

Report - SG2212 - 2018-03-26

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):

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 (approximately 3x2 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 (focussing 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 30 h per week, however the average is around 15h per week. Subtracting on average 6 hours for the actual lectures give around 8-10 hours of self-study and homeworks. As the students also comment, this is quite much, but still the students appreciate the breadth of material we go through. Students comment that the course could be given over two periods which however is difficult within the programme.

Even with the time consumption, the homeworks/project and the breadth of the course are consistently mentioned as positive aspects.

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 consistent with the previous years, and are in general very good. It is clear that putting effort into the course leads to a good grade, which means that the examination is well adapted to the contents. Therefore, there is about a fifth of the course who could achieve an A grade.



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 structure and the content. The atmosphere is quoted as open, and the teachers as helpful. The exercises were

also considered important and good, whereas some comments on the preparation during the exercise sessions were raised, namely being short and potentially not as helpful.

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 not useful. This is certainly a valid point, and should be changed for future editions

The students also realise that one should be on top of the content right from the beginning, this is the most quoted answer when asked about advice for future students

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?

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 also mentioned that a certain reorganisation of the course is adequate, including a reduction of the first lectures on basic fluid dynamics.

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 focus on better prepared exercise sessions. On the medium term we would like to build up a better course compendium. Potential restructuring of the course, removing some of the initial parts, so that there is more room for specifics of CFD.

OTHER INFORMATION

Is there anything else you would like to add?

approximately 40% of the students answered, which is more than for other courses. Also, the feedback is quite consistent, therefore we could get a quite good picture.

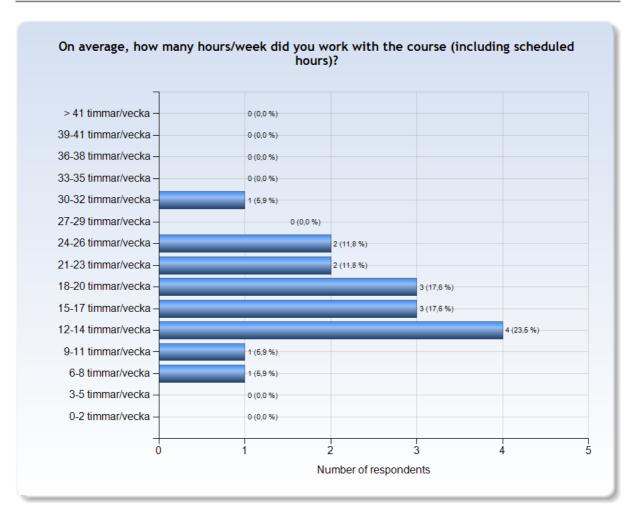


SG2212 - 2018-03-09

Antal respondenter: 43 Antal svar: 17 Svarsfrekvens: 39,53 %



ESTIMATED WORKLOAD



Comments

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

This should have been slightly longer, but unfortunately I had several clashes with other courses this term.

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

The project included a lot of work done in comparison to other courses

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

Could only attend approx half of the lectures, but assignments were a solid 10-15 hours/week, at least.

Comments (I worked: 24-26 timmar/vecka)

This was a very timeconsuming course an I didn't feel lika I hade the time to do anything properly if I where to have time for my other courses.

Comments (I worked: 30-32 timmar/vecka)

It took the majority of the week. Especially because one was unable to find sufficient information for the questions asked in the homework in the lecture scripts. 30% of each homework was research in external sources



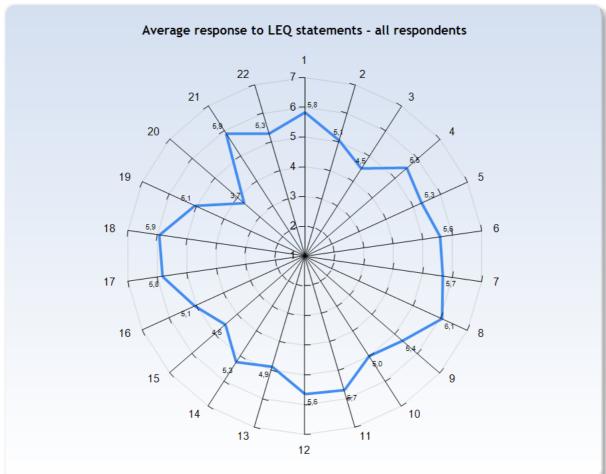
LEARNING EXPERIENCE

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 v3.1.3

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. I understood how the course was organized and what I was expected to do (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 (I)

Variation and choices

- 19. I was able to learn in a way that suited me (m)
- 20. I had opportunities to choose what to do (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, intriguing or important
- b) We can speculate, try out 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 yet supportive environment
- d) We feel that we are part of a community and believe that other people have faith 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 sufficient background knowledge to manage the present learning situation
- g) We can learn inductively by moving from specific examples and experiences to general principles, rather than the other way around
- h) We are challenged to develop a proper understanding of key concepts and successively create a coherent whole of the content
- i) We believe that the work we are expected to do will help us to reach the intended learning outcomes
- j) We can try, fail, and receive feedback in advance of and separate from any summative judgment of our efforts
- k) We believe that our work will be considered fairly and honestly
- I) We have sufficient time to learn and devote the time necessary to do so



- m) We believe that we are in control of our own learning, not manipulated
- n) We can work collaboratively 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.

