LUND UNIVERSITY

Centre for Mathematical Sciences
Division of Mathematics and Numerical Analysis

Centre for Mathematical Sciences
Faculty of Science

Course Analysis for MATP32 Harmonic Analysis, Autumn 2022

Course Information

Lecturer: Eskil Rydhe
Teaching assistants:
Number of students:
11 newly registered and 0 re-registered.
4 students answered the course evaluation, 3 of them are enrolled on the Master's Programme in Mathematics, 1 of them is enrolled on the Bachelor's Programme in Mathematics.

Examination

Assignments: 6 students passed.
Project: 6 students passed.
Oral presentation: 6 students passed.
Oral examination: N/A.
Written examination: N/A.
Final grades
In all, 6 students, including 0 re-registered students, have got their final grade.
6 passed with distinction.
0 passed.

Course Evaluation

Summary of student's answers:
Given the size of the course, the low number of respondents to the course survey is not surprising. Any conclusions about the results should be taken with a grain of salt though.

One student disagreed with the statement "My prior knowledge has been sufficient to assimilate the contents of this course".

On statements about the course in general, students essentially agree. The statement "The course literature/material was a valuable learning resource" was graded somewhat lower (on average 4.0 out of 5.0), and the statement "The workload was evenly distributed throughout the course" was graded significantly lower (3.0 out of 5.0) than the other statements.

Statements about development of generic skills were graded lower than other statements. This is true in particular for statements about communication and cooperation.

Free text comments indicate that students were satisfied with the course.

Teachers' comments:
The course was taught through lectures based on Grafakos's two books on Fourier Analysis. Typically two lectures per week were given. Lecture notes were published on the course web page.

Please, turn over!

Examination was carried out using two compulsory hand in assignments, and one project in which each student read a paper/chapter/similar. The contents were summarized in a written report, and presented orally to the other course participants. 7 students followed through with the examinations.

Changes from the previous course realisation:

The course has only been given twice, and the previous iteration was given by another lecturer. Some adjustments have been done to the ordering of the material, but the change of teacher is undoubtedly the biggest alteration to the course.

Suggestions for the next course realisation:

- Grafakos's books are modern classics (pun intended) in mathematical analysis. Despite their popularity and detailed exposition, they contain some mistakes that are quite problematic from a technical point of view. (For example, in the proof of the Calderón–Zygmund theorem the reduction to Schwartz functions is not a reasonable one, since smoothness is destroyed in the good/bad decomposition.) The books still have many advantages. One could consider different books on the subject, such as the "big Stein", but with some awareness from the lecturer the problems in Grafakos are certainly manageable.

- The course is a bit overloaded with material, even when omitting some of the proofs. It seems reasonable to leave out some of the later topics, e.g. wavelets and weights. One could also add some flexibility on what to include in the second half of the course.

- The project part of the course should probably be started quite early. In this realisation, the workload became unreasonably high towards the end of the course.

- The project on the John–Nirenberg inequality via Bellman functions contains some serious errors in the source material. This must be addressed before given to students.

- The Ball multiplier project is marked as extra difficult and will as such award a few extra credits. It seems unclear why this would be more difficult that some of the other projects.

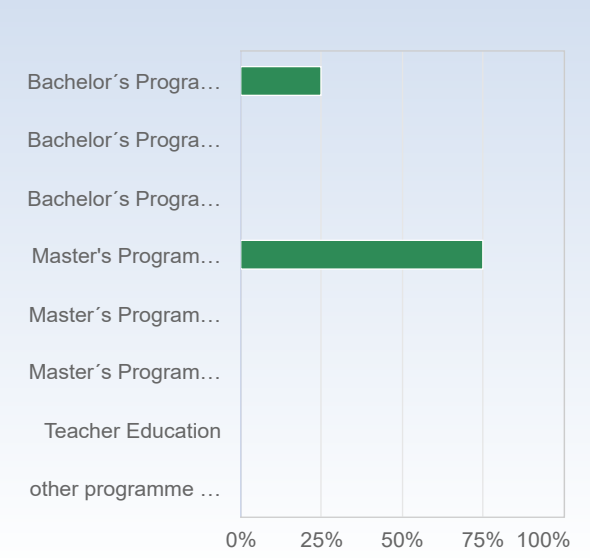
- The prerequisites to take the course should be increased to at least include a course on Functional Analysis. MATP32 doesn't really require a lot of this, but the idea that bounded linear operators are uniquely determined by their action on dense subspaces is fundamental to this course. It is also completely possible to introduce (say) H^1–BMO-duality without a background in Functional Analysis, but the significance of this result is likely very obscure without some knowledge about bounded linear functionals.

