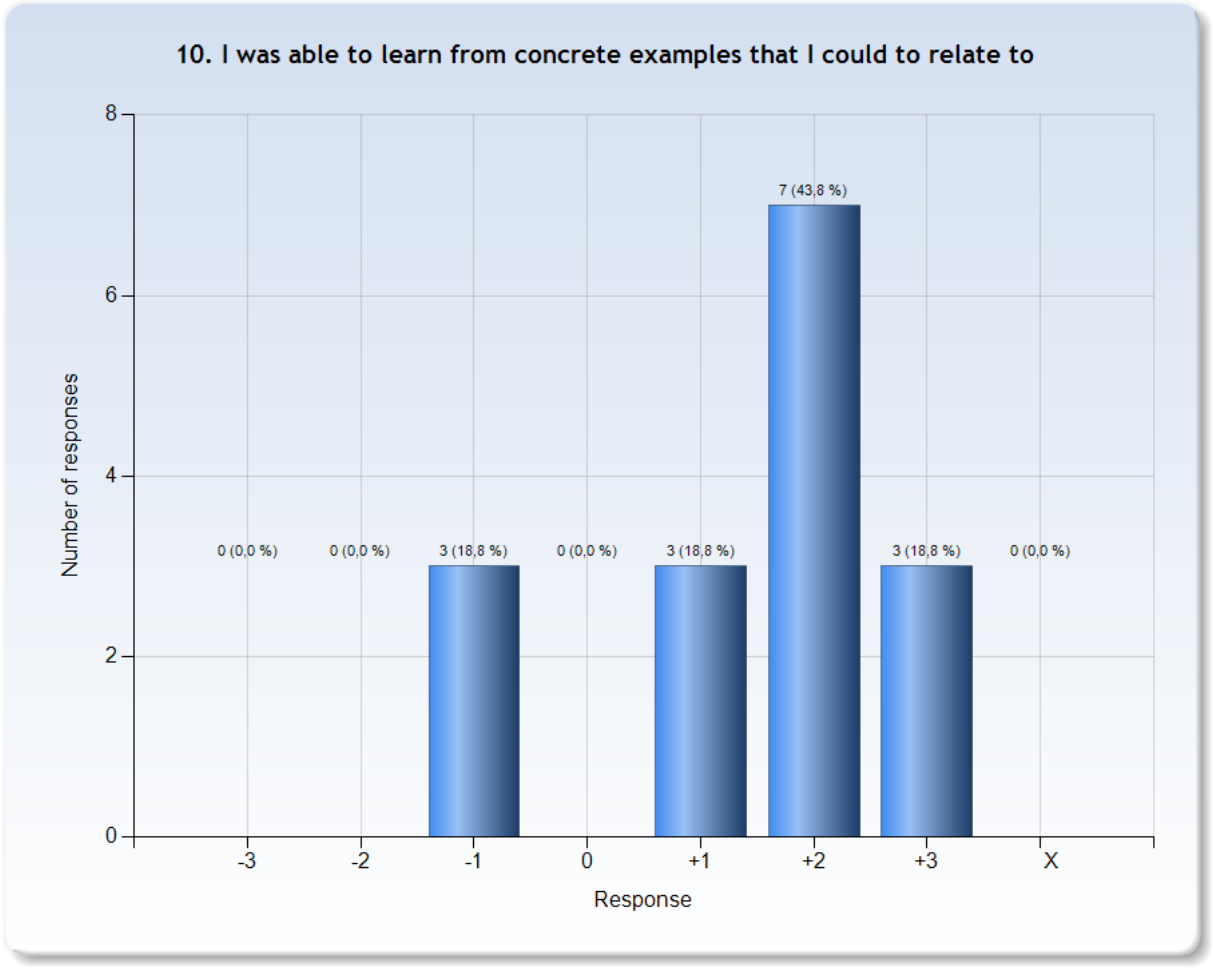
Comments



Comments

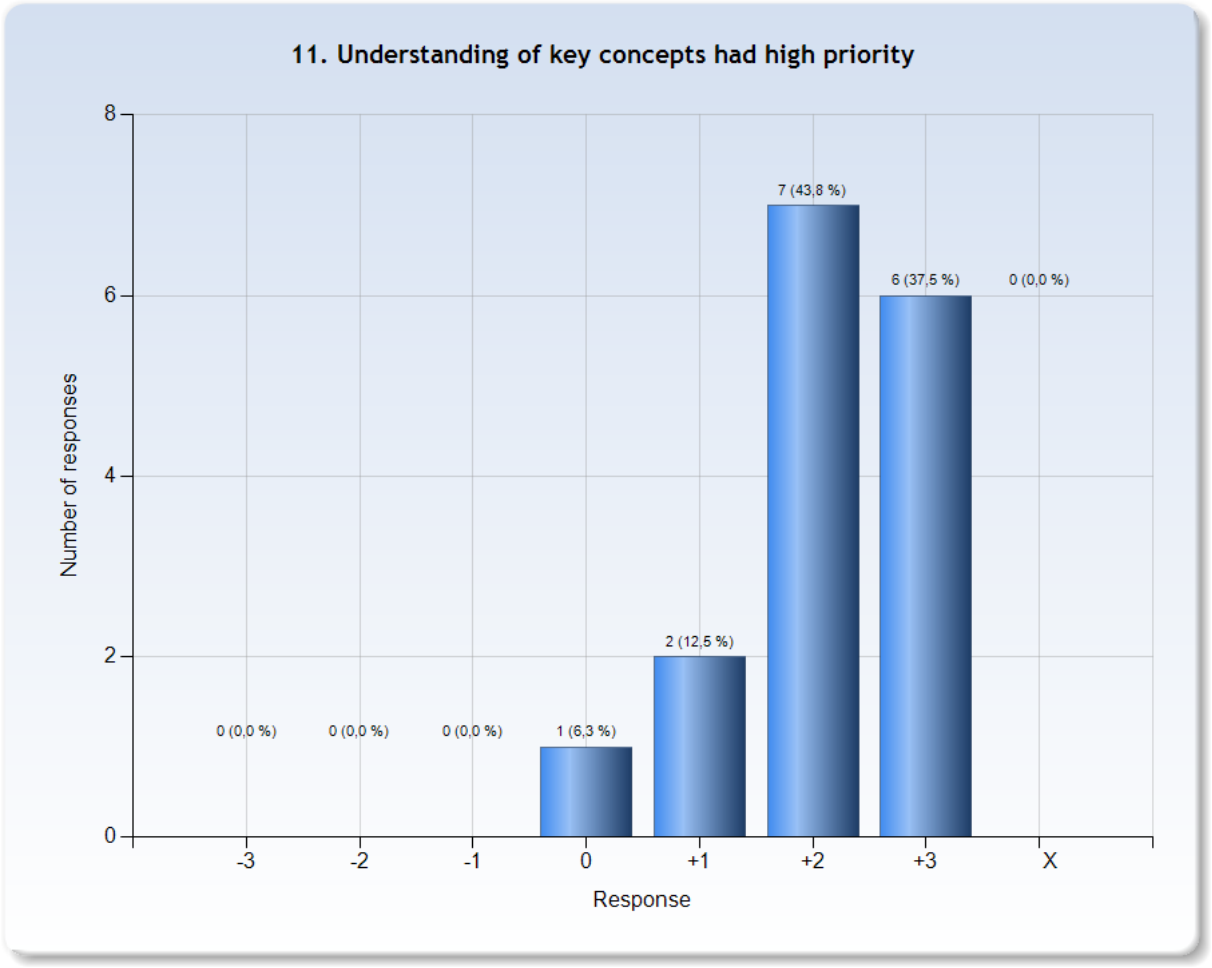
Comments (My response was: -1)

The course is more of an overview. I have a good foundation to actually study CFD but I would not say I am competent or comfortable in developing my own



Comments

Comments (My response was: +1)