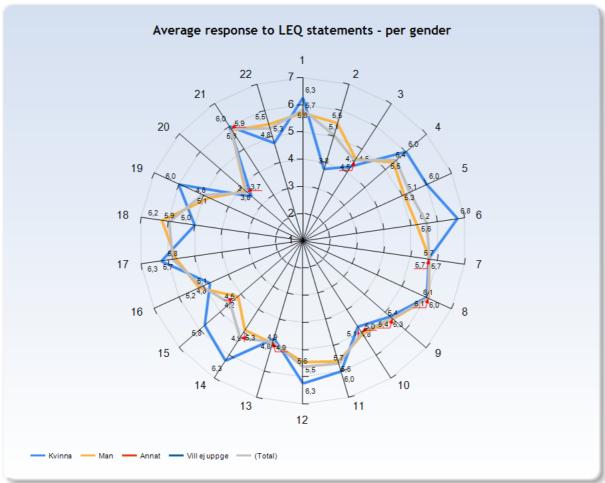
Biggs J. & Tang, C. (2011). *Teaching for Quality Learning at University*, Chapter 6, pp. 95-110. Maidenhead: McGraw Hill.

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.

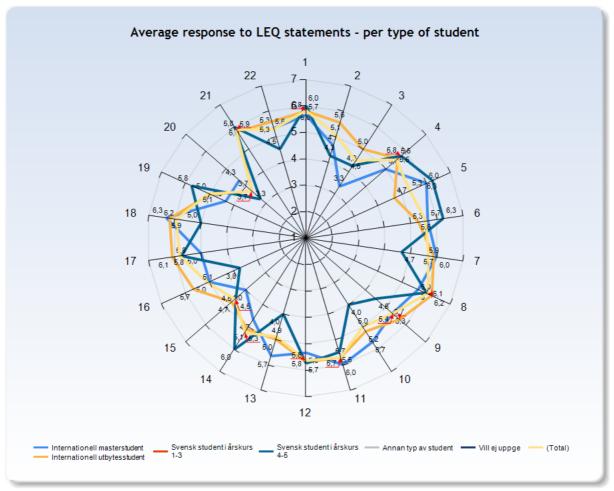
Ramsden, P. (2003). *Learning to Teach in Higher Education*, Chapter 6, pp. 84-105. New York: RoutledgeFalmer.





Comments





Comments (I am: Internationell utbytesstudent)

Bachelor in engineering physics from Technical University of Berlin, third year.



GENERAL QUESTIONS

What was the best aspect of the course?

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

The range of topics covered spanned a range of topics from both fluid dynamics and numerical computing, with clear ways to apply some knowledge outside of the field of computational fluids.

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

The homework was pretty good.

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

Really great course ,very stimulating and dealing with interesting stuff.

That is a tough question, everything was okay and nothing really popped out. But if you ask me, maybe the project.

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

The interactivity: learning something on a lecture, and then working with it in the assignments. Kudos to Philipp for engaging and informative lectures, and to Ardeshir for structured and easy to follow lecture notes.

A very good general introduction to fluid dynamics and to the numerical part. I learned alot about numerics while directly applying it.

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

Homework are really good to apply aspects seen during the lecture. Homework and lecture are really compatible and this is the best way to learn and integrate the methods.

Interesting subject.

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

The advanced use of matlab

I would say the projet, because it allows us to really understand how a CFD code is working

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

The atmosphere was quite open and the teachers were very helpful. Also, the course was very well organised.

I think the subject is really interesting and useful.

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

It was challenging, no doubt. Getting into the concepts of discretization was interesting



What would you suggest to improve?

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

The marking of the homeworks often had very little useful feedback, and it was unclear how the final mark was determined in a lot of cases. In some cases when something was marked as wrong, it was unclear why it was wrong, or even if it was wrong.

In addition, having past exam papers with some worked solutions would have helped a lot with revision, not just for revising the content but also making sure I wasn't making mistakes and practicing time management in the exam.

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

The project. Having to do it after an exam was exhausting and stressful. Also, theory questions should have been up from the start.

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

Maybe to have more computer practice

Please go over the codes we should implement and complete by ourself. Parts of it where horribly written, also for me with a lot of knowledge in solving PDEs, I already knew a lot of that but in a different way, so that actually a lot of your information confused me. For example the classifications of PDEs were done in a weird way. I received feedback that several people did not understand that.

Also some of the questions had strange parts, which I was not able to solve, even though I attended most of the lectures.

Another thing: please please don't just read from the scripts! Sometimes it felt very exhausting because everthing done was written exactly like that in the script.

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

Maybe change the format of the exam, which only test your ability to lear the course by heart.

Grading of home assignments, also the hour of overview of the previous assignment feels rather wasted. Preferably, make this into a workshop with help readily available for the current assignment instead.

Take less time trying to write down the whole skript on the board, but rather discuss the important fundaments behind it (ex. finite volume).