Harmonic Analysis (MATP32) HT 2022

Answer Count: 4

I have studied this course as part of

I have studied this course as part of	Number of responses
Bachelor´s Programme in Mathematics	1 (25,0%)
Bachelor´s Programme in Physics, Theoretical Physics, Astronomy	0 (0,0%)
Bachelor´s Programme, other specialization	0 (0,0%)
Master's Programme in Mathematics	3 (75,0%)
Master´s Programme in Mathematical Statistics	0 (0,0%)
Master´s Programme, other specialization	0 (0,0%)
Teacher Education	0 (0,0%)
other programme or as stand alone course	0 (0,0%)
Total	4 (100,0%)

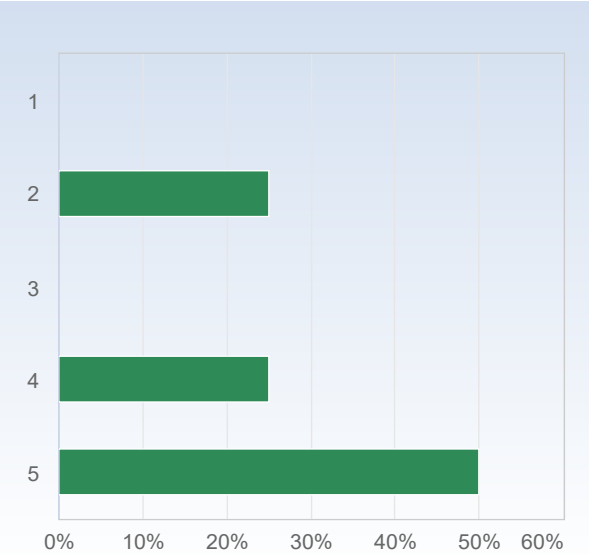


	Mean	Standard Deviation
I have studied this course as part of	3,2	1,5

On the scale 1-5 select the option that best matches your opinion: 1= disagree completely → 3= partly agree → 5= agree completely

2. My prior knowledge has been sufficient to assimilate the contents of this course.

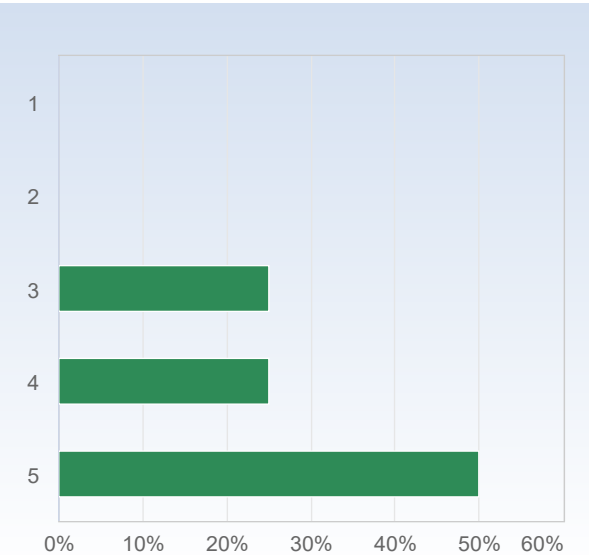
2. My prior knowledge has been sufficient to assimilate the contents of this course.	Number of responses
1	0 (0,0%)
2	1 (25,0%)
3	0 (0,0%)
4	1 (25,0%)
5	2 (50,0%)
Total	4 (100,0%)



	Mean	Standard Deviation
2. My prior knowledge has been sufficient to assimilate the contents of this course.	4,0	1,4

3. I have participated actively in the course.

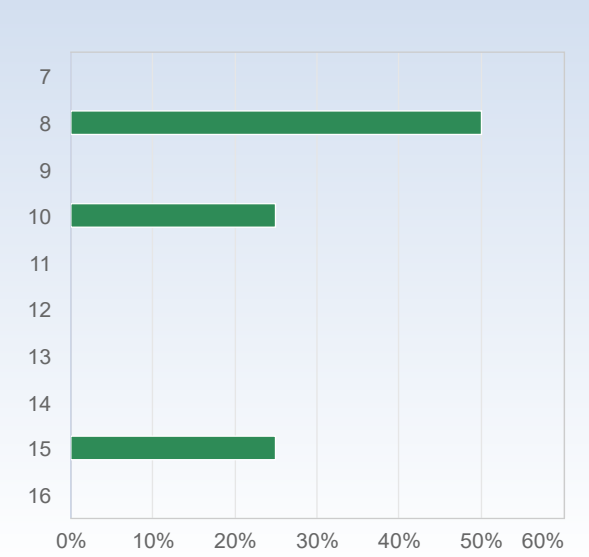
3. I have participated actively in the course.	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	1 (25,0%)
4	1 (25,0%)
5	2 (50,0%)
Total	4 (100,0%)



	Mean	Standard Deviation
3. I have participated actively in the course.	4,2	1,0

Average number of hours spent in total on the course per week (including scheduled activities):

Average number of hours spent in total on the course per week (including scheduled activities):	Number of responses
7	0 (0,0%)
8	2 (50,0%)
9	0 (0,0%)
10	1 (25,0%)
11	0 (0,0%)
12	0 (0,0%)
13	0 (0,0%)
14	0 (0,0%)
15	1 (25,0%)
16	0 (0,0%)
Total	4 (100,0%)