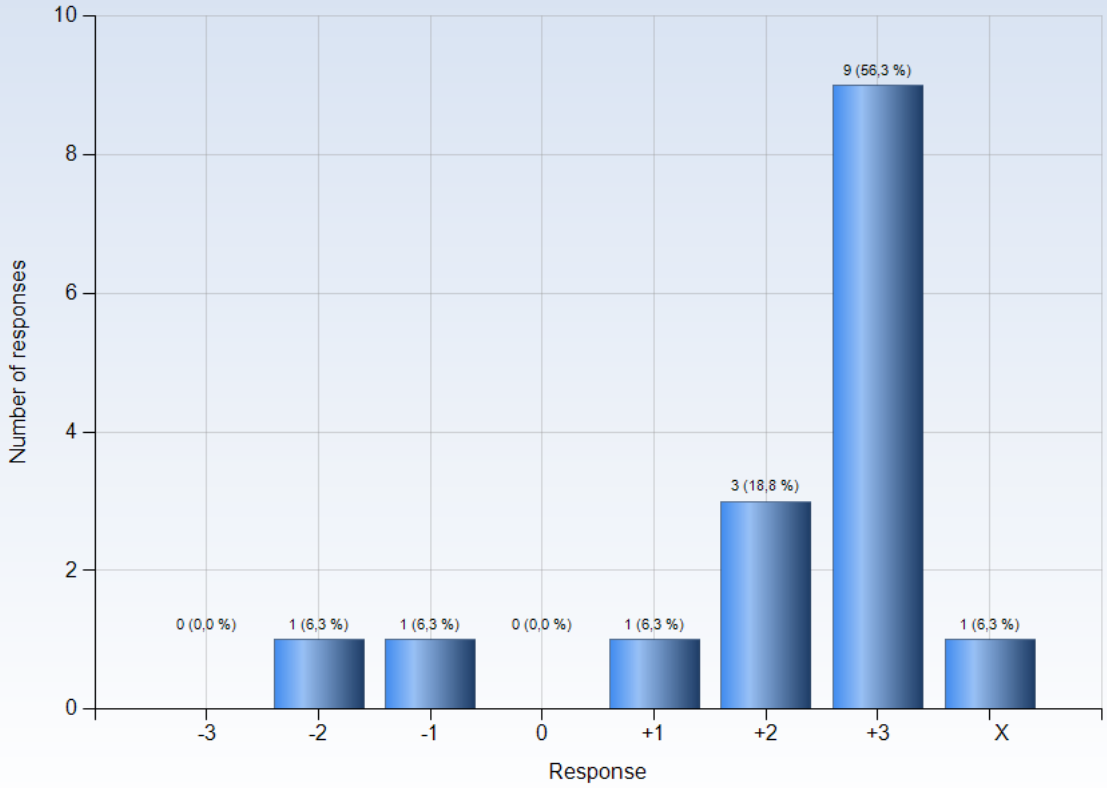


Comments

Comments (My response was: 0)
It was not really prioritized unerstanding the kew concepts.

Comments (My response was: +1)
Yes, but there was IMO a lot of "hand-waving" during the course. Some things were just stated as facts without any motivation/derivation which made some concepts hard to understand.

