Course evaluation report MATP16 "Partial Differential Equations" spring 2020

Alternative course code: FMA145F (PhD course)

Teacher: Erik Wahlén

Number of students: 12 + 1 registered students (one PhD student)

Results (after resit exam): 2 U, 1 G, 4 VG.

Evaluation

I. **Summary of the evaluation**
Number of answers: 5
Brief summary of the results: Since the number of respondents was low, one should be a bit careful drawing any conclusions. There is a big risk that the ones who answered were the ones who followed the course to the end, and that the answers from those who dropped out are missing. The respondents were overall very satisfied (grade 4 out of 4 in response to the statement "The content of the course matched my expectations"). In particular, the respondents thought that the course was well organized, appreciated the seminars and the material and methods that were discussed. They also felt that the move to online teaching went well. They did have some suggestions for how to improve the course in terms of which material is covered and in what order, though.

II. **The teacher's reflections**
I thought that the course went well overall. The transition to online teaching due to Covid-19 was a big challenge. It went well for the students who were already active, but it seems like it might have led to some of the other students giving up or falling behind too much. Unfortunately, they are not really visible in the course evaluation.

III. **Evaluation of changes since the last time the course was given**
The main change was the transition to online teaching due to Covid-19, but that was not planned. Since the last time the course was given (spring 2018) a special exercise session was added. This seems to have been highly appreciated. Moreover, due to scheduling issues, the course was given over the whole semester instead of the second half. Finally, some minor adjustments of the material covered in the course were made.

IV. **Suggested changes for the next time the course is given**
The course syllabus will have to be rewritten and therefore one should think carefully about changes. It would be good to do this in a larger context, also considering other courses. One problem with the course is that there are two categories of students. Students in the first category only have the formal prerequisites and find the course very challenging, whereas students in the other have studied other advanced courses like functional analysis and measure theory and would like to see more material which builds on those courses. Regardless, it might be a good idea to skip the section on distribution theory and instead spend more time on the remaining topics since there is a separate course on distribution theory. It seems to have been a common viewpoint among the students that too much emphasis was put on Chapter 2, which covers a large number of different methods for the three "classical" PDEs (Laplace's equation, the heat equation and

the wave equation). Later in the course, we come back to more general versions of these equations (elliptic, parabolic and hyperbolic). It might be better to focus on one type of equation at a time.

2020-09-17, compiled by Erik Wahlén.

There was unfortunately no student representative to discuss the course evaluation with, but the students were given the opportunity to comment on the analysis and the evaluation results by e-mail.
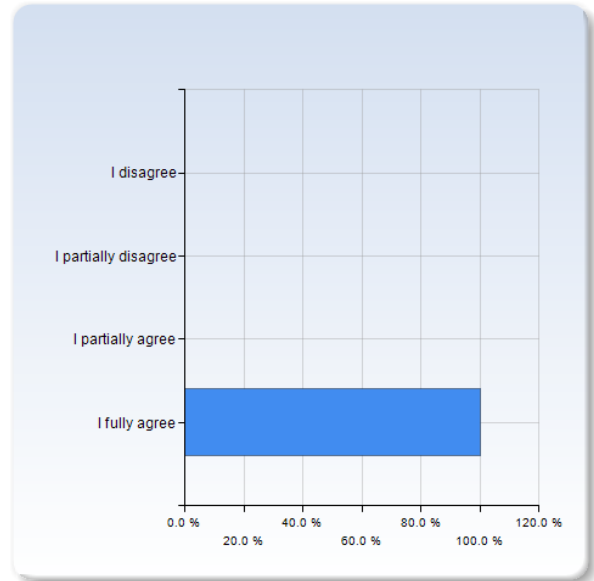
Answer Count: 5

The course in general

The content of the course matched my expectations.

The content of the course matched my expectations.	Number of Responses
I disagree	0 (0.0%)
I partially disagree	0 (0.0%)
I partially agree	0 (0.0%)
I fully agree	5 (100.0%)
Total	5 (100.0%)

	Mean	Standard Deviation
The content of the course matched my expectations.	4.0	0.0

The information about the course (schedule, exam etc.) via Internet has been satisfactory.
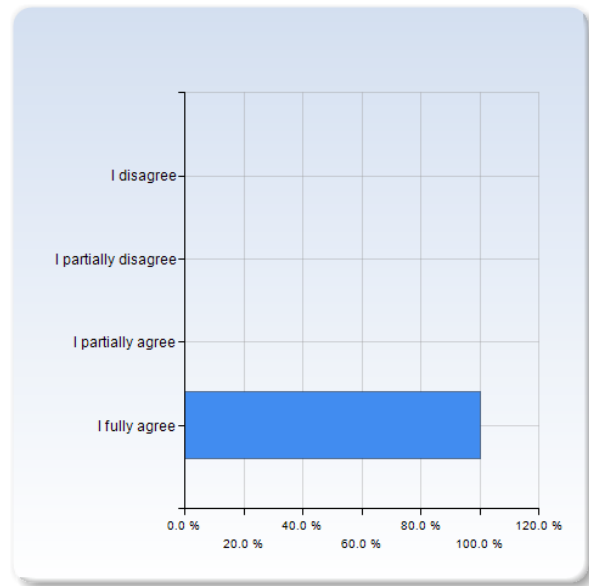
The information about the course (schedule, exam etc.) via Internet has been satisfactory.	Number of Responses
I disagree	0 (0.0%)
I partially disagree	0 (0.0%)
I partially agree	0 (0.0%)
I fully agree	5 (100.0%)
Total	5 (100.0%)

	Mean	Standard Deviation
The information about the course (schedule, exam etc.) via Internet has been satisfactory.	4.0	0.0

The information about the course (schedules, exam etc.) via lectures/and seminars has been satisfactory.