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

Maybe the homework sessions. I sometimes have the feeling that the sessions are too short and not helpful. Usually we correct the last homework but we don't go further in the physics explantation of some aspects. I think the most difficulty is to give a explanation of what you see when you plot something and we didn't talk too much about that. We stay at the essential.

More available examples of solutions, maybe a pdf with some selected problems and solutions would be good.

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

Some parts in my opinion are too advanced and not really useful for a course of computational fluid dynamics. It sometimes seemed a course of mathematics

Improve exchanges between students for the homeworks, I learnt better and faster when exchanging with students

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

The home assignments was a good way to learn but having 5 compulsary assignments, one exam and one project in the same course is extreamly stressfull and prevents you to be able to get any indepth knowledge since all time goes to trying to get everythin done in time. Having the assignemnt and the project only or just the assignments and the exam would ahve felt more reasonable. I also would ahve liked some time where we could get help and ask questions abut the assignments apart from the lectures. for example having an exercise session or a lab session.

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

Please explain what you are doing on the blackboard in more than one sentence. The derivation might be interesting but I rather know what i use the things for. Leave the derivation as the homework (with good notes) and explain during the lectures what we're working on.



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)

Try to start on the homework as soon as it becomes available. There are a lot of homework tasks which are manageable on their own, but can become stressful when combined with other deadlines, particularly if they are sent back for correction.

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

Get working on the theory questions early on.

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

Start study since the beggining and do all the homework.

The questions where a good preparation for the exam, you should focus on solving them to study for it.

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

Start preparing the exam in advance: you need to know the whole course by heart.

Focus on the assignments, you learn a lot from them. Start with the study questions early (at least a few weeks before the exam).

It is very important to work together with multiple people.

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

Attend to the lectures, try to make the homework seriously and take your time. Group work is useful also.

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

Work hard because the course is not easy at all

Be prepared to spend time on the homeworks

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

Not to leave anything for the last minute and ask if they need help.

What advice would you like to give to future participants? (I worked: 30-32 timmar/vecka)

Ask right away if you don't understand anything. Don't worry about being the only one that don't understands. In the retrospective, it turned it that you are at least 30%

Is there anything else you would like to add?

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

A lot of knowledge in a short period of time. Even though you could do some things better, I still enjoyed it because I really look forward to do more in CFD.

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

Is there anything else you would like to add? (I worked: 30-32 timmar/vecka)

It's a interesting course that works with a tough subject. Maybe try to keep people focused by explaining more what is done

SPECIFIC QUESTIONS



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

How many of the lectures and exercises did you attend (in %)?
90%
70%
70% (had a mandatory course colliding once a week)
90%
Approximately 70%
80% due to course colliding with other ones.
100
95%
90%
40%
Ca 50%
90%
100
90%
I miss just one lecture.
90%

Was your background adequate for this course?

Was your background adequate for this course?
I had to review different concepts of mathematics or linear algebra so it was not easy. Anyway, on balance it was adeguate
No. But that's my fault
yes, it is only necessary to have previous knowledge in Aerodynamics
Yes (TTMAM)
yes
Yes
Yes
Introduction & Applied numerical methods. Numerical linear algebra (Large scale computations for matrices).
Introduction to fluid mechanics.
Numerical solutions to partial differential equations.
yes
Yes.
Yes
no, but that was also the reason I chose the course.
Mostly yes.
Yes

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?

Some parts were perfectly clear and with the right speed even if the concepts were not easy. On the other hand, other parts was explained too fast and some concepts were too advanced and complex and probably not really useful for my future carrer.

High. People coming from more applied fields will have problems

The lectures were well paced, neither too fast nor too slow. The topics were often interesting and approachable.

That was a bit challenging but handled in a good way by the professors.

I think the difficulty can be higher but right now is okey to follow the lessons. For me the first week of introduction could have been neglected. Certain parts of the course are taught too fast, I think about the last part of the course about compact finite differences while for example the beginning of the course about basic fluid mechanics is too long. It would be good to spend more time on difficult aspects

Since I had a lot of backround knowledge in numerics, it was not too hard for me. Different for others though.

It was a difficult course and it was organised in a way to cover every aspect as fast as possible, but that wasn't a problem. Professors would adjust to the speed of the students if needed.

Fast pace, but some recurring elements. Not to fast, but rather engaging and keeping us on our toes.

The difficulty might be okay but the number of assignmets and the ever pressing deadlines was extremelly stressful.

I found it somewhat difficult, at least in finding information from lectures/notes.

It was very good for a motivated student.

Perfect in general maybe the beginning you can go faster (most of people have the background) to have the opportunities to talk about interesting subjects at the end of the course.

Not too difficult.



What did you think about the lectures (organisation, explanation, literature)?

What did you think about the lectures (organisation, explanation, literature)?

Not so well explained, see above

The lectures were well-organised, with a clear structure running over their course. They explained the topics covered well, and the literature provided on canvas covered everything clearly as well, while being easy to read.

Lectures were ok.

Good organization, you can expect what to learn before the lesson and it was easy to know the order. Good explanations, it was useful to go to class

As I said, please stop just reading down the script and actually TEACH us stuff. It really helps us students to understand the topics used and lightens up the atmosphere in the lectures.

