LUND UNIVERSITY

Centre for Mathematical Sciences
Faculty of Science

Course Analysis for MATM35 Number Theory, Autumn 2021

Course Information

Lecturer: Oscar Marmon
Teaching assistants: –
Number of students:
25 newly registered and 2 re-registered. In addition, 1 PhD student (under the course code MATM15F). 10 students answered the course evaluation, 5 of them are enrolled on the Bachelor's programme in mathematics, 3 on the Master's programme in mathematics.

Examination

Written assignment: 20 students passed.
Oral examination: 14 students passed.
Written examination: 14 students passed.

- Ordinary examination 11/01 2022: 10 students participated and 9 of them passed.
- Resit examination 29/01 2022: 6 students participated and 5 of them passed.

Final grades
In all, 14 students, including 0 re-registered students, have got their final grade.
10 passed with distinction.
3 passed.
1 passed with Pass as highest possible grade (PhD student).

Course Evaluation

The evaluation has been discussed with the elected course representative.
Summary of students' answers:
The feedback was in general positive, for example the statement *"Overall, I am satisfied with the course"* had a mean score of 4.8 out of 5. A surprising find is the low workload: the average number of hours spent per week, including scheduled activities, was only 9.1. For more details, see the following pages.
Teacher's comments:
Overall, the course went well.

- The teaching consisted of lectures and seminars combined into two 2-hour sessions per week. From the start, the lectures were given exclusively on campus, but links to last year's recordings of the lectures were posted as a remote option. The last few sessions in December were held in a hybrid format as a response to new Covid restrictions from the government. Usually 10-15 students participated in the teaching sessions.

Please, turn over!

– A group exercise in cryptography was carried out in course week 4 (replacing one of the seminars). There was a possibility to participate via Zoom, but unfortunately there was a global malfunction of Breakout Rooms that particular day, which caused some students to meet on their own to carry out the activity. A written report of this exercise comprised the mandatory written assignment in the course.
– Active participation in the seminars (see below) was rewarded with up to 2 bonus points for the written exam.
– At two occasions during the course, again instead of a regular seminar, the students were given a set of Challenging Problems to work on. Each set consisted of four problems, and in order to obtain 0.5 bonus points for the written exam, one had to hand in a solution to one of these within one week.
– The written examinations were conducted on campus, but a few days before the first exam, the decision was taken to also provide an option to participate remotely, in view of the rapidly increasing infection rates. The remote version was given as an assignment in Canvas and conducted under Zoom surveillance. For the oral exam, the students could choose between preassigned time slots on campus or via Zoom.

Changes from the previous course realisation:
Two changes were made in order to make the seminars more valuable.

– For each homework problem, one student was assigned to *present* the problem and another one to *solve* it. Both were awarded (a fraction of) a bonus point. The motivation behind this was twofold: to encourage students to prepare for the seminars by allowing them to participate actively also on problems they had not been able to solve, and also to provide more structure in the demonstrations. From my experience as a teacher, it did indeed improve the quality of the demonstrations somewhat. The reception among students was mixed, with some negative and some positive opinions.
– The group was divided into two smaller groups where demonstrations were run independently (in the same room). After a while, however, the number of participants was too small for this to make sense, and it was discontinued. The reception among the students was again mixed.

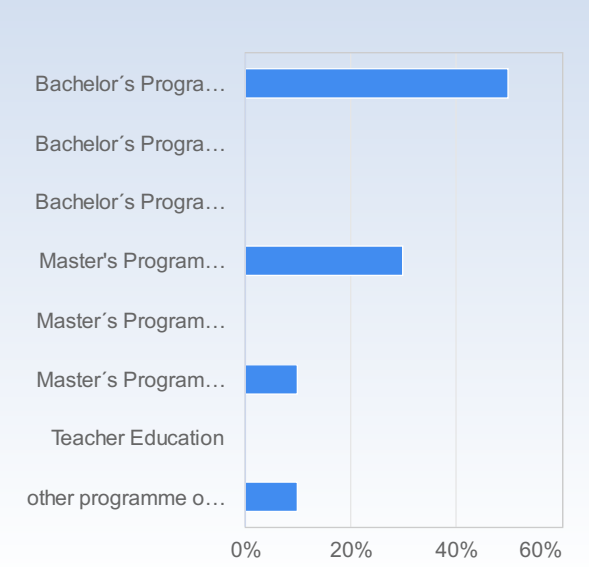
The statement *"The seminars (problem demonstrations) were valuable for my learning"* had a mean score of 4.0 out of 5, compared to 3.7 for the previous year.
Suggestions for the next course realisation:
If I were to give the course again, I would continue to look for new ways of organising the seminar to make it a more rewarding learning activity for everyone.
I would also consider increasing the number of scheduled hours per week, based on the low workload reported by the students.
The course representative suggests to consider adding further topics, such as a more in-depth treatment of cryptography into the course, again based on the low reported workload.