The information about the course (schedules, exam etc.) via lectures/and seminars has been satisfactory.	Number of Responses
I disagree	0 (0.0%)
I partially disagree	0 (0.0%)
I partially agree	0 (0.0%)
I fully agree	5 (100.0%)
Total	5 (100.0%)

	Mean	Standard Deviation
The information about the course (schedules, exam etc.) via lectures/and seminars has been satisfactory.	4.0	0.0

## The course was organized in a satisfactory manner.

The course was organized in a satisfactory manner.	Number of Responses
I disagree	0 (0.0%)
I partially disagree	0 (0.0%)
I partially agree	0 (0.0%)
I fully agree	5 (100.0%)
Total	5 (100.0%)
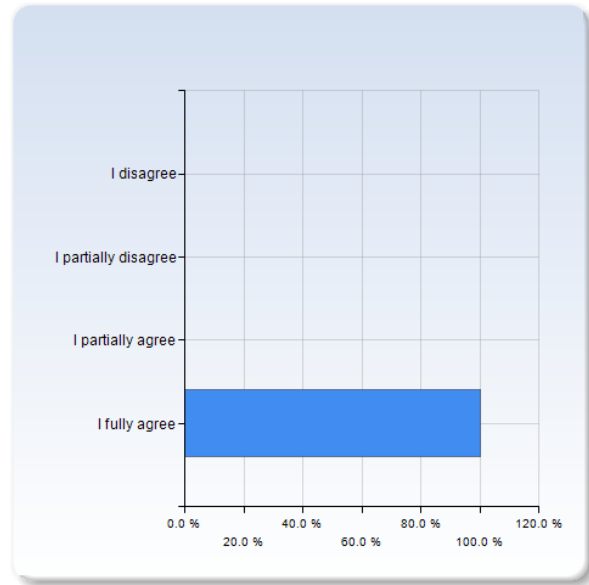
	Mean	Standard Deviation
The course was organized in a satisfactory manner.	4.0	0.0

The course material has been comprehensible.

The course material has been comprehensible.	Number of Responses
I disagree	0 (0.0%)
I partially disagree	0 (0.0%)
I partially agree	0 (0.0%)
I fully agree	5 (100.0%)
Total	5 (100.0%)
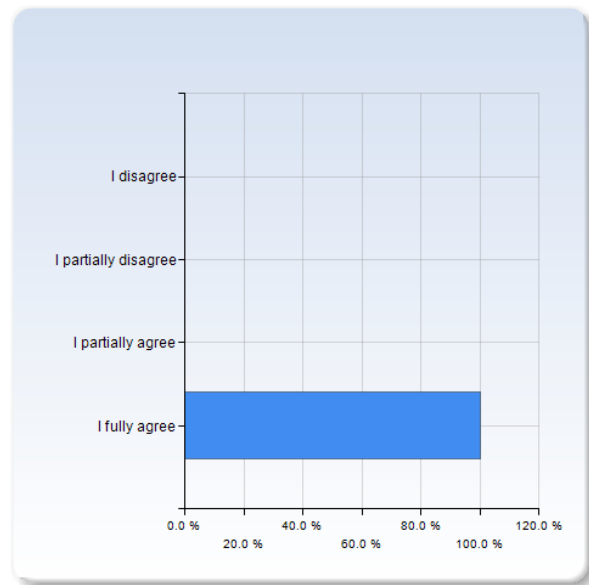
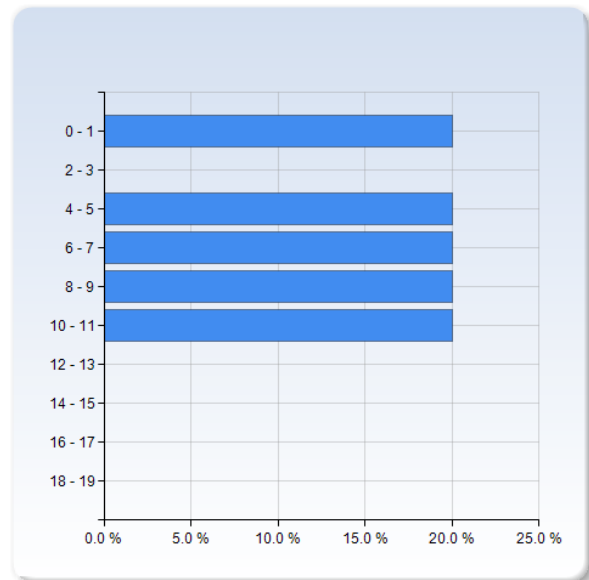|	Mean	Standard Deviation
The course material has been comprehensible.	4.0	0.0

My prior knowledge has been sufficient in order to be able to assimilate the contents of the course.

My prior knowledge has been sufficient in order to be able to assimilate the contents of the course.	Number of Responses
I disagree	0 (0.0%)
I partially disagree	0 (0.0%)
I partially agree	0 (0.0%)
I fully agree	5 (100.0%)
Total	5 (100.0%)

	Mean	Standard Deviation
My prior knowledge has been sufficient in order to be able to assimilate the contents of the course.	4.0	0.0

How many hours per week have you spent on studying for this course, including scheduled hours?

How many hours per week have you spent on studying for this course, including scheduled hours? - From
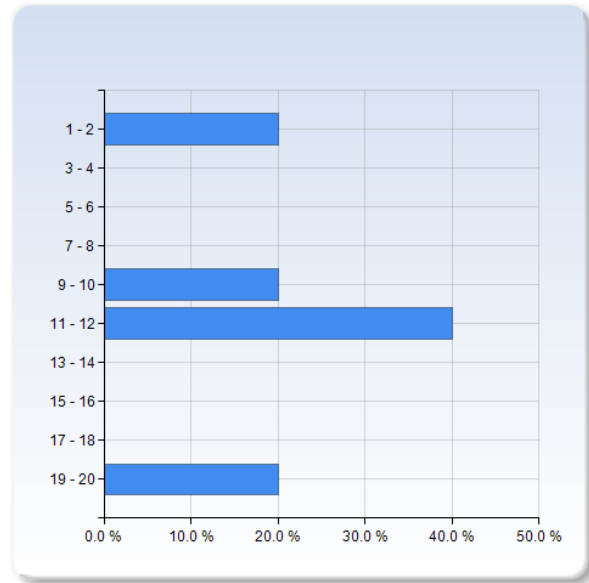
How many hours per week have you spent on studying for this course, including scheduled hours? - From	Number of Responses
0 - 1	1 (20.0%)
2 - 3	0 (0.0%)
4 - 5	1 (20.0%)
6 - 7	1 (20.0%)
8 - 9	1 (20.0%)
10 - 11	1 (20.0%)
12 - 13	0 (0.0%)
14 - 15	0 (0.0%)
16 - 17	0 (0.0%)
18 - 19	0 (0.0%)
Total	5 (100.0%)

	Mean	Standard Deviation
How many hours per week have you spent on studying for this course, including scheduled hours? - From	5.8	3.8

How many hours per week have you spent on studying for this course, including scheduled hours? - To

| How many hours per week have you spent on studying for this course, including scheduled hours? - To	Number of Responses
1 - 2	1 (20.0%)
3 - 4	0 (0.0%)
5 - 6	0 (0.0%)
7 - 8	0 (0.0%)
9 - 10	1 (20.0%)
11 - 12	2 (40.0%)
13 - 14	0 (0.0%)
15 - 16	0 (0.0%)
17 - 18	0 (0.0%)
19 - 20	1 (20.0%)
Total	5 (100.0%)