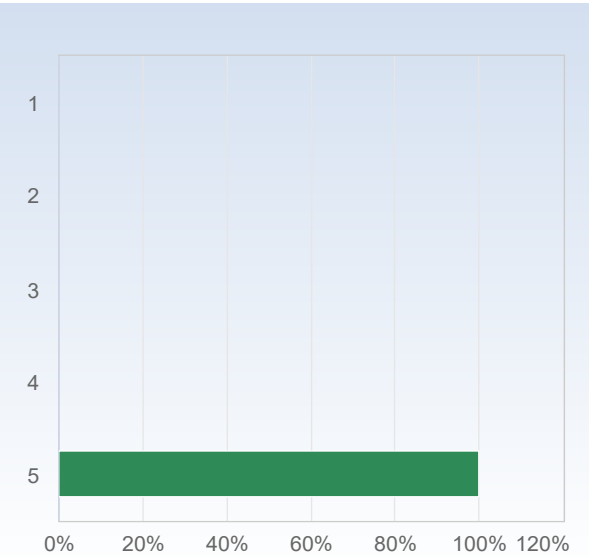


	Mean	Standard Deviation
Average number of hours spent in total on the course per week (including scheduled activities):	10,2	3,3

The course in general
On the scale 1-5 select the option that best matches your opinion:1= disagree completely → 3= partly agree → 5= agree completely

The way the course was taught and organised suited me.

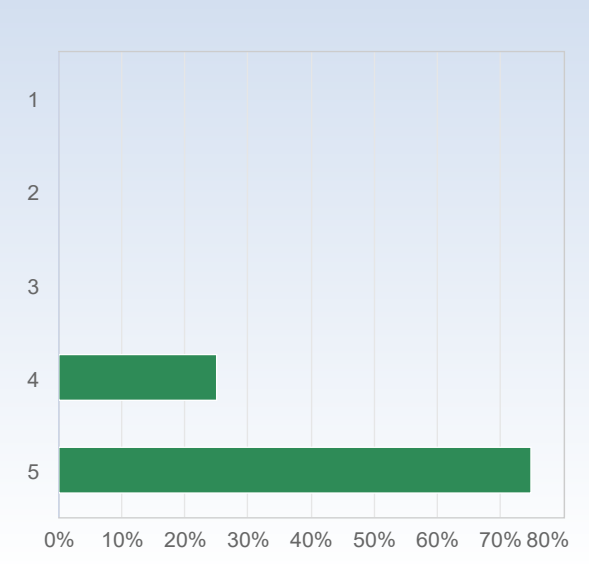
The way the course was taught and organised suited me.	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	0 (0,0%)
4	0 (0,0%)
5	4 (100,0%)
Total	4 (100,0%)



	Mean	Standard Deviation
The way the course was taught and organised suited me.	5,0	0,0

The number of teacher lead activities (lectures, seminars etc.) has been satisfactory.

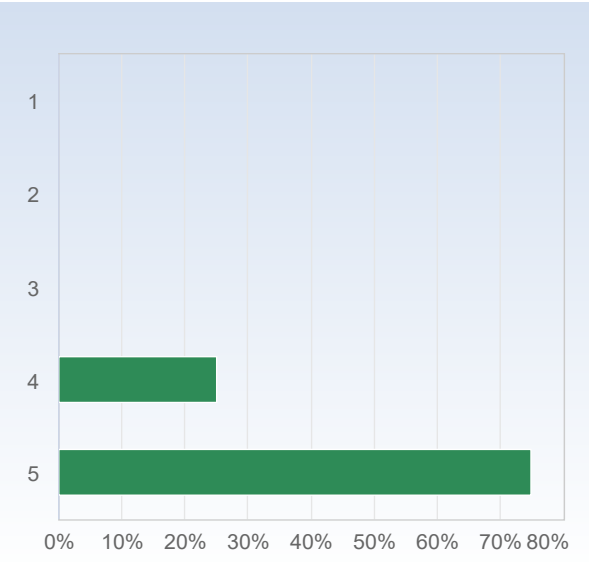
The number of teacher lead activities (lectures, seminars etc.) has been satisfactory.	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	0 (0,0%)
4	1 (25,0%)
5	3 (75,0%)
Total	4 (100,0%)



	Mean	Standard Deviation
The number of teacher lead activities (lectures, seminars etc.) has been satisfactory.	4,8	0,5

The lectures were valuable for my learning.