Number theory 2021/22

Answer Count: 10

I have studied this course as part of

I have studied this course as part of	Number of responses
Bachelor´s Programme in Mathematics	5 (50.0%)
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 (30.0%)
Master´s Programme in Mathematical Statistics	0 (0.0%)
Master´s Programme, other specialization	1 (10.0%)
Teacher Education	0 (0.0%)
other programme or as stand alone course	1 (10.0%)
Total	10 (100.0%)

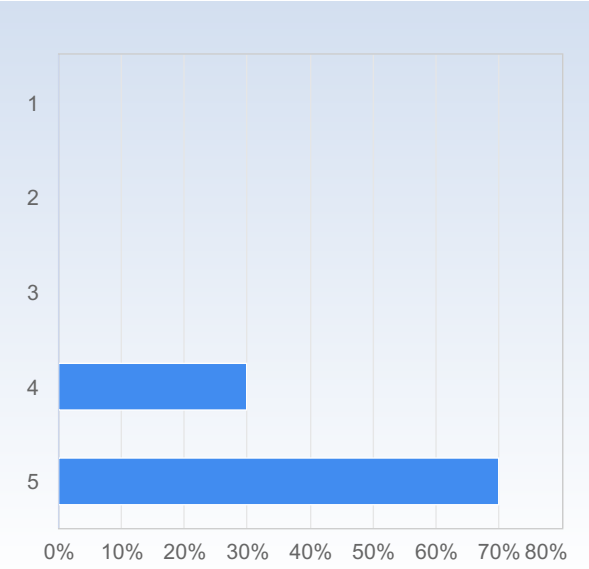


	Mean	Standard Deviation
I have studied this course as part of	3.1	2.5

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.

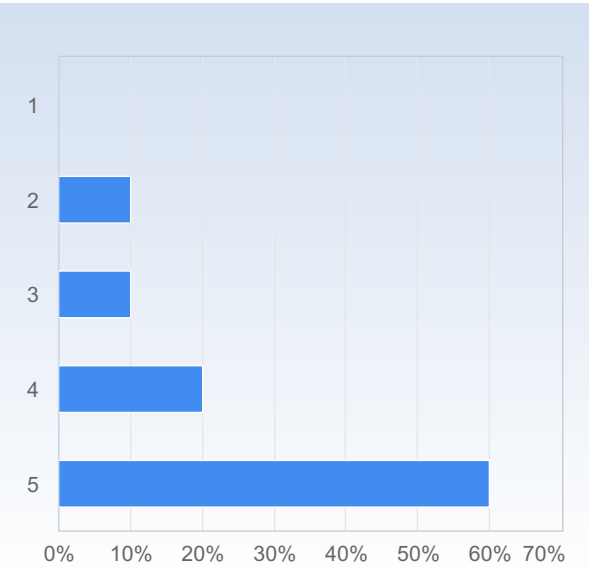
2.□My prior knowledge has been sufficient to assimilate the contents of this course.	Number of responses
1	0 (0.0%)
2	0 (0.0%)
3	0 (0.0%)
4	3 (30.0%)
5	7 (70.0%)
Total	10 (100.0%)



	Mean	Standard Deviation
2.□My prior knowledge has been sufficient to assimilate the contents of this course.	4.7	0.5

3.□I have participated actively in the course.

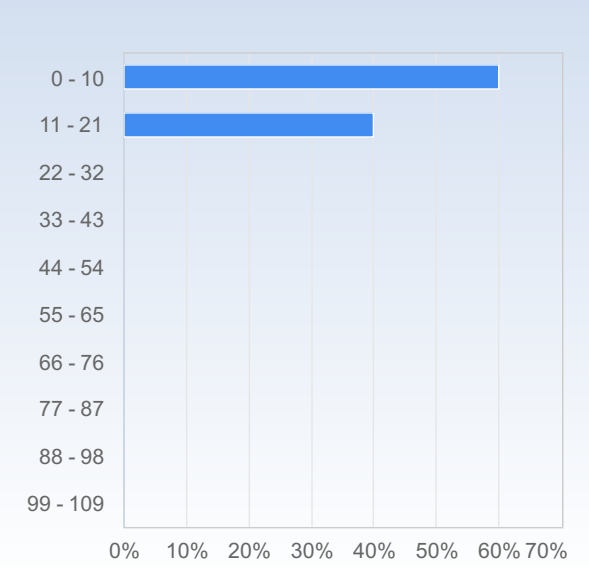
3.□I have participated actively in the course.	Number of responses
1	0 (0.0%)
2	1 (10.0%)
3	1 (10.0%)
4	2 (20.0%)
5	6 (60.0%)
Total	10 (100.0%)



	Mean	Standard Deviation
3.□I have participated actively in the course.	4.3	1.1

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
0 - 10	6 (60.0%)
11 - 21	4 (40.0%)
22 - 32	0 (0.0%)
33 - 43	0 (0.0%)
44 - 54	0 (0.0%)
55 - 65	0 (0.0%)
66 - 76	0 (0.0%)
77 - 87	0 (0.0%)
88 - 98	0 (0.0%)
99 - 109	0 (0.0%)
Total	10 (100.0%)