	Mean	Standard Deviation
How many hours per week have you spent on studying for this course, including scheduled hours? - To	11.0	6.8

Course literature, course material

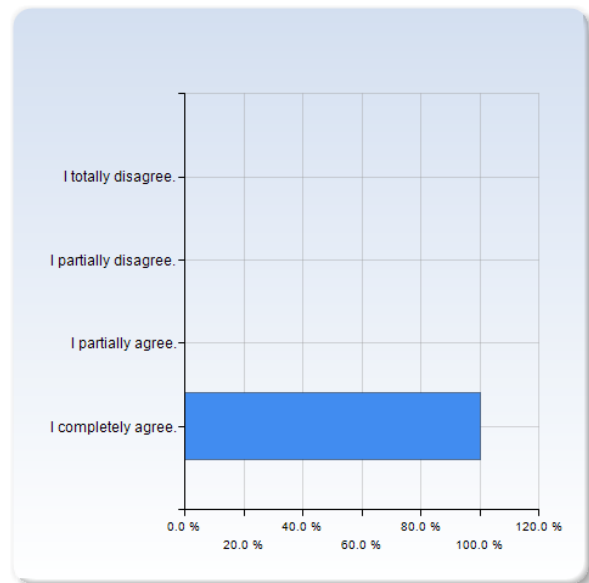## The course literature has been informative and relevant.

The course literature has been informative and relevant.	Number of Responses
I totally disagree.	0 (0.0%)
I partially disagree.	0 (0.0%)
I partially agree.	0 (0.0%)
I completely agree.	5 (100.0%)
Total	5 (100.0%)
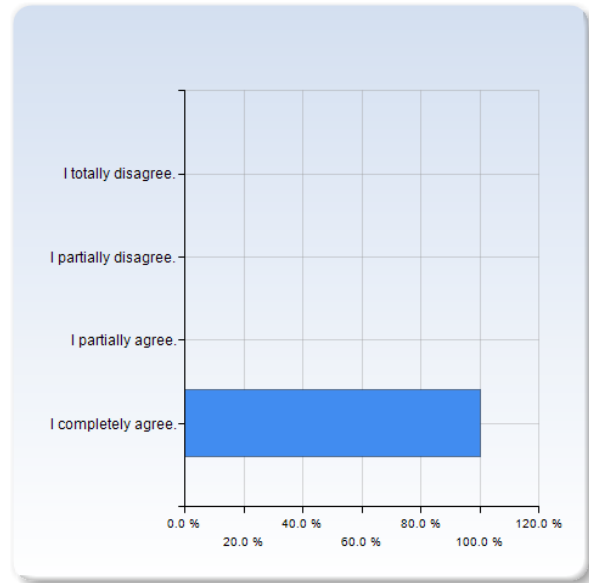
	Mean	Standard Deviation
The course literature has been informative and relevant.	4.0	0.0

I have used the course literature and material extensively.

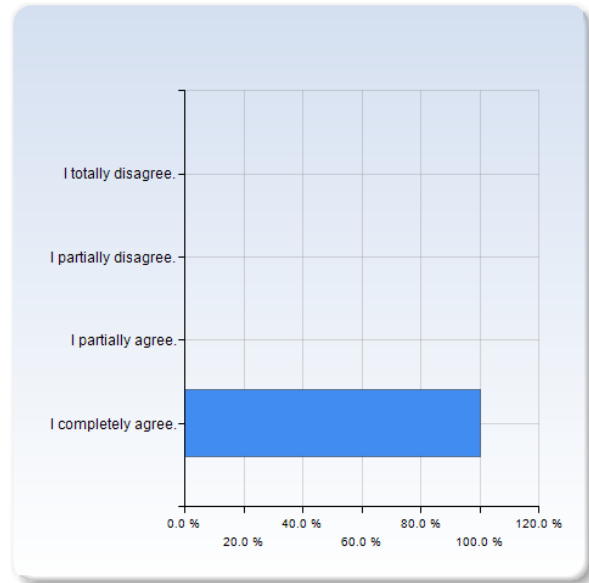| I have used the course literature and material extensively.	Number of Responses
I totally disagree.	0 (0.0%)
I partially disagree.	0 (0.0%)
I partially agree.	0 (0.0%)
I completely agree.	5 (100.0%)
Total	5 (100.0%)

	Mean	Standard Deviation
I have used the course literature and material extensively.	4.0	0.0

The complementary course material has been satisfactory.

| The complementary course material has been satisfactory.	Number of Responses
I totally disagree.	0 (0.0%)
I partially disagree.	0 (0.0%)
I partially agree.	0 (0.0%)
I completely agree.	5 (100.0%)
Total	5 (100.0%)

	Mean	Standard Deviation
The complementary course material has been satisfactory.	4.0	0.0

The course website

The course website was easy to reach and navigate.

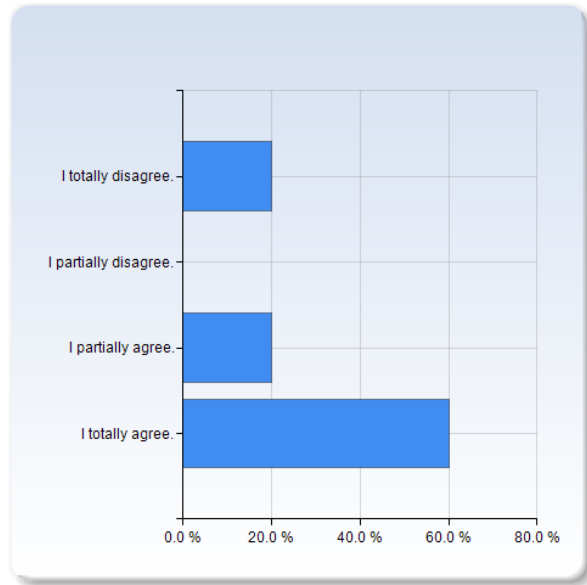| The course website was easy to reach and navigate.	Number of Responses
I totally disagree.	0 (0.0%)
I partially disagree.	0 (0.0%)
I partially agree.	0 (0.0%)
I totally agree.	5 (100.0%)
Total	5 (100.0%)
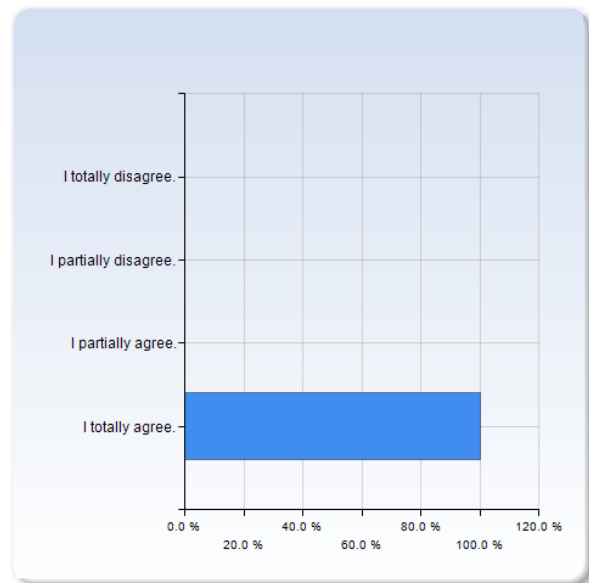
	Mean	Standard Deviation
The course website was easy to reach and navigate.	4.0	0.0