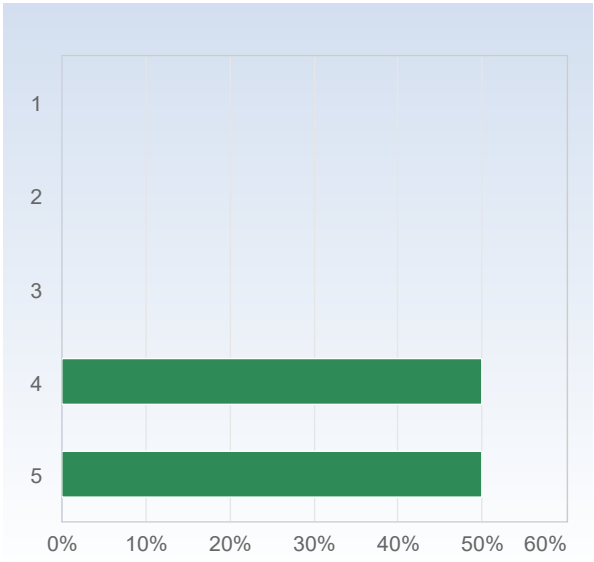
The lectures were valuable for my learning.	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	0 (0,0%)
4	1 (25,0%)
5	3 (75,0%)
Total	4 (100,0%)



	Mean	Standard Deviation
The lectures were valuable for my learning.	4,8	0,5

Studying on my own was valuable for my learning.

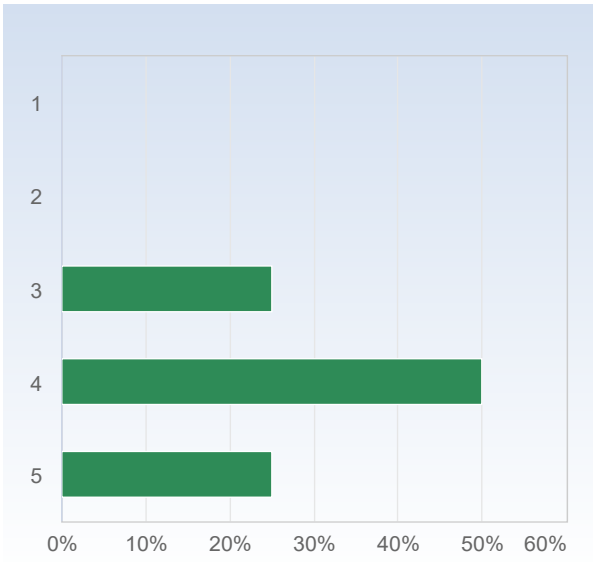
Studying on my own was valuable for my learning.	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	0 (0,0%)
4	2 (50,0%)
5	2 (50,0%)
Total	4 (100,0%)



	Mean	Standard Deviation
Studying on my own was valuable for my learning.	4,5	0,6

The course literature/material was a valuable learning resource.

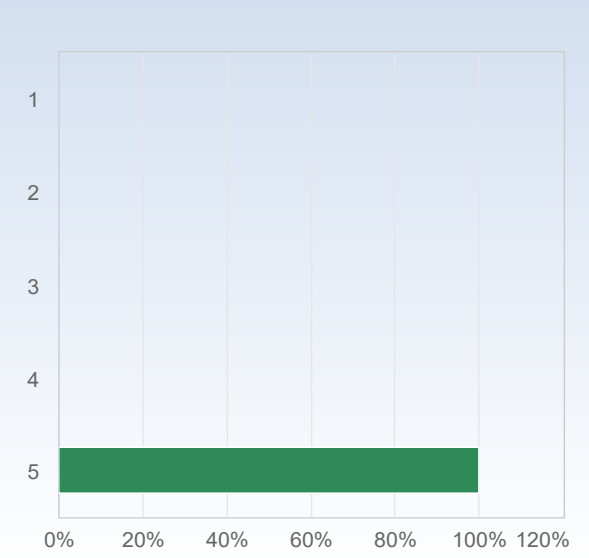
The course literature/material was a valuable learning resource.	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	1 (25,0%)
4	2 (50,0%)
5	1 (25,0%)
Total	4 (100,0%)



	Mean	Standard Deviation
The course literature/material was a valuable learning resource.	4,0	0,8

The information I received before the course start was satisfactory.

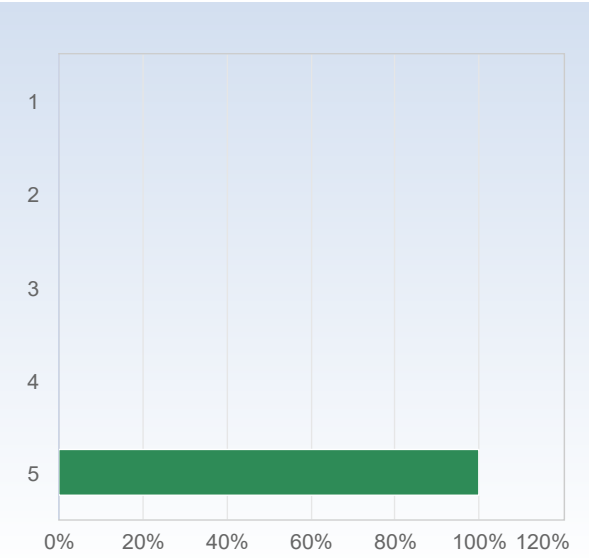
The information I received before the course start was satisfactory.	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	0 (0,0%)
4	0 (0,0%)
5	4 (100,0%)
Total	4 (100,0%)



	Mean	Standard Deviation
The information I received before the course start was satisfactory.	5,0	0,0

The communication with the teaching staff during the course was good.