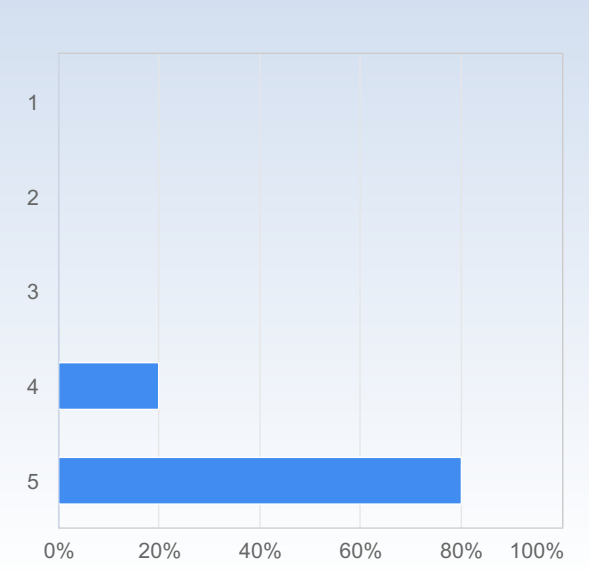
	Mean	Standard Deviation
Average number of hours spent in total on the course per week (including scheduled activities):	9.1	4.2

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.

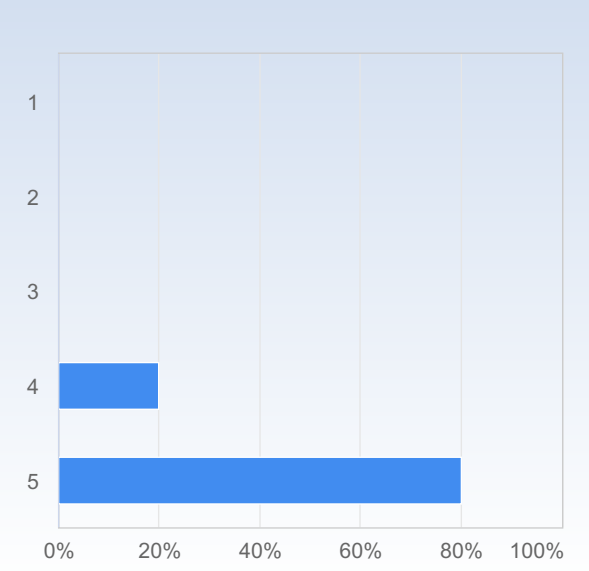
The way the course was taught and organised suited me.	Number of responses
1	0 (0.0%)
2	0 (0.0%)
3	0 (0.0%)
4	2 (20.0%)
5	8 (80.0%)
Total	10 (100.0%)



	Mean	Standard Deviation
The way the course was taught and organised suited me.	4.8	0.4

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

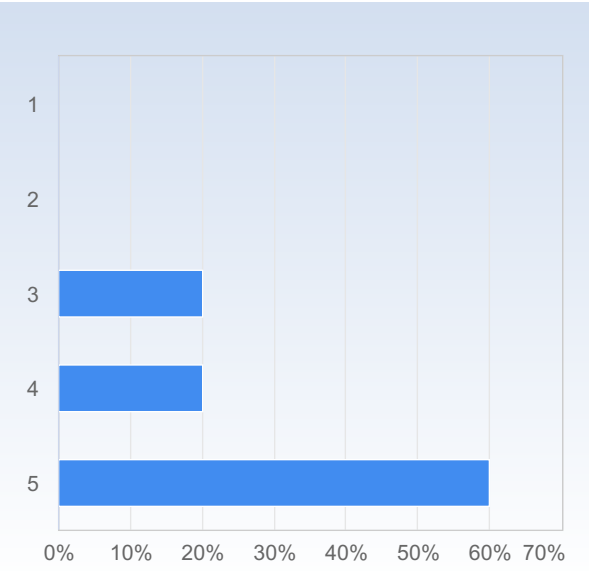
The number of teacher lead activities (lectures, seminars etc.) has been satisfactory.	Number of responses
1	0 (0.0%)
2	0 (0.0%)
3	0 (0.0%)
4	2 (20.0%)
5	8 (80.0%)
Total	10 (100.0%)



	Mean	Standard Deviation
The number of teacher lead activities (lectures, seminars etc.) has been satisfactory.	4.8	0.4

The lectures were valuable for my learning.