Very well organised and explained. Professors would encourage students to ask and understand. The given material was adequite.

Pretty okay

see earlier comment.

Good

What did you think about the homework sessions (organisation, explanation, literature)?

What did you think about the homework sessions (organisation, explanation, literature)?

Homework correction after the assessment was very boring. If we have already done the homework is not necessary to explain everything so slowly. Maybe it would have been better to explain more the future homework instead of focusing so much on the past one. Moreover, I asked several times to have corrected the homework with also comments on WHAT I DID WRONG. To learn by your mistakes you have to understand where they are. It was not done at all and I also got 80-90% without understanding what I did wrong Good in general.

The homework sessions were reasonably well organised, and covered most questions about the homework. However, not all questions those attending asked were properly answered, and there was no summary for those who had a clash with another lecture.

ok

Interesting exercises

Homework allowed me to understand many things but the time spent on the homework is too long. It took lots of my time during the week end and I think I could have saved more time with maybe a bit shorter homework and more interaction with all the students.

Some tasks have to be reworked in my opinion. Also some tasks were not really related to the things dealt with in the courses at all (machine accuracy). Also the short part about unstructered grids was good, but too packed in the end, I wasn't able to fully understand it, even though it is a very very important issue.

Very well organised and explained.

I would have liked the homework sessions to be before the homework was due instead so we could ask questons and get help with the homeworks since they sometmes contained elements which had not been explained during the lectures.

Good for learning.

it would be helpful to discuss an example of the homework before we do it, since sometimes one has never seen anything like it before. I talked about this above.

What did you think about the project (organisation, explanation, literature)?

What did you think about the project (organisation, explanation, literature)?

The project was explained properly and it was really interesting!!

The project has been well organised, with clear instructions on what needs to be done, for both PhD and Master students. The literature provides a full description of the problems, with hints for solving, and the classes where questions about the project could be answered were helpful too.

ok

Really important but it would be great if we could have started it some weeks before to have more time.

Putting the project at the end of the period while others courses of P4 are beginning is hard. Maybe replacing the last homework (or the first on basic fluid mechanics) would save time. However, the project is interesting and I liked it.

Okay

Also very well organised and explained.

Well designed and good final assignment.

It was okay, just badly timed.

very well explained, maybe formulate the questions more clearly

Really good way to practise what you learned. Maybe it could be better to not have a template for the code.

Maybe provide more specific guidelines for the report, and some guidelines what gives 10 p etc.



Any specific comments on the teachers and assistants?

Any specific comments on the teachers and assistants?

Both the teachers and assistants have been helpful throughout the run of the course, with clear information about how, where and when to contact them if any questions arise.

Some courses were only rewriting on the board the course available on Canvas and the course became soporific. I preferred when the teacher was using notes but with some others practical remarks or examples out of the written notes.

Work stronger together as a team between teachers and assistants!

I think they are doing a great job. And I liked how the assistants would help us correct our mistakes on the assignments.

I think both the teachers and assistants did a good job.

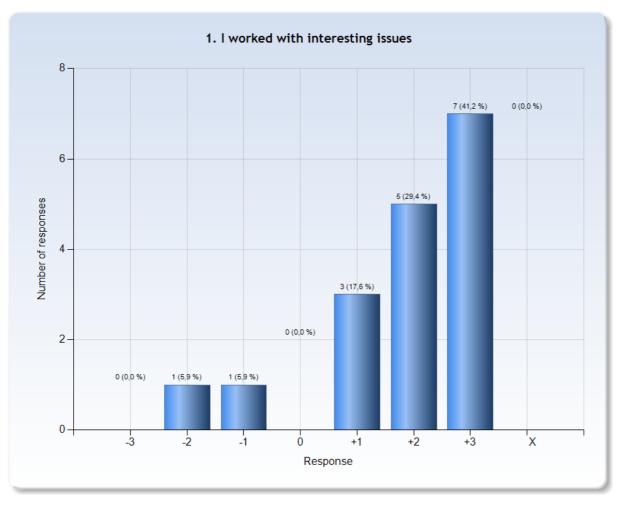


RESPONSE DATA

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

- -3 = No, I strongly disagree with the statement
- 0 = I am neutral to the statement
- +3 = Yes, I strongly agree with the statement

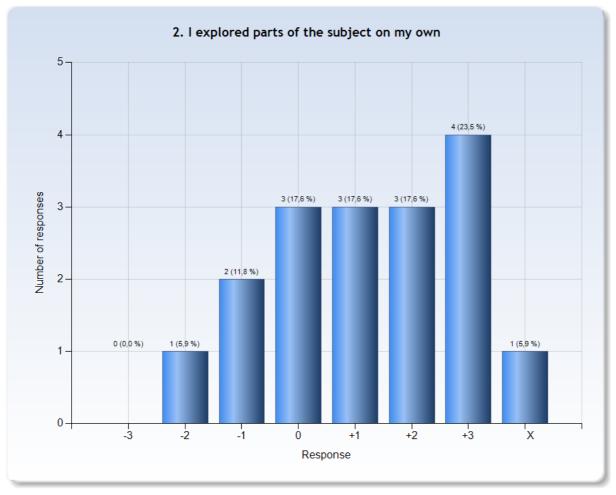
X = I decline to take a position on the statement



Comments

Comments (My response was: -1)
They could have been interesting if one explained what I was actually doing, what it is used for.