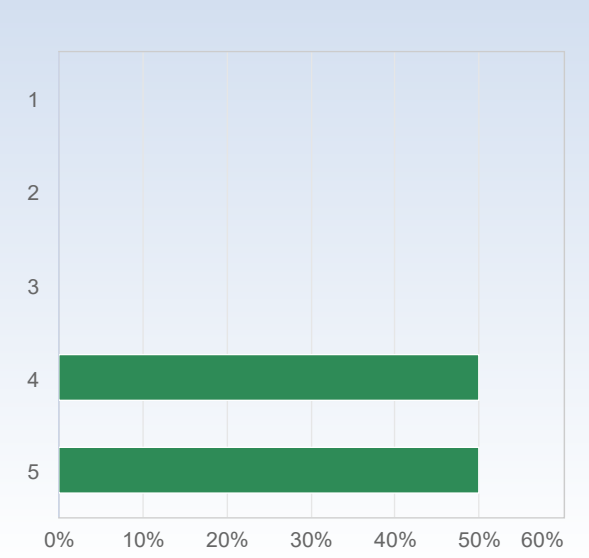
The communication with the teaching staff during the course was good.	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	0 (0,0%)
4	0 (0,0%)
5	4 (100,0%)
Total	4 (100,0%)



	Mean	Standard Deviation
The communication with the teaching staff during the course was good.	5,0	0,0

It was clear throughout the course what was expected of me.

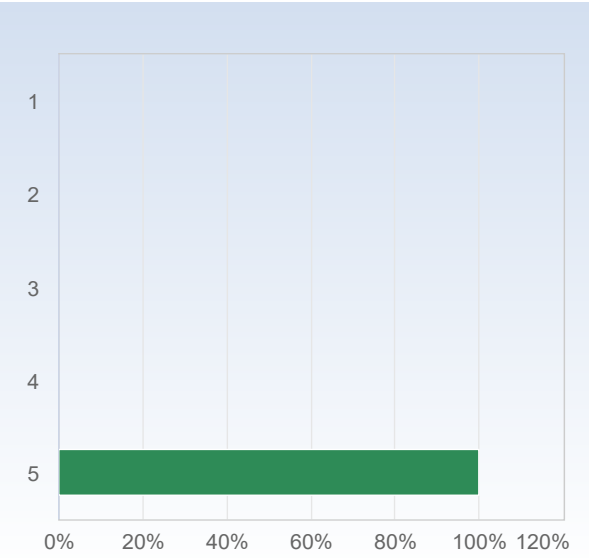
It was clear throughout the course what was expected of me.	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	0 (0,0%)
4	2 (50,0%)
5	2 (50,0%)
Total	4 (100,0%)



	Mean	Standard Deviation
It was clear throughout the course what was expected of me.	4,5	0,6

I have received valuable feedback from my teacher/teachers during the course.

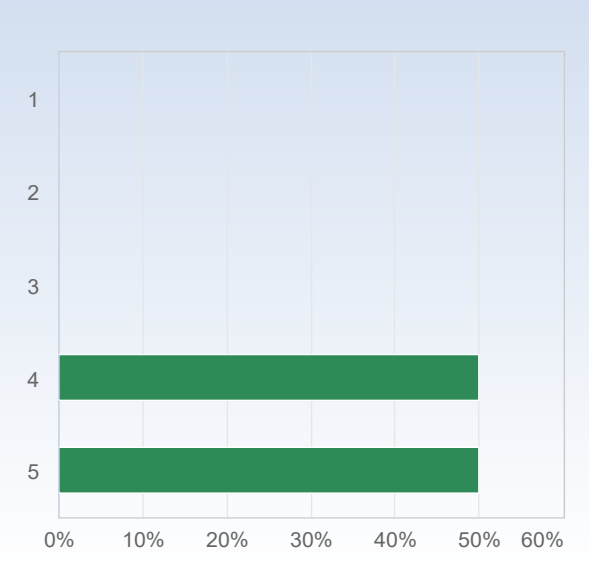
I have received valuable feedback from my teacher /teachers during the course.	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	0 (0,0%)
4	0 (0,0%)
5	4 (100,0%)
Total	4 (100,0%)



	Mean	Standard Deviation
I have received valuable feedback from my teacher/teachers during the course.	5,0	0,0

The course had a reasonable workload.