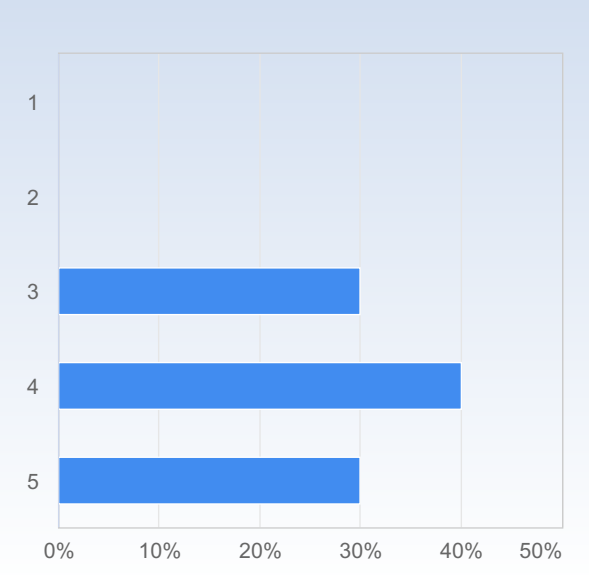
The lectures were valuable for my learning.	Number of responses
1	0 (0.0%)
2	0 (0.0%)
3	2 (20.0%)
4	2 (20.0%)
5	6 (60.0%)
Total	10 (100.0%)



	Mean	Standard Deviation
The lectures were valuable for my learning.	4.4	0.8

The seminars (problem demonstrations) were valuable for my learning.

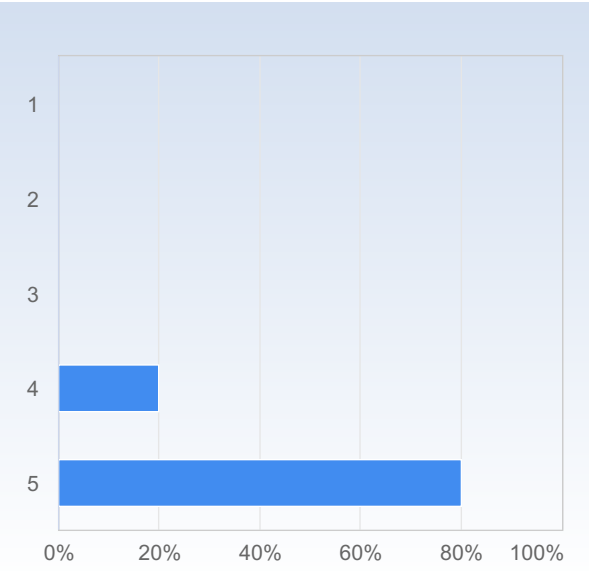
The seminars (problem demonstrations) were valuable for my learning.	Number of responses
1	0 (0.0%)
2	0 (0.0%)
3	3 (30.0%)
4	4 (40.0%)
5	3 (30.0%)
Total	10 (100.0%)



	Mean	Standard Deviation
The seminars (problem demonstrations) were valuable for my learning.	4.0	0.8

Studying on my own was valuable for my learning.

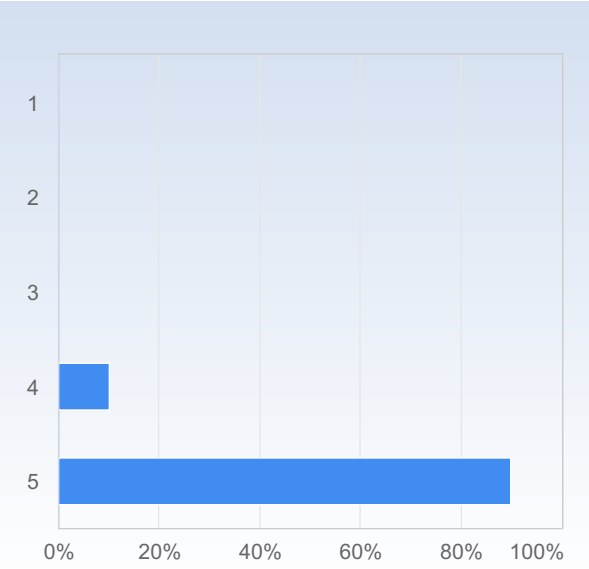
Studying on my own was valuable for my learning.	Number of responses
1	0 (0.0%)
2	0 (0.0%)
3	0 (0.0%)
4	2 (20.0%)
5	8 (80.0%)
Total	10 (100.0%)



	Mean	Standard Deviation
Studying on my own was valuable for my learning.	4.8	0.4

The course literature/material was a valuable learning resource.

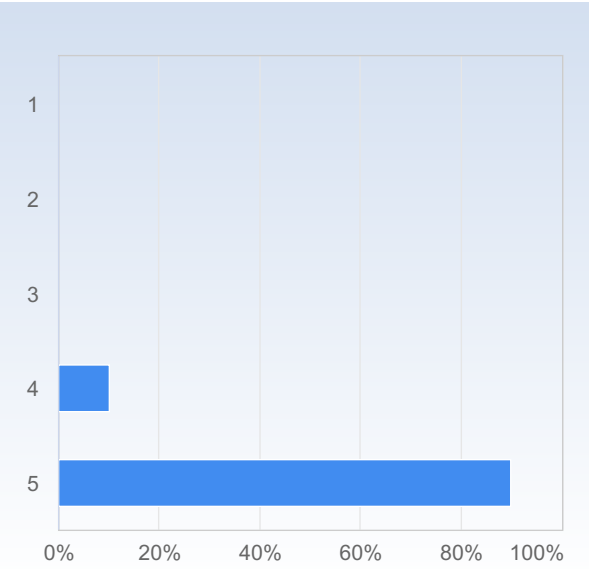
The course literature/material was a valuable learning resource.	Number of responses
1	0 (0.0%)
2	0 (0.0%)
3	0 (0.0%)
4	1 (10.0%)
5	9 (90.0%)
Total	10 (100.0%)



	Mean	Standard Deviation
The course literature/material was a valuable learning resource.	4.9	0.3

The information I received before the course start was satisfactory.