I have used the course website extensively during the course.

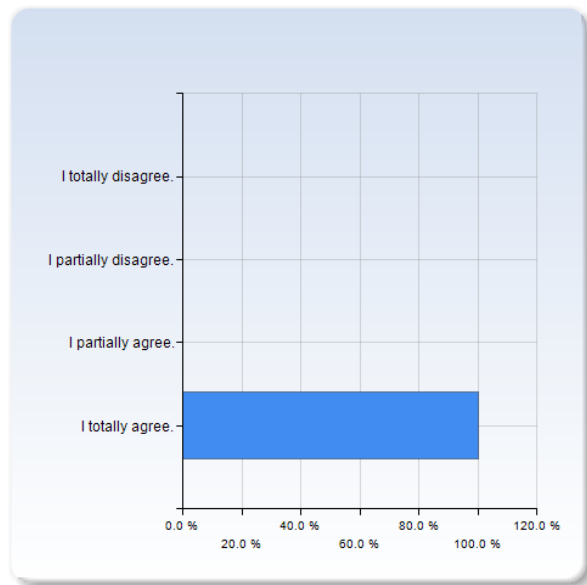| I have used the course website extensively during the course.	Number of Responses
I totally disagree.	1 (20.0%)
I partially disagree.	0 (0.0%)
I partially agree.	1 (20.0%)
I totally agree.	3 (60.0%)
Total	5 (100.0%)

	Mean	Standard Deviation
I have used the course website extensively during the course.	3.2	1.3

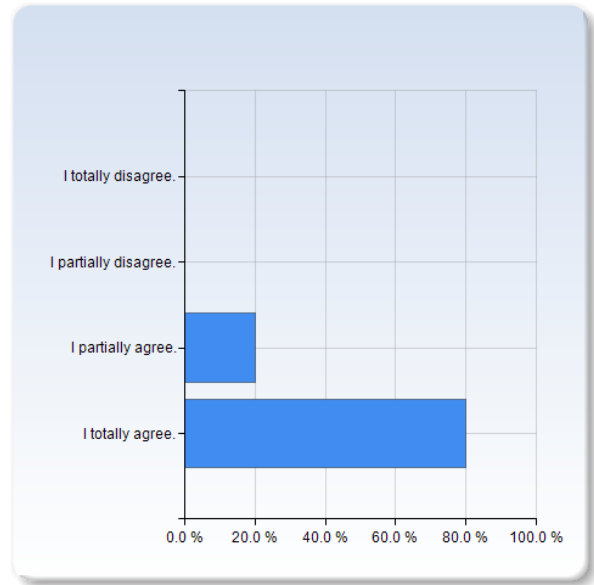## The information posted on the course website has been satisfactory.

The information posted on the course website has been satisfactory.	Number of Responses
I totally disagree.	0 (0.0%)
I partially disagree.	0 (0.0%)
I partially agree.	0 (0.0%)
I totally agree.	5 (100.0%)
Total	5 (100.0%)

	Mean	Standard Deviation
The information posted on the course website has been satisfactory.	4.0	0.0

The material posted on the course website has been relevant.

The material posted on the course website has been relevant.	Number of Responses
I totally disagree.	0 (0.0%)
I partially disagree.	0 (0.0%)
I partially agree.	1 (20.0%)
I totally agree.	4 (80.0%)
Total	5 (100.0%)

	Mean	Standard Deviation
The material posted on the course website has been relevant.	3.8	0.4

Other comments about the course in general:

Other comments about the course in general:
I think that the course was excellently organized, both while we had lectures at MH and also while we had them online.
It's got a broad arsenal of topics related to PDE. Just what I deem relevant for such a course.
Well structured and presented, even when it moved online.

What did you like the most about the course?

What did you like the most about the course?
I always like to have exercise seminars in courses, since I think that solving and presenting problems is the most fun aspect of learning (and also the best way of learning).
Solution methods because relevance for myself.
That it was well presented and interesting material like characteristics and the general theory for sedond order elliptic equations.
Sobolev spaces and in particular the Lax-Milgram theorem was very interesting.

What features of the course need improvement?

I would suggest a slight change of content, though this might be a subjective matter.

For me the part where we discussed Fourier transforms and distributions felt a bit disjoint from the rest of the course. Of course, I am aware that Fourier methods are extremely important in PDEs and distributions are needed to fully understand weak solutions, fundamental solutions etc. However these things are discussed in the distribution theory course anyway so I don't think it is necessary to have them in the PDEs course. I think that anyone interested in PDEs will take eventually the distribution course anyway.

On the other hand, I think that the regularity theory for elliptic and parabolic operators (with proofs) should be included in the course. This follows the "PDE theme" a bit more closely and I think it is important to know it. I would also include the theory for hyperbolic operators in the course. Perhaps even the eigenvalue theory for elliptic operators would be nice to see (subjective).

Finally, I think that it would be good to discuss the method of characteristics directly from the start, i.e. in the first few lectures. Perhaps the conservation laws can be skipped (this might again be subjective of me since I did not really find that part of the course very interesting).

No idea

The first few weeks of studying Laplace, heat and wave equation felt at some points like we just did technical results about them for no reason. Now when I have seen how those can be generalised to broader classes of equations they feel a bit more justified but some variation at the start would have been nice.

The course jumped around quite a lot in terms of material, I think I would rather have it a bit more focused and coherent in that sense. In particular we spent a lot of time on Chapter 2 which didn't really come back that much later.