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



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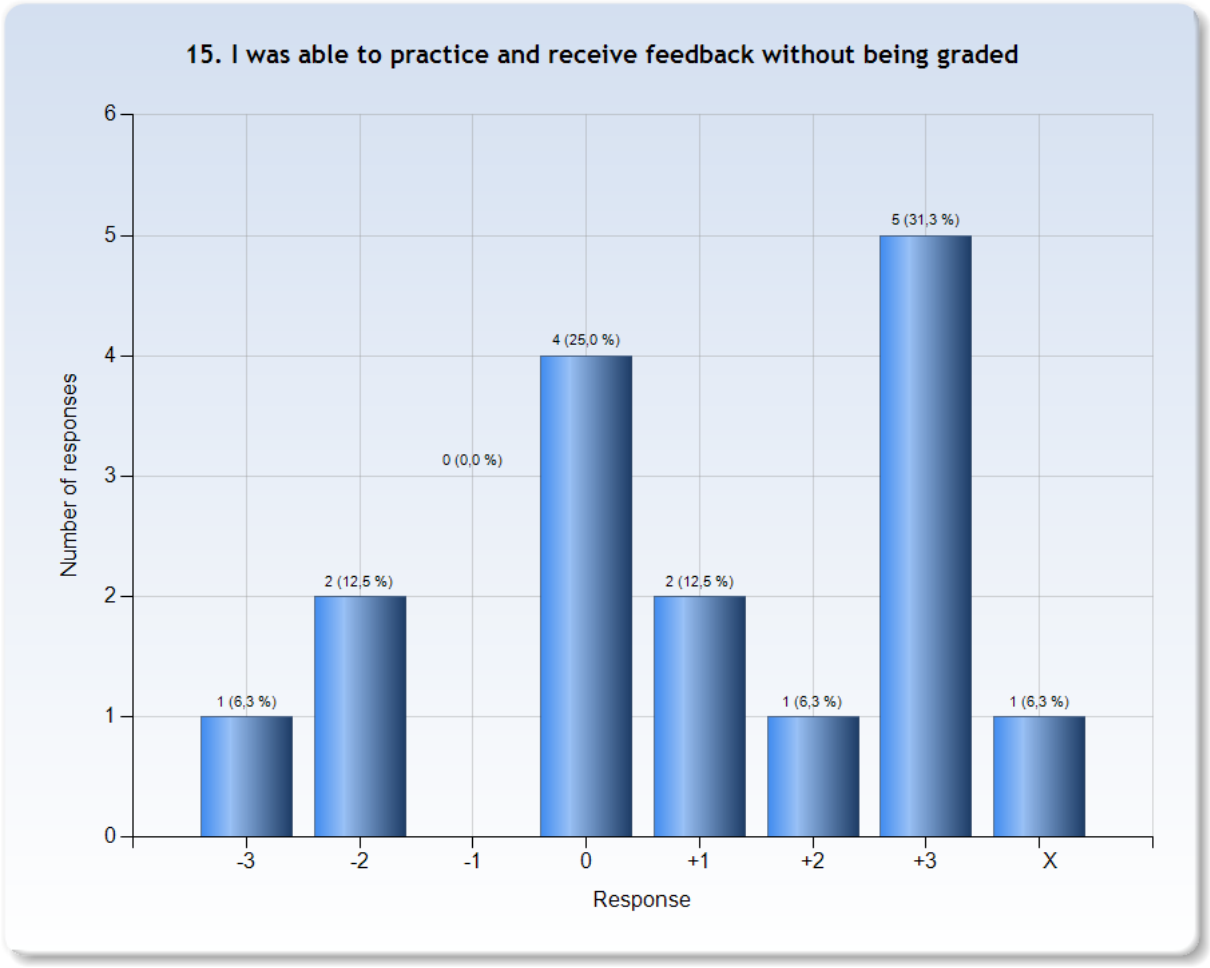
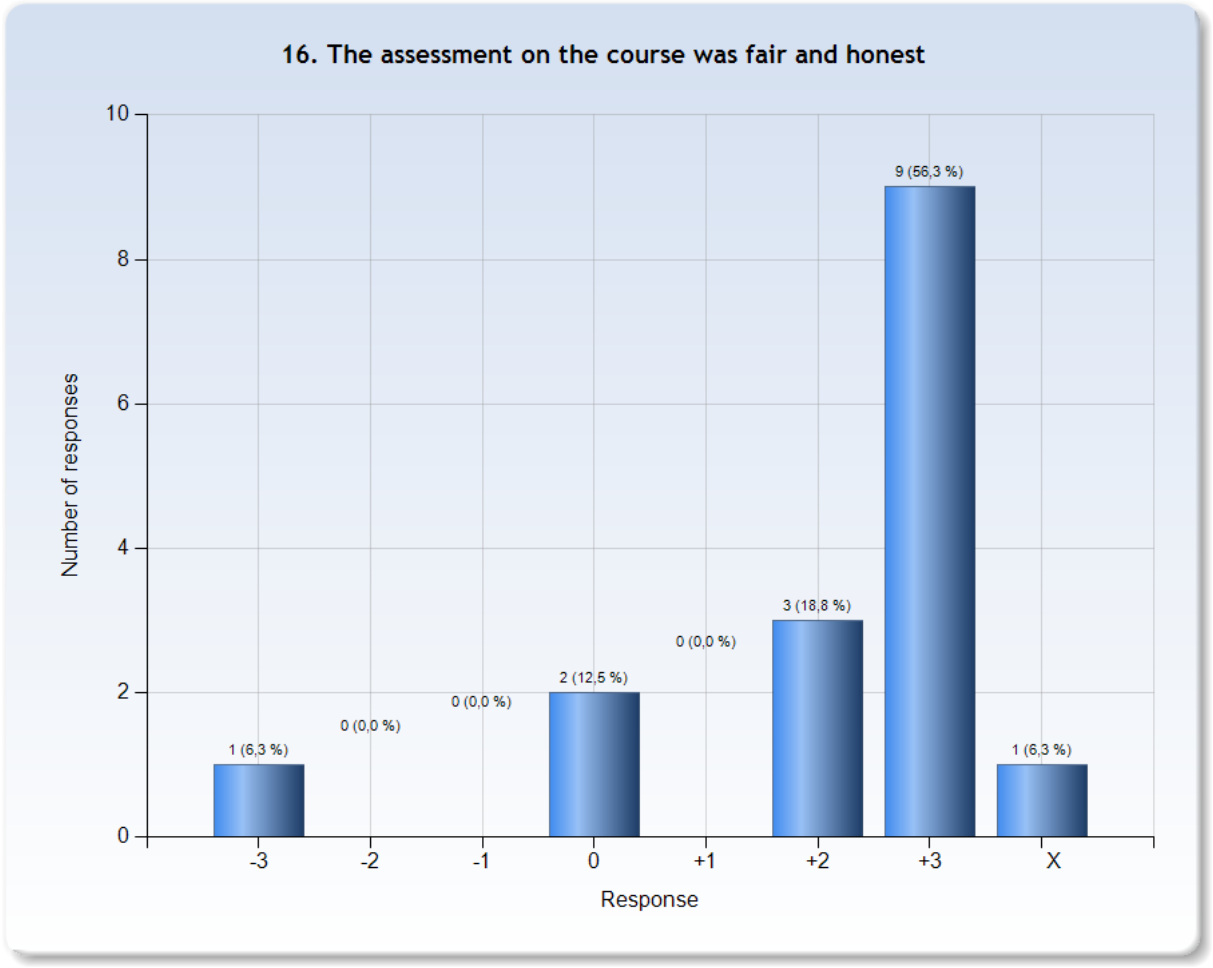