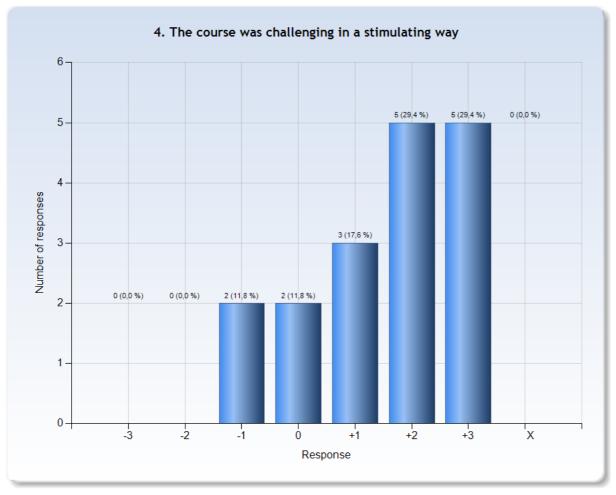


Comments (My response was: +1)
It often felt like the home assignments asked questions about things that we hadn't gone trough or bearly gone through during the lectures.



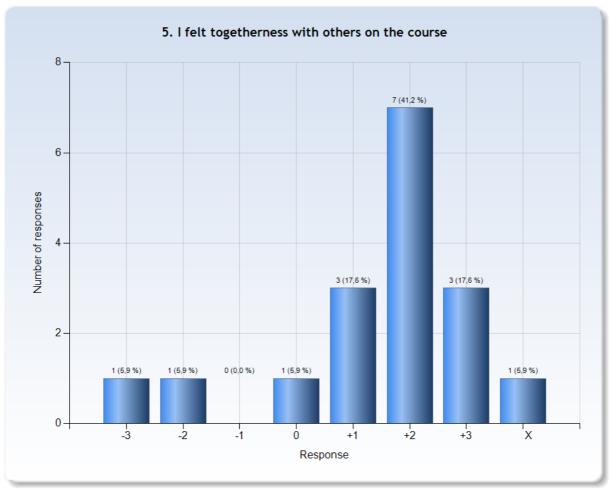






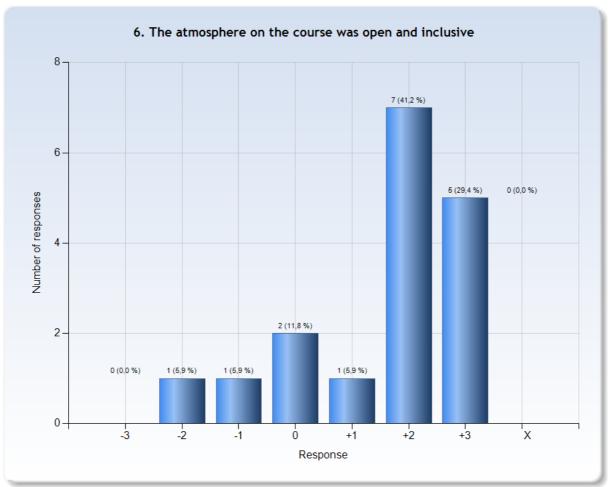
Comments (My response was: -1)
Challenging yes, but I was so overwhelmed by information sometimes, that I rather memorized then understood