Lectures
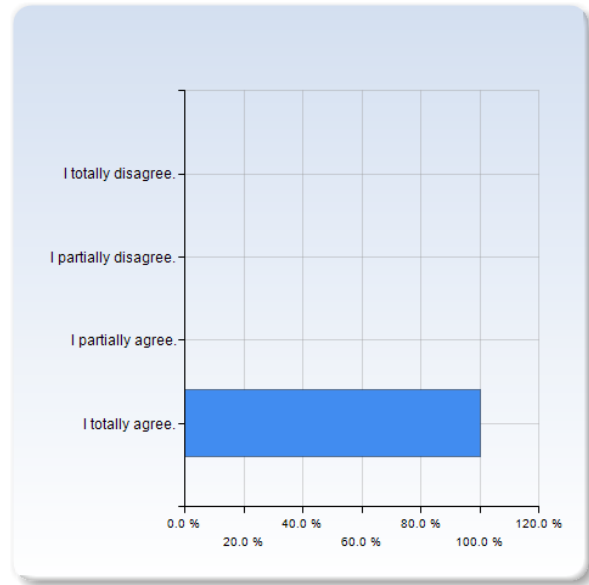
The planning of the lectures has been satisfactory.

The planning of the lectures has been satisfactory.	Number of Responses
I totally disagree.	0 (0.0%)
I partially disagree.	0 (0.0%)
I partially agree.	0 (0.0%)
I totally agree.	5 (100.0%)
Total	5 (100.0%)
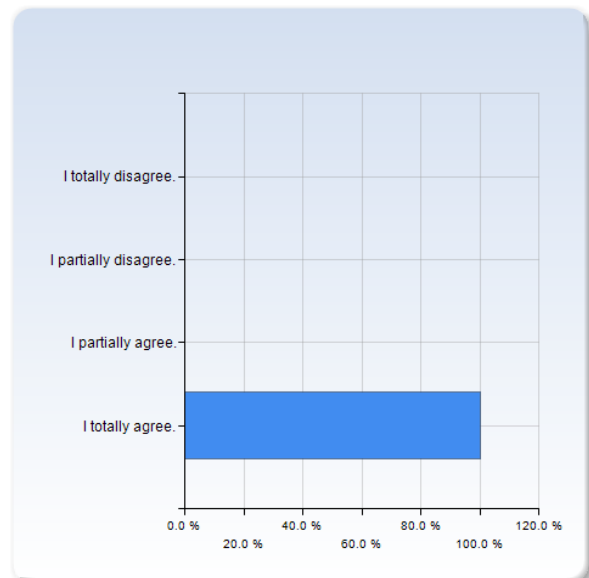
	Mean	Standard Deviation
The planning of the lectures has been satisfactory.	4.0	0.0

The number of lectures has been satisfactory.

The number of lectures has been satisfactory.	Number of Responses
I totally disagree.	0 (0.0%)
I partially disagree.	0 (0.0%)
I partially agree.	0 (0.0%)
I totally agree.	5 (100.0%)
Total	5 (100.0%)

	Mean	Standard Deviation
The number of lectures has been satisfactory.	4.0	0.0

The pace of the lectures matched the content of the course.

The pace of the lectures matched the content of the course.	Number of Responses
I totally disagree.	0 (0.0%)
I partially disagree.	0 (0.0%)
I partially agree.	0 (0.0%)
I totally agree.	5 (100.0%)
Total	5 (100.0%)
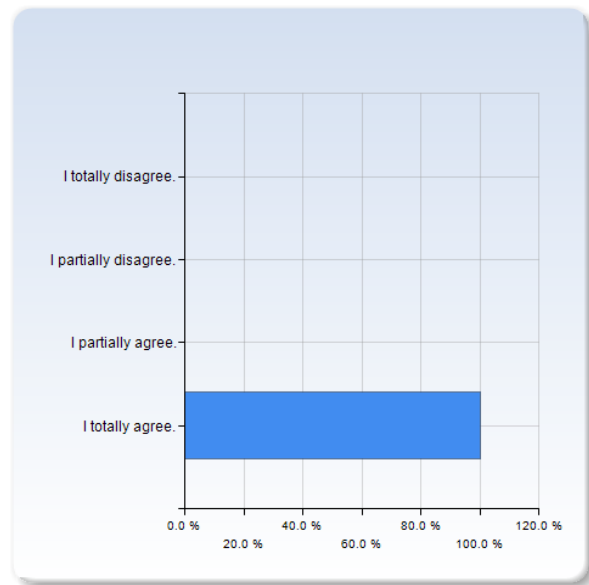
	Mean	Standard Deviation
The pace of the lectures matched the content of the course.	4.0	0.0

The lecturer presented the material in a pedagogical manner.

| The lecturer presented the material in a pedagogical manner.	Number of Responses
I totally disagree.	0 (0.0%)
I partially disagree.	0 (0.0%)
I partially agree.	0 (0.0%)
I totally agree.	5 (100.0%)
Total	5 (100.0%)
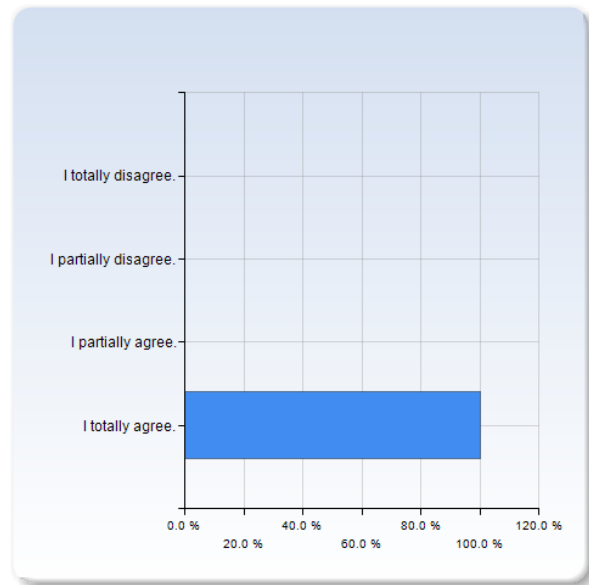
	Mean	Standard Deviation
The lecturer presented the material in a pedagogical manner.	4.0	0.0

To which extent did you attend the lectures? (percentage)