15. I was able to practice and receive feedback without being graded
Number of responses
Response
0
1
2
3
4
5
6
-3
-2
-1
0
+1
+2
+3
X
1 (6,3 %)
2 (12,5 %)
0 (0,0 %)
4 (25,0 %)
2 (12,5 %)
1 (6,3 %)
5 (31,3 %)
1 (6,3 %)

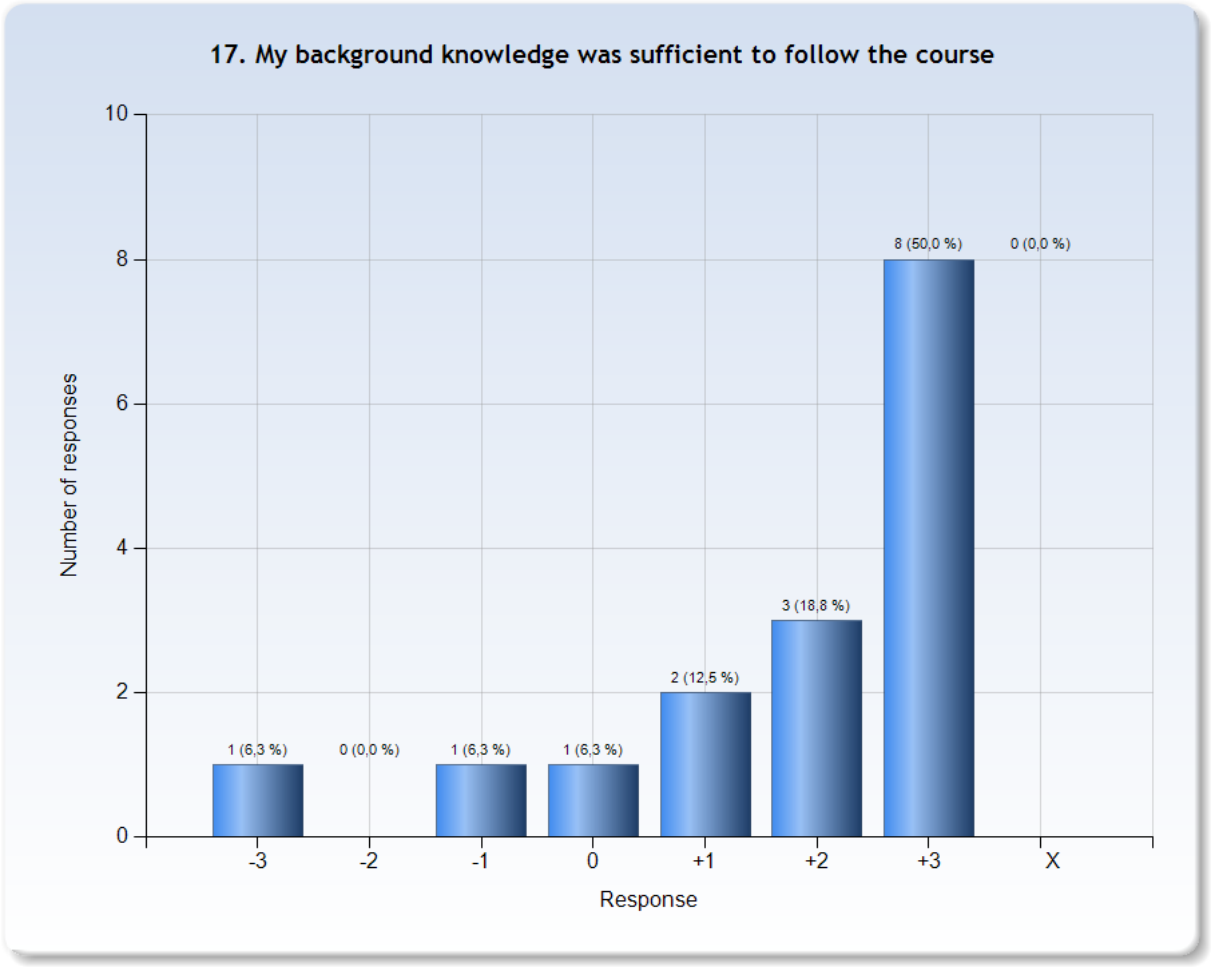
Comments



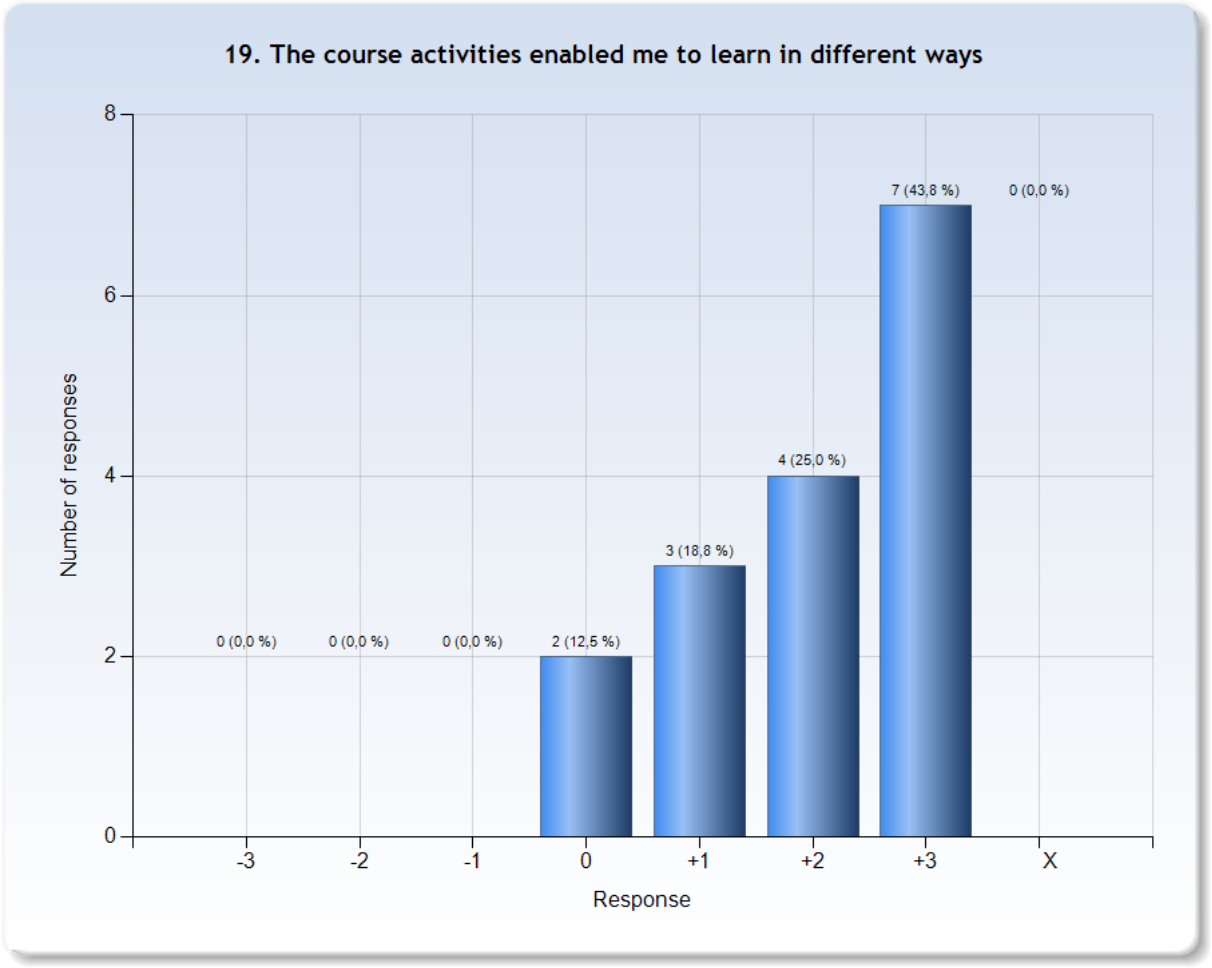
Comments

Comments (My response was: -3)