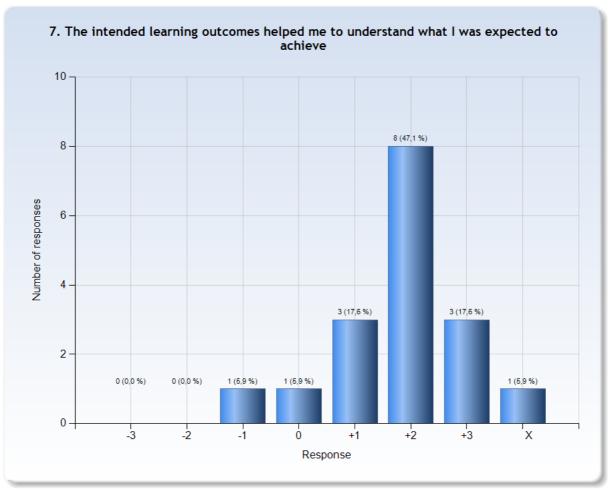


Comments





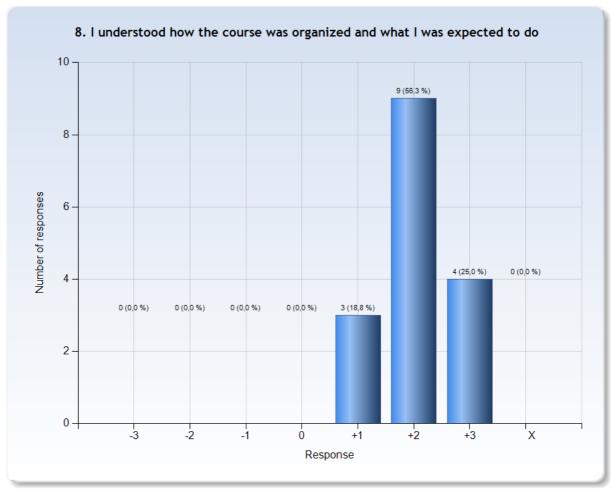




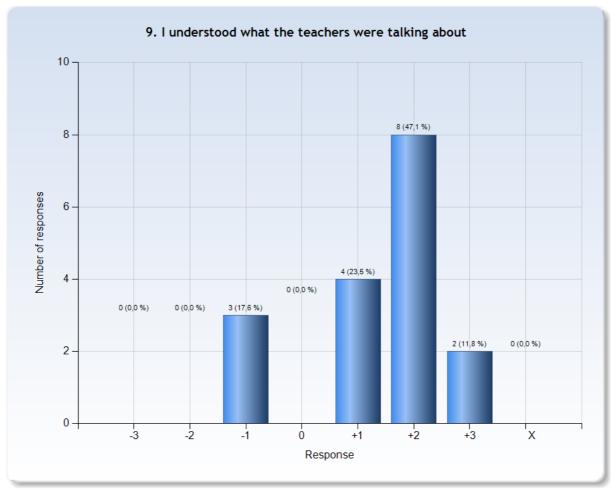
Comments (My response was: -1)

The goals for the course could be more clearly sated becaouse now it was hard to know which parts were the most important ones.



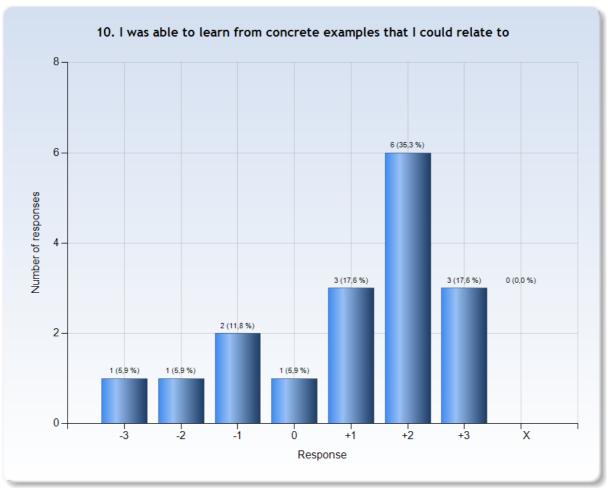






Comments (My response was: -1)
Not always, I felt it could get quite confusing at times



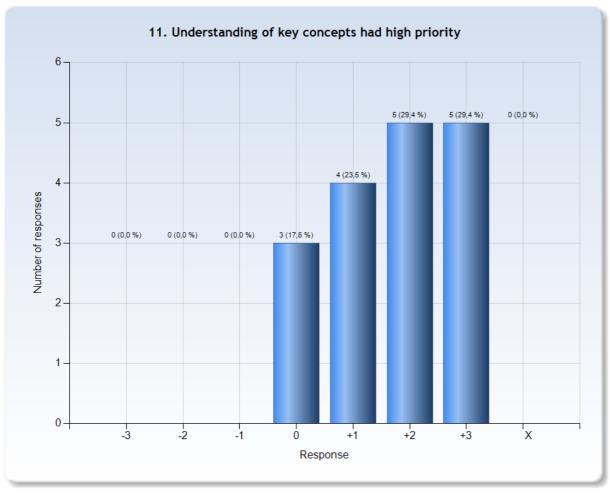


Comments (My response was: -1) Too few examples

Comments (My response was: 0)
Yes and no. Yes because I could work on the CFD code and no because that codes where a small part of the lecture

Comments (My response was: +1)
very few examples, maybe refer to examples in the literture, for interested students

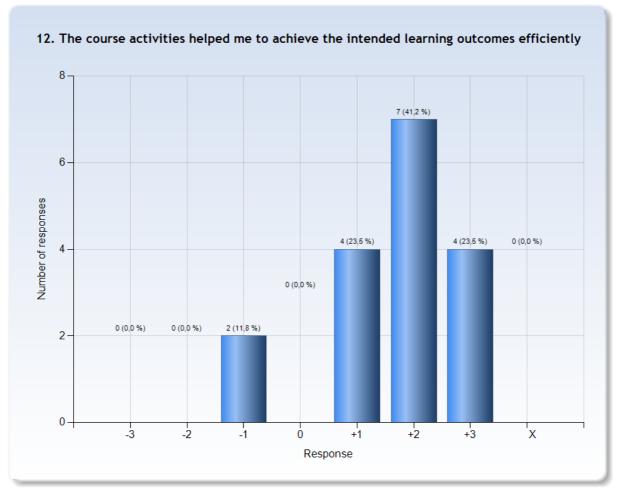




Comments (My response was: 0)
It's still a bit unclear for me what the key conceps were.