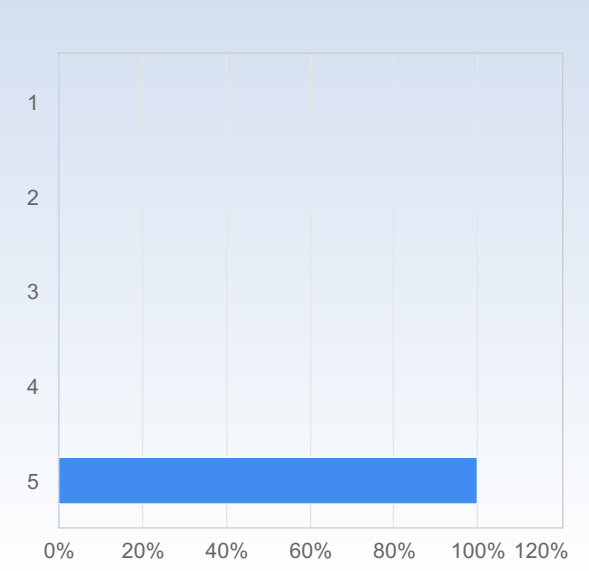
The information I received before the course start was satisfactory.	Number of responses
1	0 (0.0%)
2	0 (0.0%)
3	0 (0.0%)
4	1 (10.0%)
5	9 (90.0%)
Total	10 (100.0%)



	Mean	Standard Deviation
The information I received before the course start was satisfactory.	4.9	0.3

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

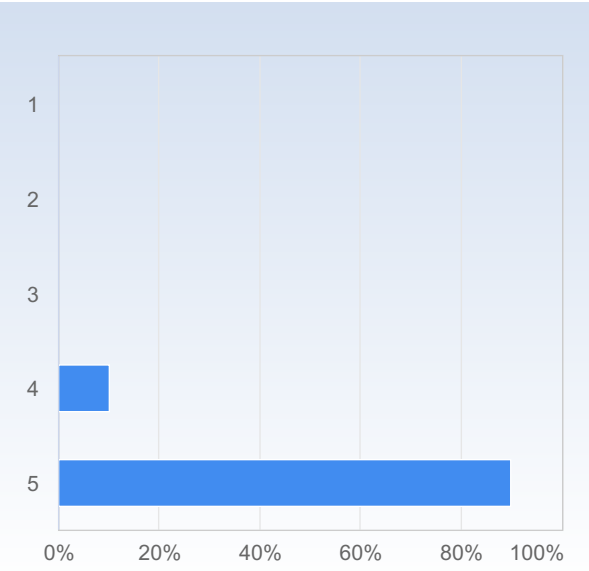
The communication with the teaching staff during the course was good.	Number of responses
1	0 (0.0%)
2	0 (0.0%)
3	0 (0.0%)
4	0 (0.0%)
5	10 (100.0%)
Total	10 (100.0%)



	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.

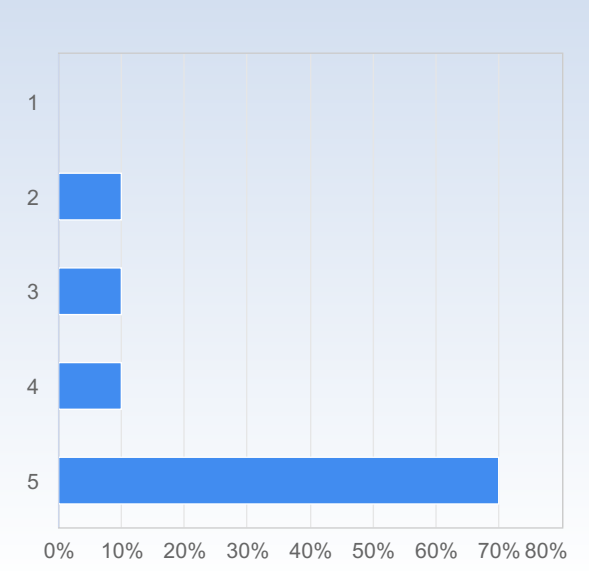
It was clear throughout the course what was expected of me.	Number of responses
1	0 (0.0%)
2	0 (0.0%)
3	0 (0.0%)
4	1 (10.0%)
5	9 (90.0%)
Total	10 (100.0%)



	Mean	Standard Deviation
It was clear throughout the course what was expected of me.	4.9	0.3