To which extent did you attend the lectures? (percentage)	Number of Responses
2 - 11	1 (20.0%)
12 - 21	0 (0.0%)
22 - 31	0 (0.0%)
32 - 41	0 (0.0%)
42 - 51	0 (0.0%)
52 - 61	0 (0.0%)
62 - 71	0 (0.0%)
72 - 81	0 (0.0%)
82 - 91	2 (40.0%)
92 - 101	2 (40.0%)
Total	5 (100.0%)
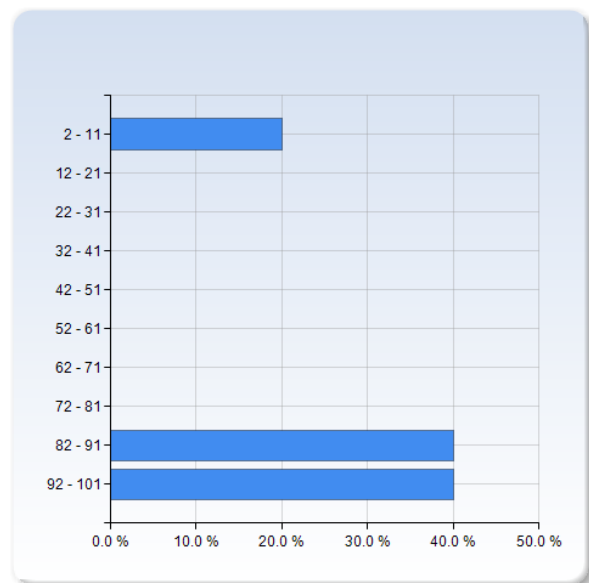
	Mean	Standard Deviation
To which extent did you attend the lectures? (percentage)	75.4	41.5

Other comments regarding the lectures:

| Other comments regarding the lectures: |
| --- |
| Great! Nothing needs to change really. |
| Well done, especially when moved online. |
| I really appreciated having zoom lectures instead of just leaving us with the book. The pacing in particular was good with an appropriate amount of time being spent on proofs. |

Seminars

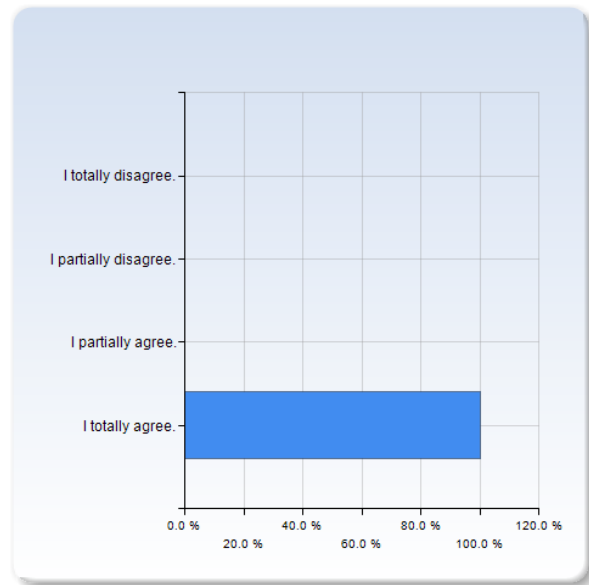## The number of seminars has been satisfactory.

The number of seminars has been satisfactory.	Number of Responses
I totally disagree.	0 (0.0%)
I partially disagree.	0 (0.0%)
I partially agree.	0 (0.0%)
I totally agree.	5 (100.0%)
Total	5 (100.0%)
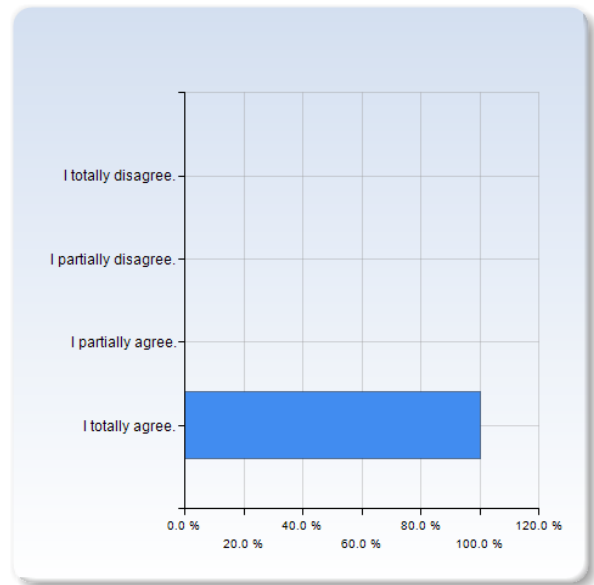
	Mean	Standard Deviation
The number of seminars has been satisfactory.	4.0	0.0

The teaching form and planning of the seminars has been satisfactory.

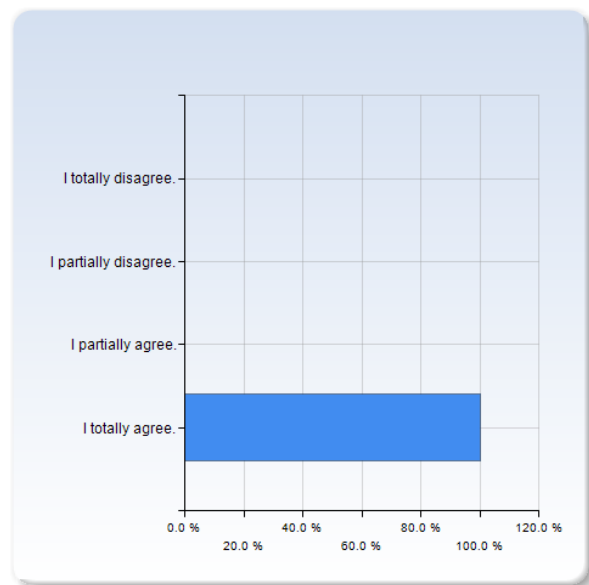| The teaching form and planning of the seminars has been satisfactory.	Number of Responses
I totally disagree.	0 (0.0%)
I partially disagree.	0 (0.0%)
I partially agree.	0 (0.0%)
I totally agree.	5 (100.0%)
Total	5 (100.0%)

	Mean	Standard Deviation
The teaching form and planning of the seminars has been satisfactory.	4.0	0.0

## The seminars contributed to increase my understanding of the subject.

The seminars contributed to increase my understanding of the subject.	Number of Responses
I totally disagree.	0 (0.0%)
I partially disagree.	0 (0.0%)
I partially agree.	0 (0.0%)
I totally agree.	5 (100.0%)
Total	5 (100.0%)