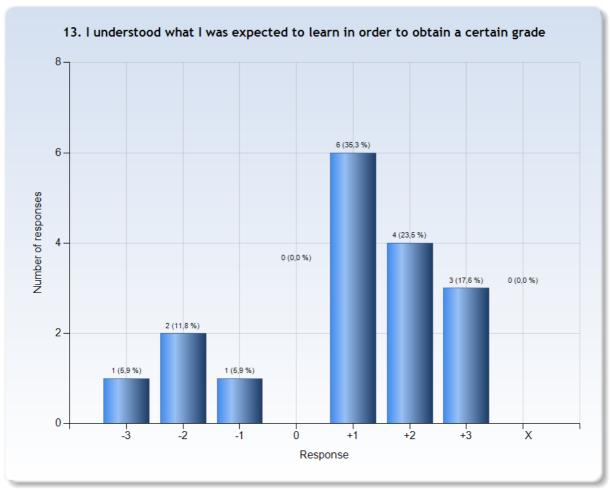
Comments (My response was: +1)
Yes, somehow. But it took time to figure out what these concepts where





(My response was: -1)
I think i would have benefited allot from proper notes, that would especially give descriptions of what has been done and why



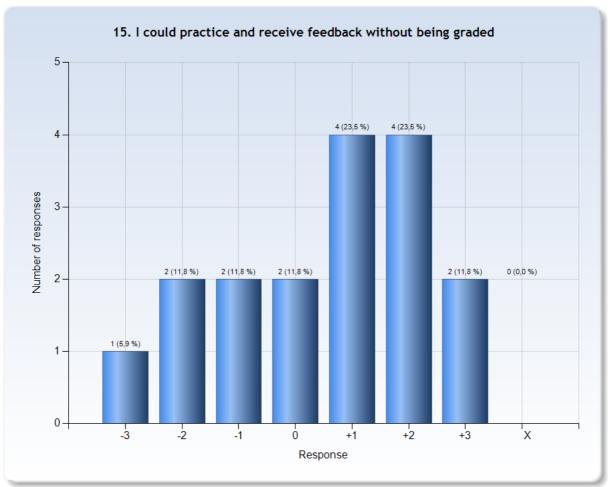


Comments (My response was: -2)
This was very unclear. I know the points required but not what kind of knowledge the different grades correspond to.

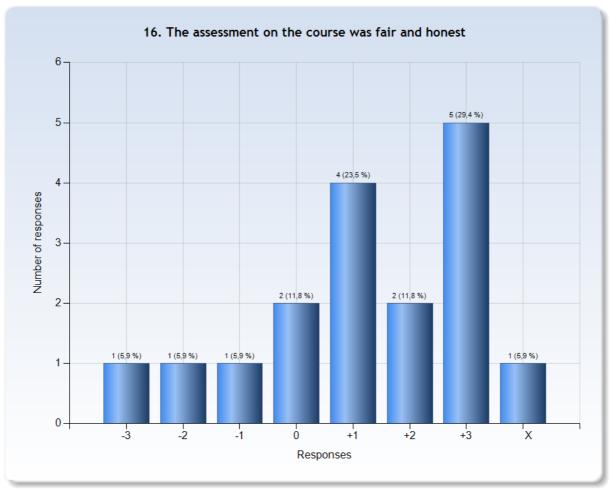










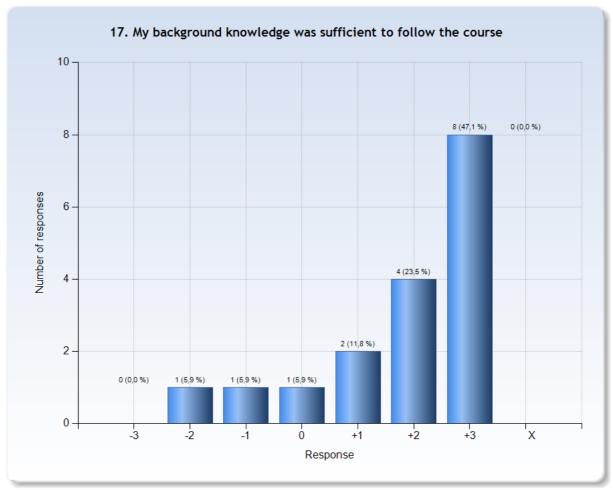


Comments (My response was: -3)

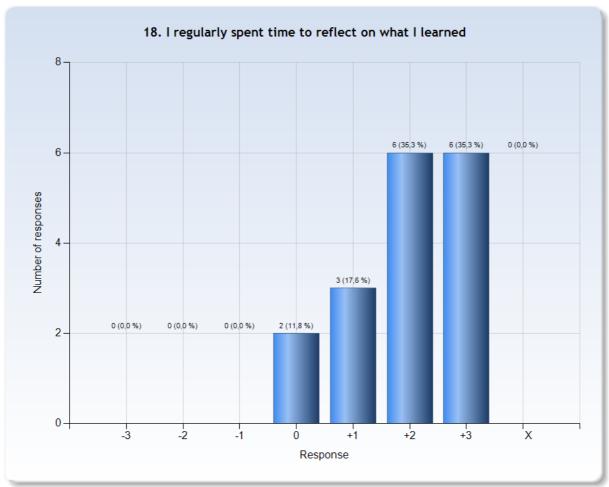
The "grading" of the home assignments varied greatly from student to student. Results, presented in what seemed to be identical or near identical ways, could have as much as 20 or 30 points difference in grading, without explanation enough that we understood why. The grading felt arbitrary at best, and the assistants likely need much stronger directives and possibly supervision to ensure a fair treatment. Luckily, the assignments do not affect the grade of the course.