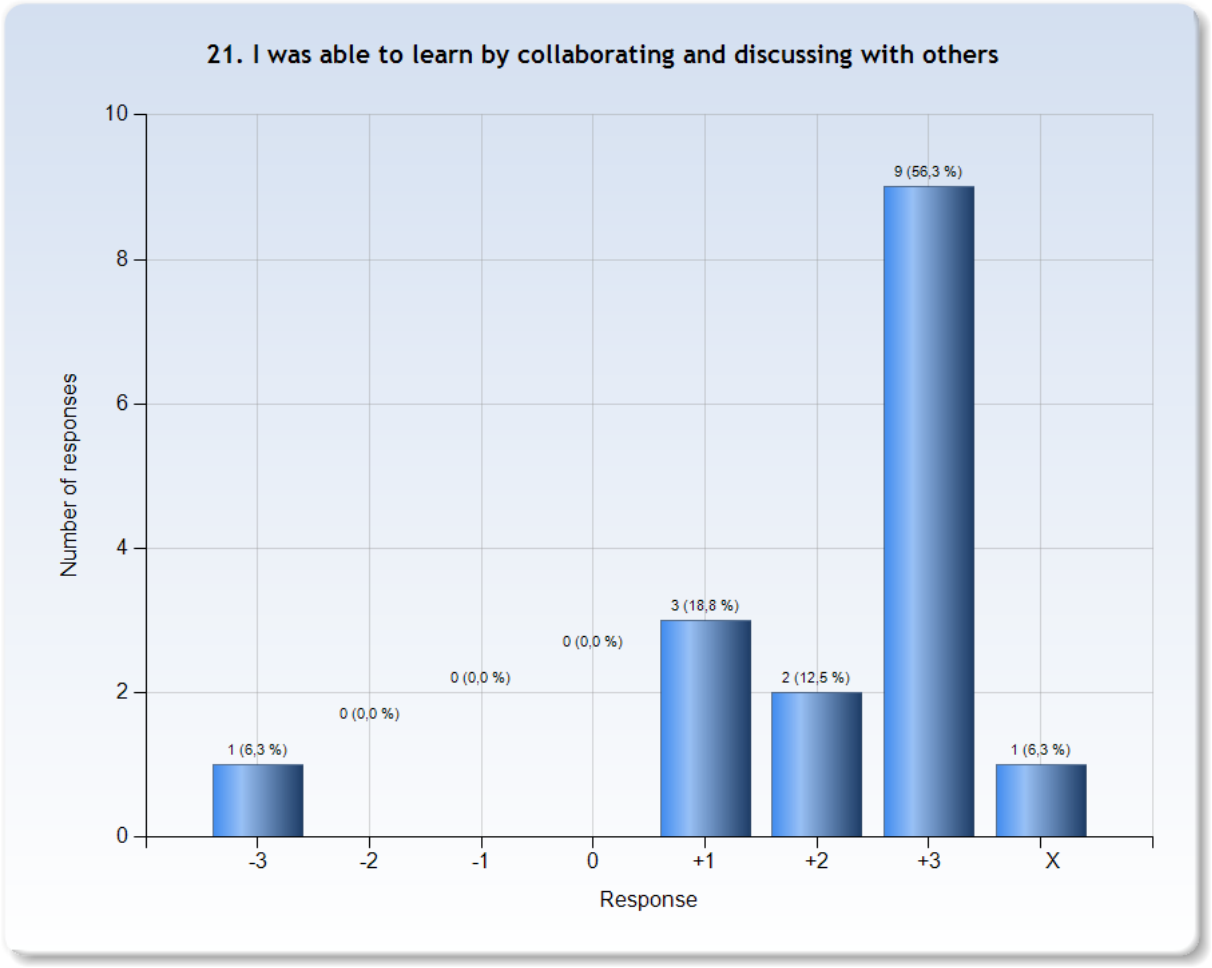
The exam was effectively a test of memorisation. Perhaps it is because of the nature of the subject, but in general, it is not really straightforward or necessarily possible for us as students to work toward a solution from first principles/ some general rules, at least in the timeframe for the exam.