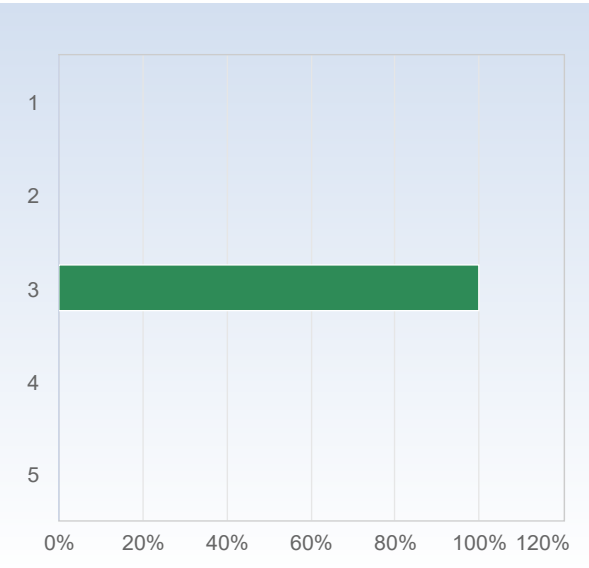
The course had a reasonable workload.	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	0 (0,0%)
4	2 (50,0%)
5	2 (50,0%)
Total	4 (100,0%)



	Mean	Standard Deviation
The course had a reasonable workload.	4,5	0,6

The workload was evenly distributed throughout the course.

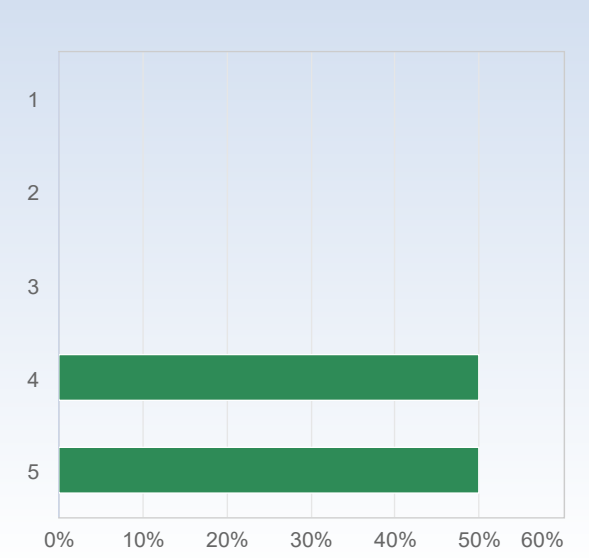
The workload was evenly distributed throughout the course.	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	4 (100,0%)
4	0 (0,0%)
5	0 (0,0%)
Total	4 (100,0%)



	Mean	Standard Deviation
The workload was evenly distributed throughout the course.	3,0	0,0

The examination matched the contents and level of the course.

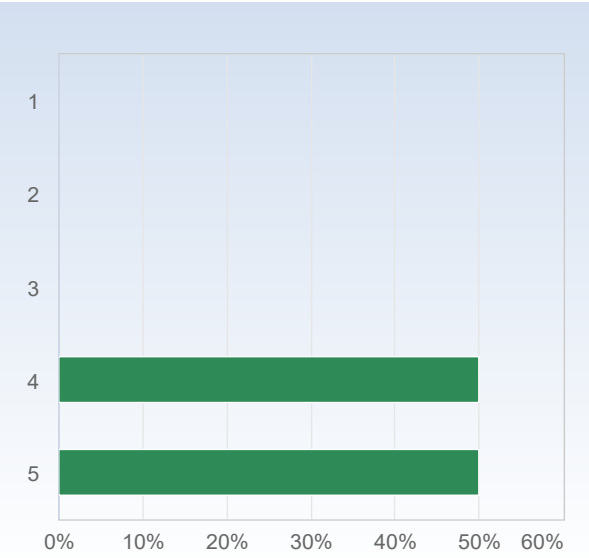
The examination matched the contents and level of the course.	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	0 (0,0%)
4	2 (50,0%)
5	2 (50,0%)
Total	4 (100,0%)



	Mean	Standard Deviation
The examination matched the contents and level of the course.	4,5	0,6

Overall, I am satisfied with the course.

Overall, I am satisfied with the course.	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	0 (0,0%)
4	2 (50,0%)
5	2 (50,0%)
Total	4 (100,0%)



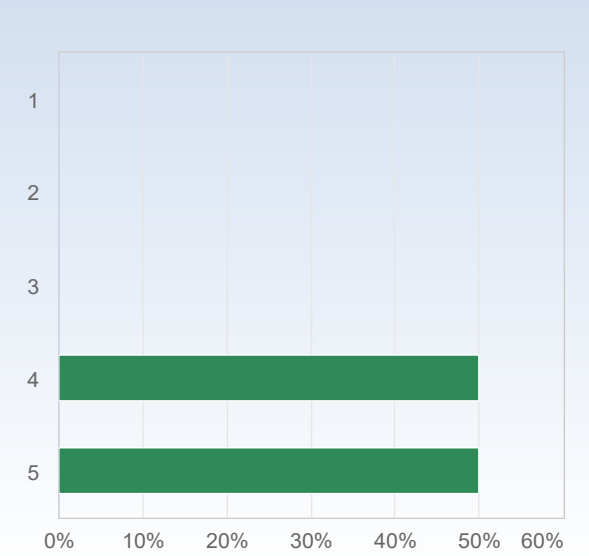
	Mean	Standard Deviation
Overall, I am satisfied with the course.	4,5	0,6

On the development of generic skills

On a scale 1-5 select the option that best matches your opinion: 1= disagree completely → 3= partly agree → 5= agree completely

The course has increased my ability to read a mathematical text.