Comments (My response was: -2)
Way to hart for people without backround knowledge in Numerics

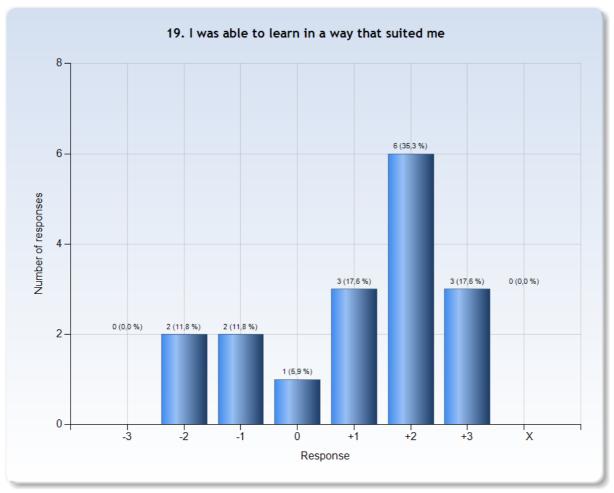






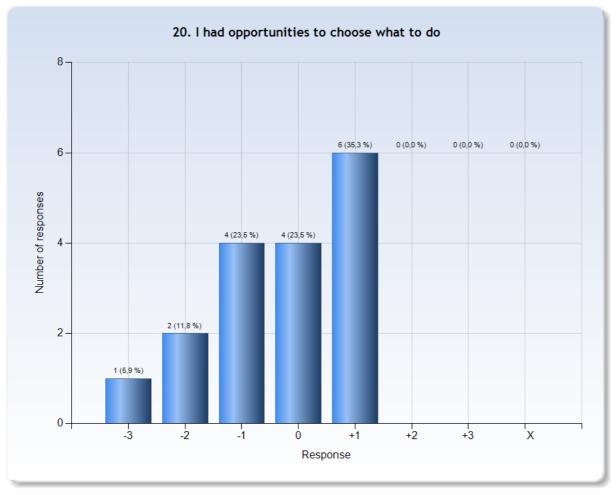






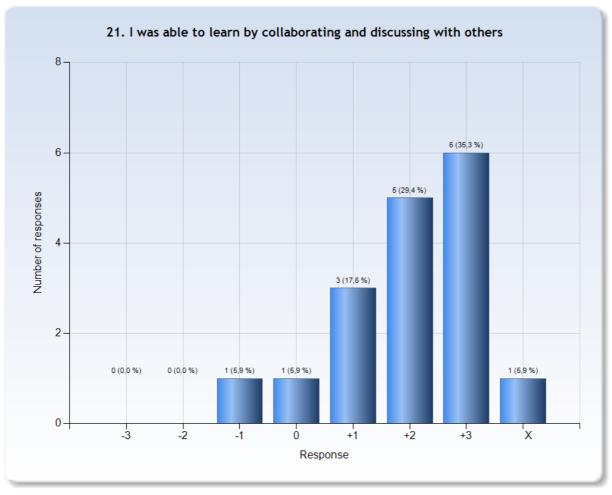
Comments (My response was: -1)
I learn better if I know what things are used for then if I know how there are derived. The derivation I find in the books





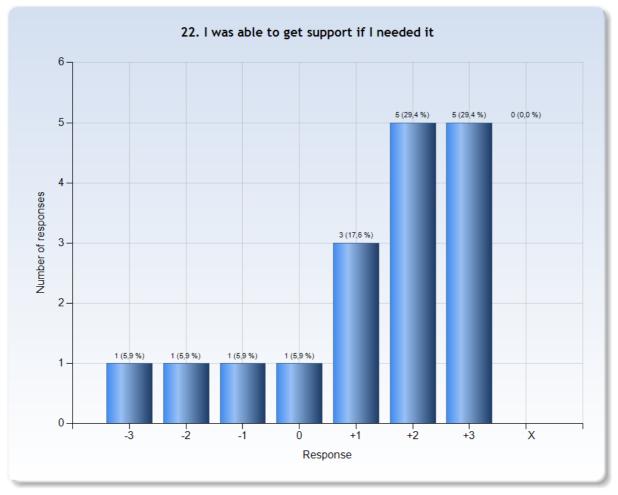
Comments (My response was: 0)
I don't really understand the question. But in this course I think we are mostly supervise without having opportunity of what to do.





Comments (My response was: X)
I completed the homework tasks on my own, due to being limited in when I could meet up with other people on the course by factors outside of this course. As such I cannot comment on the effect of group work.





Comments (My response was: -1)
Some exercises or labs where you could ask questions about the home assignments would have been helpful.