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

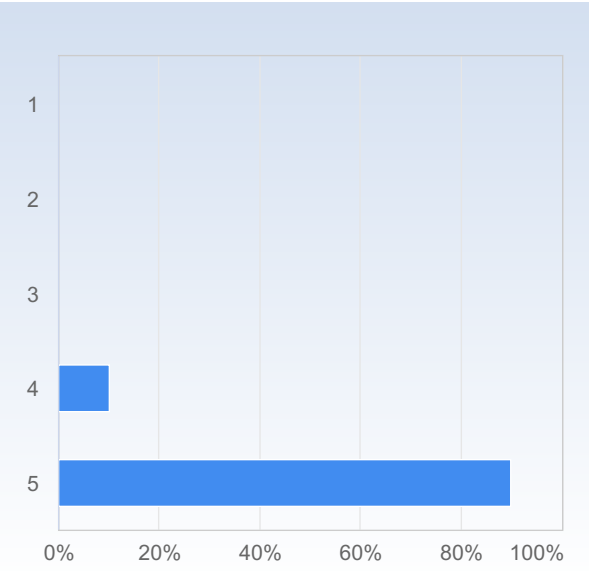
I have received valuable feedback from my teacher/teachers during the course.	Number of responses
1	0 (0.0%)
2	1 (10.0%)
3	1 (10.0%)
4	1 (10.0%)
5	7 (70.0%)
Total	10 (100.0%)



	Mean	Standard Deviation
I have received valuable feedback from my teacher/teachers during the course.	4.4	1.1

The course had a reasonable workload.

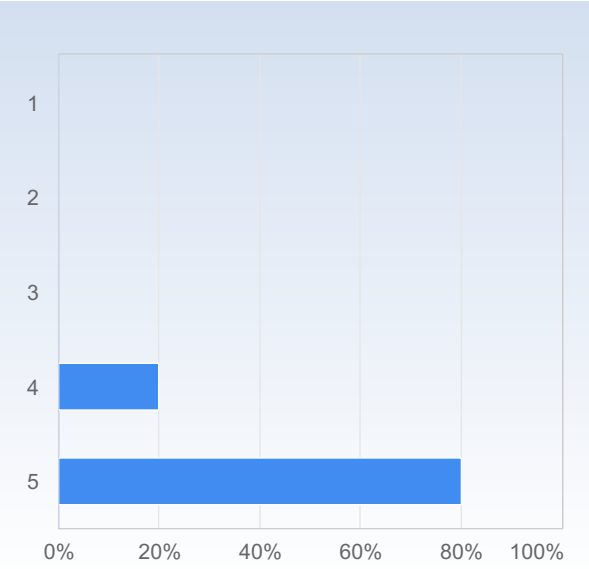
The course had a reasonable workload.	Number of responses
1	0 (0.0%)
2	0 (0.0%)
3	0 (0.0%)
4	1 (10.0%)
5	9 (90.0%)
Total	10 (100.0%)



	Mean	Standard Deviation
The course had a reasonable workload.	4.9	0.3

The workload was evenly distributed throughout the course.

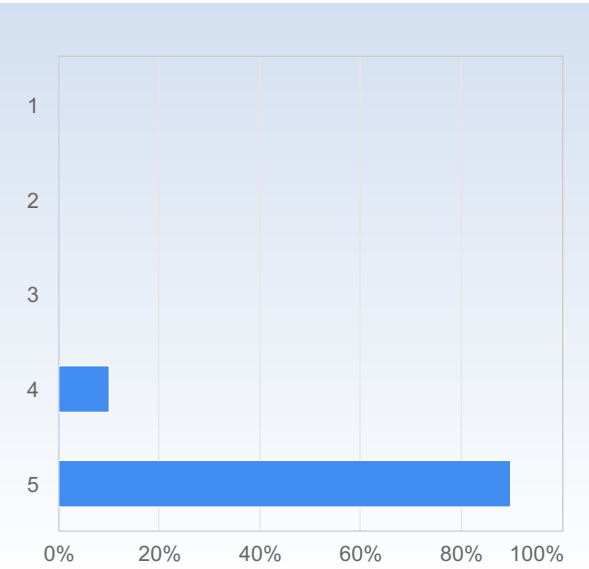
The workload was evenly distributed throughout the course.	Number of responses
1	0 (0.0%)
2	0 (0.0%)
3	0 (0.0%)
4	2 (20.0%)
5	8 (80.0%)
Total	10 (100.0%)



	Mean	Standard Deviation
The workload was evenly distributed throughout the course.	4.8	0.4

The examination matched the contents and level of the course.