17. My background knowledge was sufficient to follow the course
Number of responses
10
8
6
4
2
0
1 (6,3 %)
0 (0,0 %)
1 (6,3 %)
1 (6,3 %)
2 (12,5 %)
3 (18,8 %)
8 (50,0 %)
0 (0,0 %)
-3
-2
-1
0
+1
+2
+3
X
Response

Comments

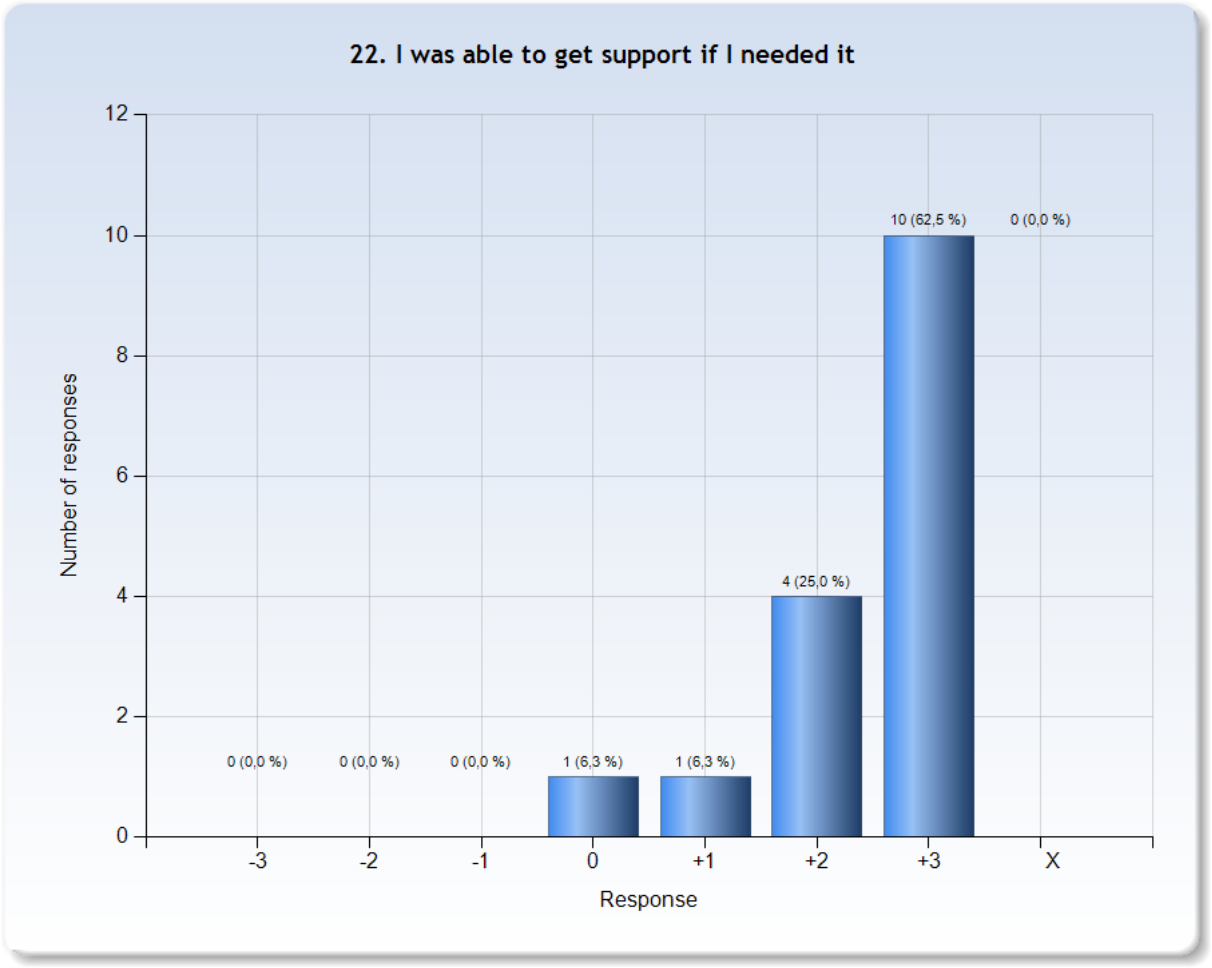

19. The course activities enabled me to learn in different ways
Number of responses
Response
0
2
4
6
8
-3
-2
-1
0
+1
+2
+3
X
0 (0,0 %)
0 (0,0 %)
0 (0,0 %)
2 (12,5 %)
3 (18,8 %)
4 (25,0 %)
7 (43,8 %)
0 (0,0 %)

Comments



Comments

Comments (My response was: -3)
Didn't really have that opportunity since I took the course by myself. (Not a masters/PhD student)



Comments

Comments (My response was: +3)
The teachers were helpful and responding.
Suggestion: TA need to go to Canvas discussion and answer questions from students