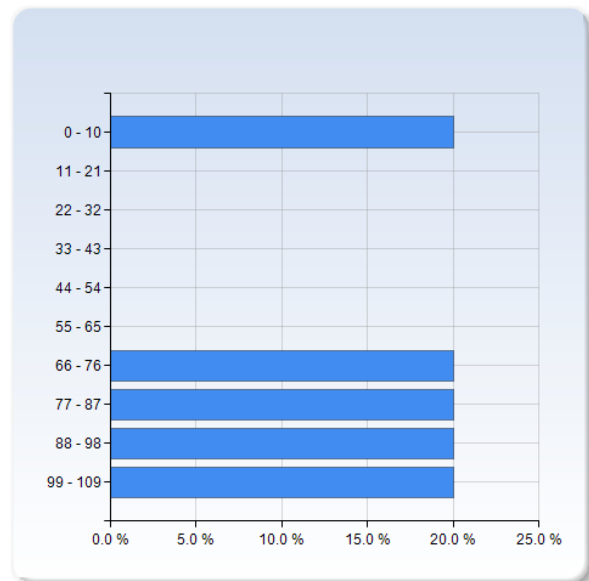|	Mean	Standard Deviation
The seminars contributed to increase my understanding of the subject.	4.0	0.0

I have actively participated in the seminars.

I have actively participated in the seminars.	Number of Responses
I totally disagree.	0 (0.0%)
I partially disagree.	0 (0.0%)
I partially agree.	1 (25.0%)
I totally agree.	3 (75.0%)
Total	4 (100.0%)
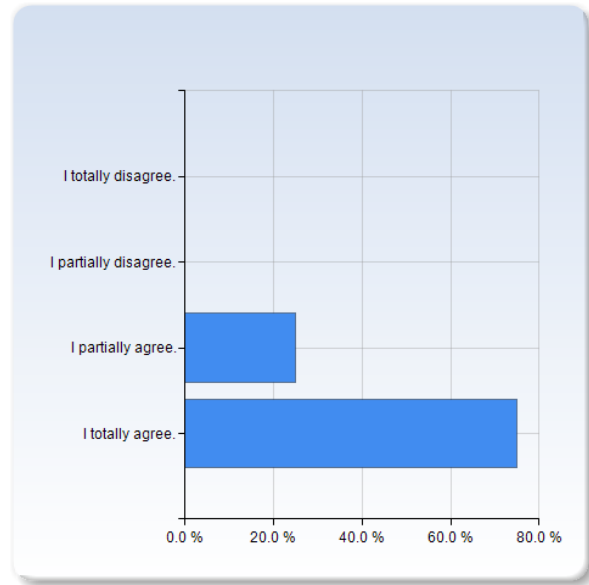
	Mean	Standard Deviation
I have actively participated in the seminars.	3.8	0.5

To which extent did you attend the seminars? (percentage)

To which extent did you attend the seminars? (percentage)	Number of Responses
0 - 10	1 (20.0%)
11 - 21	0 (0.0%)
22 - 32	0 (0.0%)
33 - 43	0 (0.0%)
44 - 54	0 (0.0%)
55 - 65	0 (0.0%)
66 - 76	1 (20.0%)
77 - 87	1 (20.0%)
88 - 98	1 (20.0%)
99 - 109	1 (20.0%)
Total	5 (100.0%)

	Mean	Standard Deviation
To which extent did you attend the seminars? (percentage)	70.0	40.5

How many hours did you spend to prepare for the seminars?

How many hours did you spend to prepare for the seminars?	Number of Responses
0 - 1	1 (20.0%)
2 - 3	0 (0.0%)
4 - 5	1 (20.0%)
6 - 7	1 (20.0%)
8 - 9	0 (0.0%)
10 - 11	2 (40.0%)
12 - 13	0 (0.0%)
14 - 15	0 (0.0%)
16 - 17	0 (0.0%)
18 - 19	0 (0.0%)
Total	5 (100.0%)
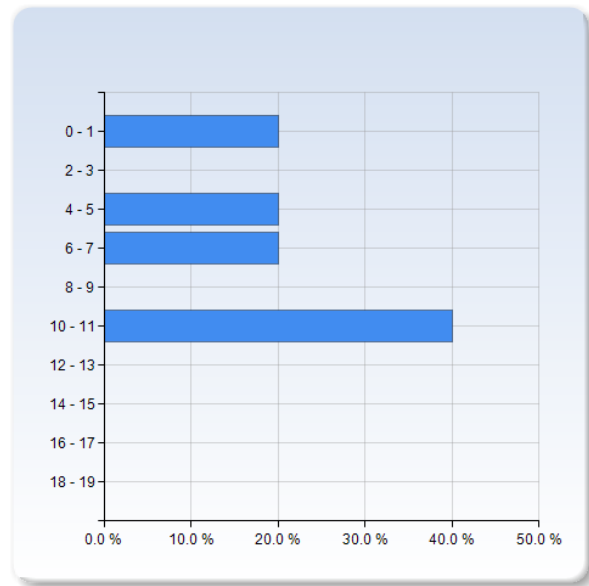
	Mean	Standard Deviation
How many hours did you spend to prepare for the seminars?	6.0	4.2

Other comments regarding the seminars.

| Other comments regarding the seminars. |
|---|
| My favourite part of any course! |
| They increased my understanding and it was nice to see solutions of the exercises I couldn't solve. |