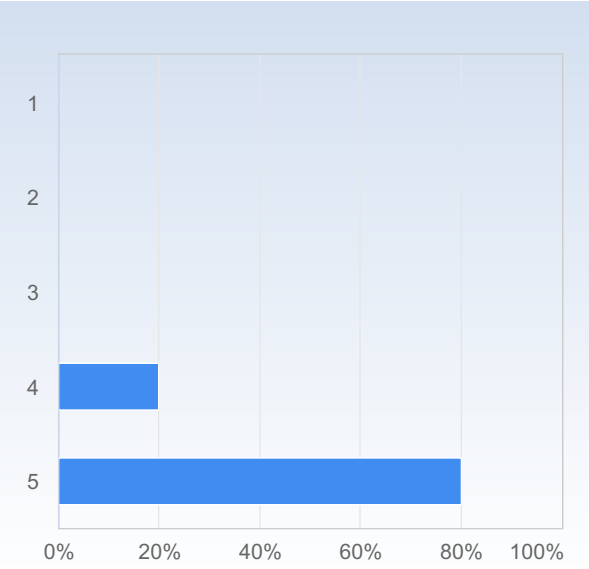
The examination matched the contents and level of the course.	Number of responses
1	0 (0.0%)
2	0 (0.0%)
3	0 (0.0%)
4	1 (10.0%)
5	9 (90.0%)
Total	10 (100.0%)



	Mean	Standard Deviation
The examination matched the contents and level of the course.	4.9	0.3

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 (20.0%)
5	8 (80.0%)
Total	10 (100.0%)



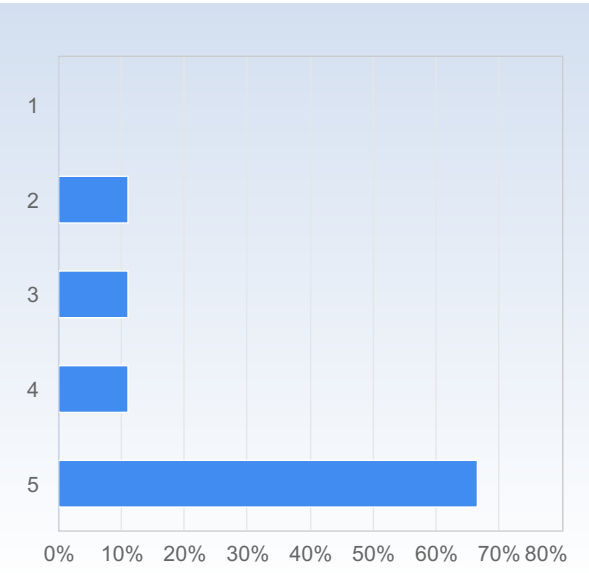
	Mean	Standard Deviation
Overall, I am satisfied with the course.	4.8	0.4

Specific activities

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

The Challenging Problems were valuable for my learning

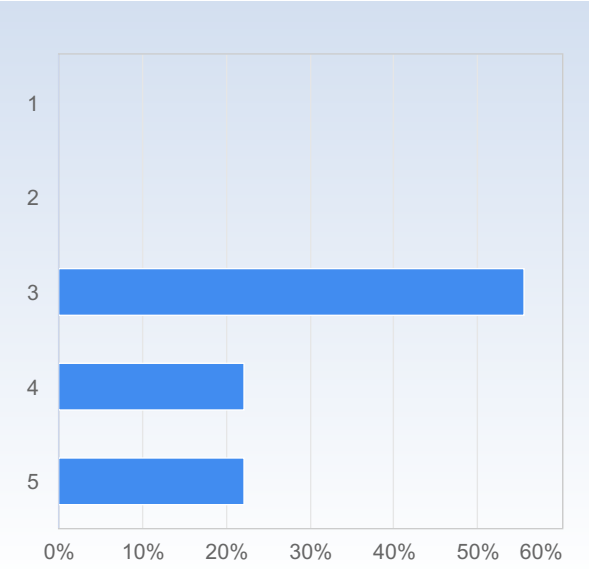
The Challenging Problems were valuable for my learning	Number of responses
1	0 (0.0%)
2	1 (11.1%)
3	1 (11.1%)
4	1 (11.1%)
5	6 (66.7%)
Total	9 (100.0%)



	Mean	Standard Deviation
The Challenging Problems were valuable for my learning	4.3	1.1

The Cryptography Exercise was valuable for my learning

The Cryptography Exercise was valuable for my learning	Number of responses
1	0 (0.0%)
2	0 (0.0%)
3	5 (55.6%)
4	2 (22.2%)
5	2 (22.2%)
Total	9 (100.0%)



	Mean	Standard Deviation
The Cryptography Exercise was valuable for my learning	3.7	0.9

Comments on the Challenging Problems or the Cryptography Exercise
The challenging problems were a great addition!
Have not seen to much sense in the challenging problems but was at least a bit interesting though
Challenging Problems: The challenge problems were quite fun and overall I appreciate having them as an optional feature in the course. Cryptography Exercise: The cryptography exercise was a bit of a "weird" addition to the course, largely because it feels as just haphazard addition to the main course content for the sake of illustrating that modular arithmetic is used in certain encryption methods. Additionally, I think that just like how cryptography "in real life" is primarily employed for digital communication I likewise think that if the cryptography exercise is to remain a part of the course then it would make sense to permit solutions in the form of computer programs (perhaps collaborative scripts written in groups), as performing all the necessary computations by hand can be rather finicky/unpleasant.