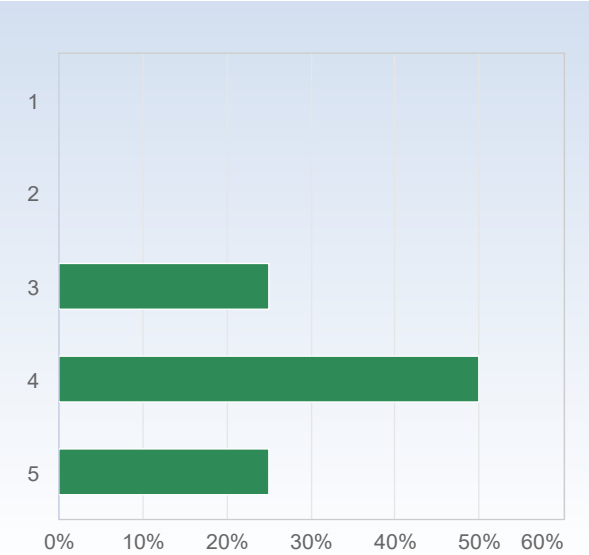
The course has increased my ability to read a mathematical text.	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	0 (0,0%)
4	2 (50,0%)
5	2 (50,0%)
Total	4 (100,0%)



	Mean	Standard Deviation
The course has increased my ability to read a mathematical text.	4,5	0,6

The course has increased my ability to communicate the subject in writing.

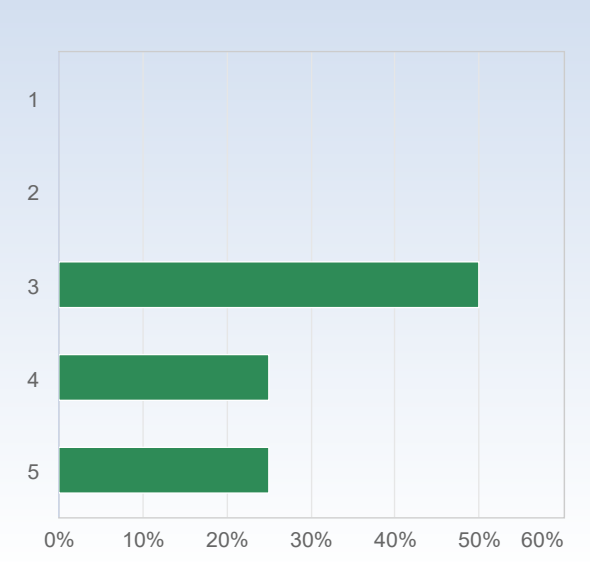
The course has increased my ability to communicate the subject in writing.	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	1 (25,0%)
4	2 (50,0%)
5	1 (25,0%)
Total	4 (100,0%)



	Mean	Standard Deviation
The course has increased my ability to communicate the subject in writing.	4,0	0,8

The course has increased my ability to communicate the subject orally.

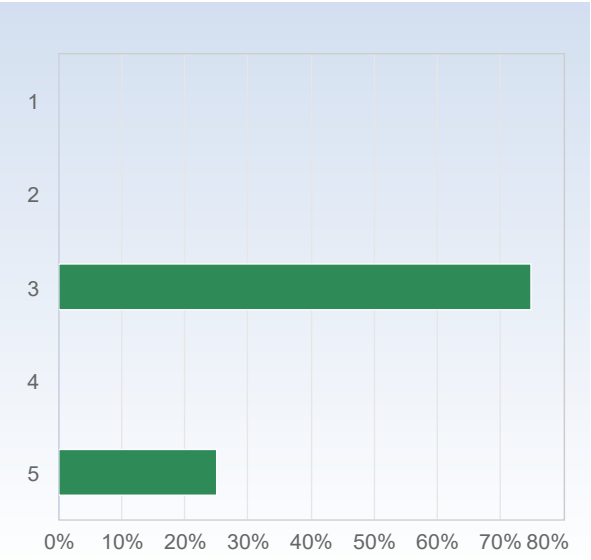
The course has increased my ability to communicate the subject orally.	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	2 (50,0%)
4	1 (25,0%)
5	1 (25,0%)
Total	4 (100,0%)



	Mean	Standard Deviation
The course has increased my ability to communicate the subject orally.	3,8	1,0

The course has increased my ability to cooperate.