Examination

The examination form has been satisfactory.
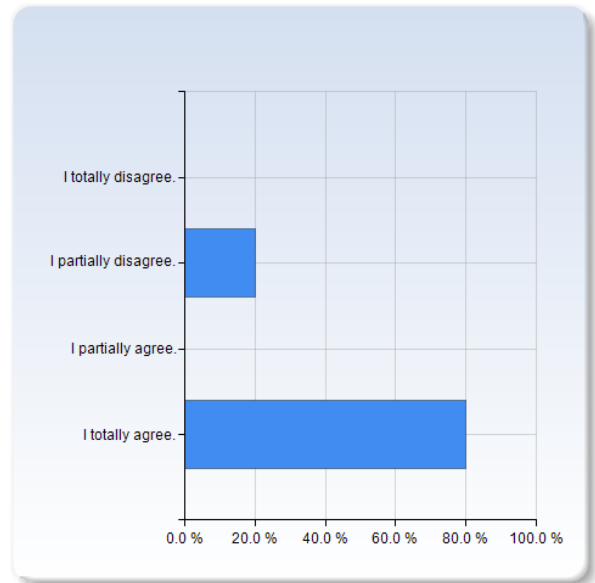
The examination form has been satisfactory.	Number of Responses
I totally disagree.	0 (0.0%)
I partially disagree.	0 (0.0%)
I partially agree.	1 (20.0%)
I totally agree.	4 (80.0%)
Total	5 (100.0%)
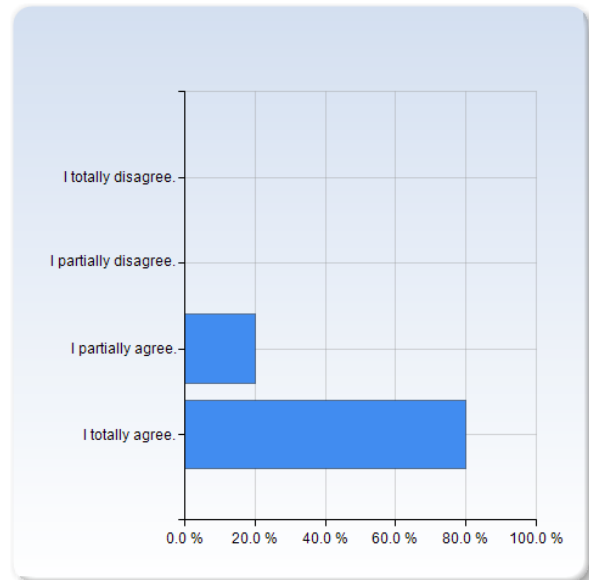
	Mean	Standard Deviation
The examination form has been satisfactory.	3.8	0.4

The degree of difficulty of the examination matched the content of the course.

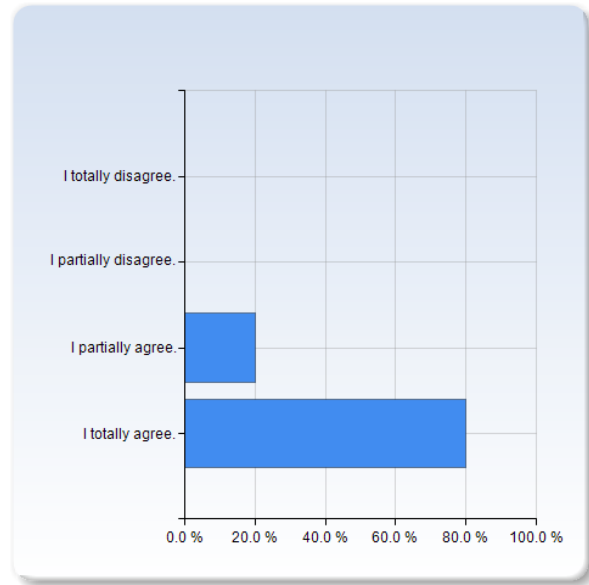| The degree of difficulty of the examination matched the content of the course.	Number of Responses
I totally disagree.	0 (0.0%)
I partially disagree.	1 (20.0%)
I partially agree.	0 (0.0%)
I totally agree.	4 (80.0%)
Total	5 (100.0%)

	Mean	Standard Deviation
The degree of difficulty of the examination matched the content of the course.	3.6	0.9

The exam questions reflected the content of the course and matched the learning objectives.

The exam questions reflected the content of the course and matched the learning objectives.	Number of Responses
I totally disagree.	0 (0.0%)
I partially disagree.	0 (0.0%)
I partially agree.	1 (20.0%)
I totally agree.	4 (80.0%)
Total	5 (100.0%)

	Mean	Standard Deviation
The exam questions reflected the content of the course and matched the learning objectives.	3.8	0.4

The grade that I received on the exam reflects my work during the course.

The grade that I received on the exam reflects my work during the course.	Number of Responses
I totally disagree.	0 (0.0%)
I partially disagree.	1 (25.0%)
I partially agree.	0 (0.0%)
I totally agree.	3 (75.0%)
Total	4 (100.0%)
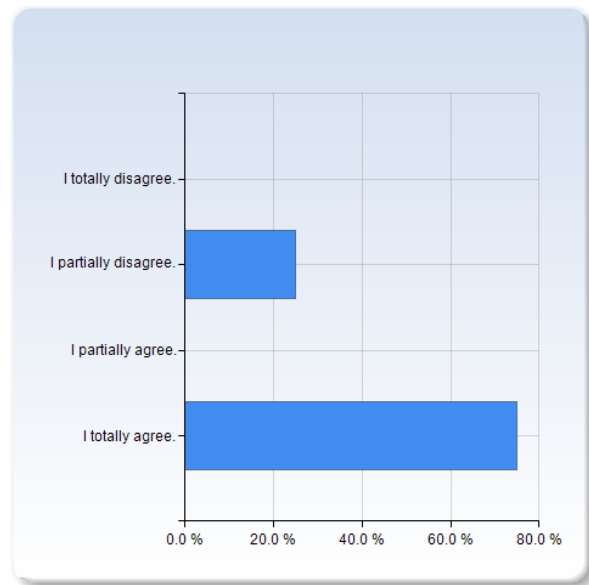
	Mean	Standard Deviation
The grade that I received on the exam reflects my work during the course.	3.5	1.0

Other comments regarding the examination:

Other comments regarding the examination:

I think that the examination was organized quite well. It is comforting to see that the teachers have enough trust in us students to allow us to take a "regular" exam from home.

Personally I think it would have better to have an open book take-home exam with substantially tougher questions where one is given more time to solve it (e.g. a week). I think such exams are really interesting since one learns a lot while wrestling with the hard problems, and books and notes are generally not helpful anyway if one doesn't know the content of the course well enough.

The written exam was harder than expected with some tricks we had not practiced on.

It would have been nice if the written exam was a take home exam.

How do you think that the transition to online teaching worked? What could be improved?

How do you think that the transition to online teaching worked? What could be improved?

The switch to online learning was quite smooth and I think it worked brilliantly. ZOOM is a nice platform so I think you can continue using it in the future if necessary.

Well structured. However I myself prefer to see proofs given in real-time than prewritten and commented.

It went really well. Personally, I think you did all the right things.

It was handled well given the circumstances

I think it worked well. I didn't miss the in-lecture questions or the breakout room things when they were removed but those sort of active participation things are probably good.

What is your opinion about this course evaluation form?

What is your opinion about this course evaluation form?

I think it would maybe be better to have only one text field to fill in, where one can write something like a short essay about the course. You could state some specific questions above the field. In the current format I feel that I answer some questions in one text field, and then an analogous question appears a few items later.

I'm glad it does not ask ridiculous questions about gender perspectives. (This is anonymous right?)

Works well

10/10