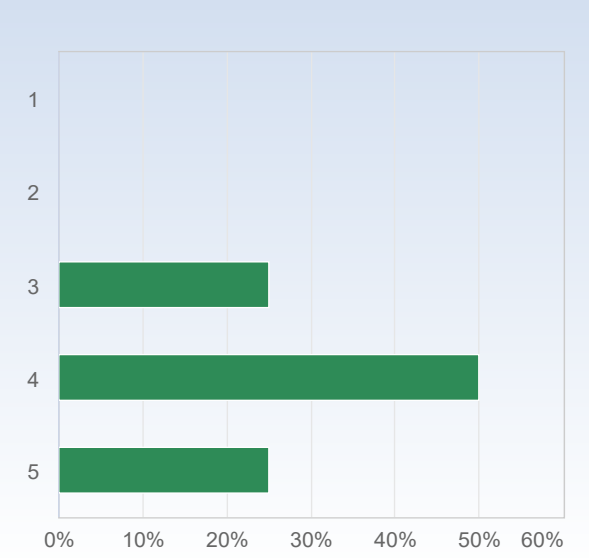
The course has increased my ability to cooperate.	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	3 (75,0%)
4	0 (0,0%)
5	1 (25,0%)
Total	4 (100,0%)



	Mean	Standard Deviation
The course has increased my ability to cooperate.	3,5	1,0

The course has increased my ability to search and process information.

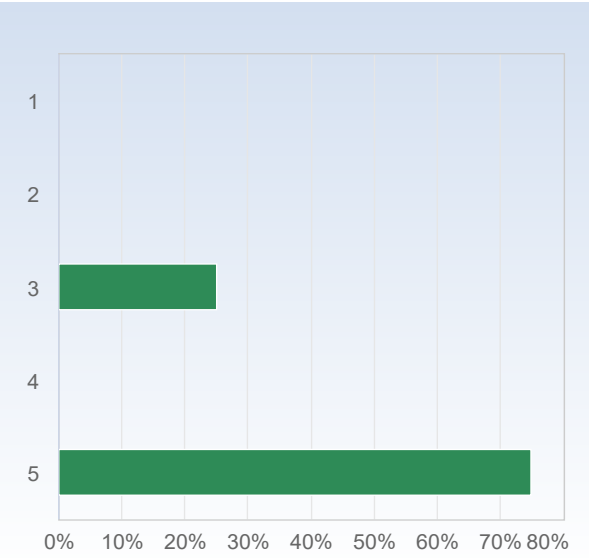
The course has increased my ability to search and process information.	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	1 (25,0%)
4	2 (50,0%)
5	1 (25,0%)
Total	4 (100,0%)



	Mean	Standard Deviation
The course has increased my ability to search and process information.	4,0	0,8

The course has increased my ability to analyze and solve problems.

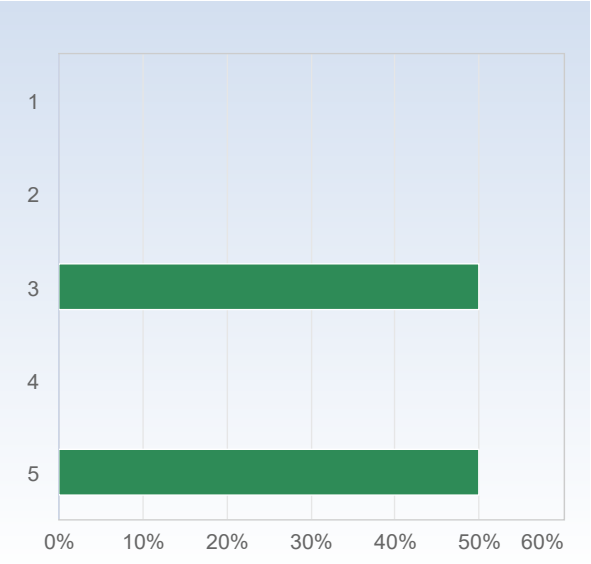
The course has increased my ability to analyze and solve problems.	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	1 (25,0%)
4	0 (0,0%)
5	3 (75,0%)
Total	4 (100,0%)



	Mean	Standard Deviation
The course has increased my ability to analyze and solve problems.	4,5	1,0

As a result of this course, I feel confident about tackling unfamiliar problems.

As a result of this course, I feel confident about tackling unfamiliar problems.	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	2 (50,0%)
4	0 (0,0%)
5	2 (50,0%)
Total	4 (100,0%)



	Mean	Standard Deviation
As a result of this course, I feel confident about tackling unfamiliar problems.	4,0	1,2

What did you appreciate most with the course?

What did you appreciate most with the course?
The great teaching and fun assignments.
Eskil was always very helpful.
The selection of discussed topics and their presentation. Every lecture had a clear motivation and some interesting main result(s). The proofs were complete yet not too detailed, the focus on the central arguments was maintained and e.g. exact constants neglected etc. The handwritten lecture notes were also helpfull as important details are mising in Grafakos sometimes.

What do you think should be improved?

What do you think should be improved?
no idea

Have you during this course experienced course literature, staff or teaching methods to be discriminatory in any way (gender, ethnicity, etc.)?

Have you during this course experienced course literature, staff or teaching methods to be discriminatory in any way (gender, ethnicity, etc.)?
no
No.
No, not at all.