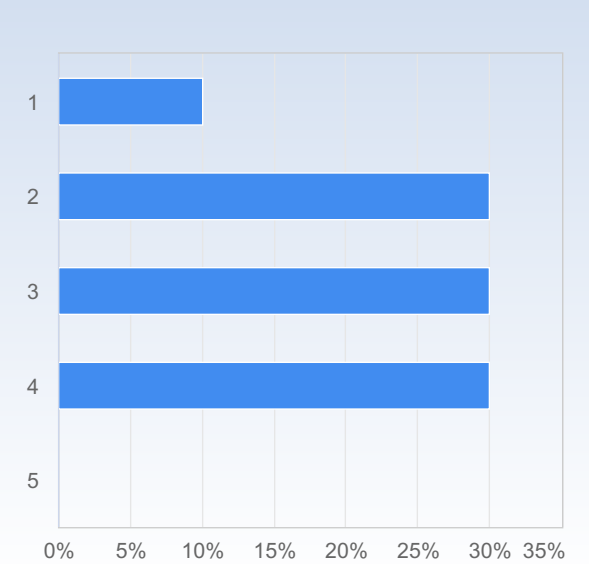
Seminars

A new format for the problem demonstrations was introduced, with two different roles - one student presenting the problem and another one solving it. In addition, in the beginning, we divided the class into two groups running simultaneous demonstrations.

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

The division into present/solve improved the quality of the demonstrations

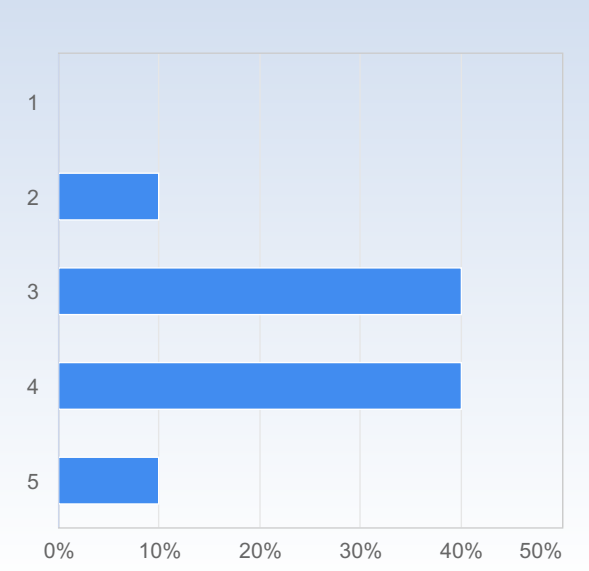
The division into present/solve improved the quality of the demonstrations	Number of responses
1	1 (10.0%)
2	3 (30.0%)
3	3 (30.0%)
4	3 (30.0%)
5	0 (0.0%)
Total	10 (100.0%)



	Mean	Standard Deviation
The division into present/solve improved the quality of the demonstrations	2.8	1.0

The division into present/solve encouraged me to prepare for the seminars

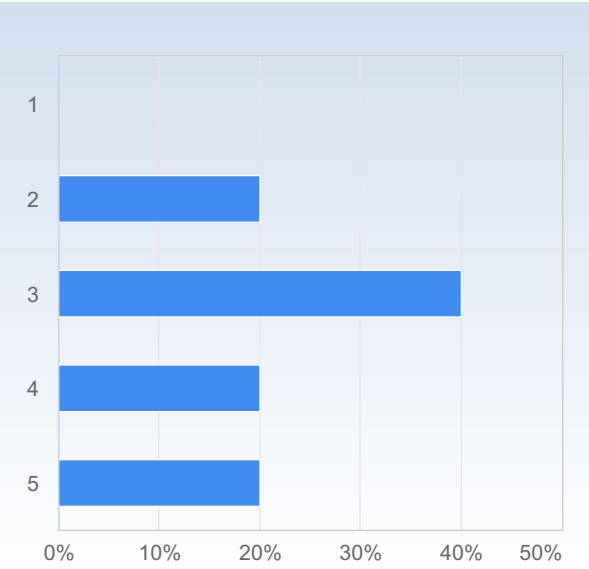
The division into present/solve encouraged me to prepare for the seminars	Number of responses
1	0 (0.0%)
2	1 (10.0%)
3	4 (40.0%)
4	4 (40.0%)
5	1 (10.0%)
Total	10 (100.0%)



	Mean	Standard Deviation
The division into present/solve encouraged me to prepare for the seminars	3.5	0.8

The splitting into two groups was beneficial for my learning

The splitting into two groups was beneficial for my learning	Number of responses
1	0 (0.0%)
2	2 (20.0%)
3	4 (40.0%)
4	2 (20.0%)
5	2 (20.0%)
Total	10 (100.0%)



	Mean	Standard Deviation
The splitting into two groups was beneficial for my learning	3.4	1.1

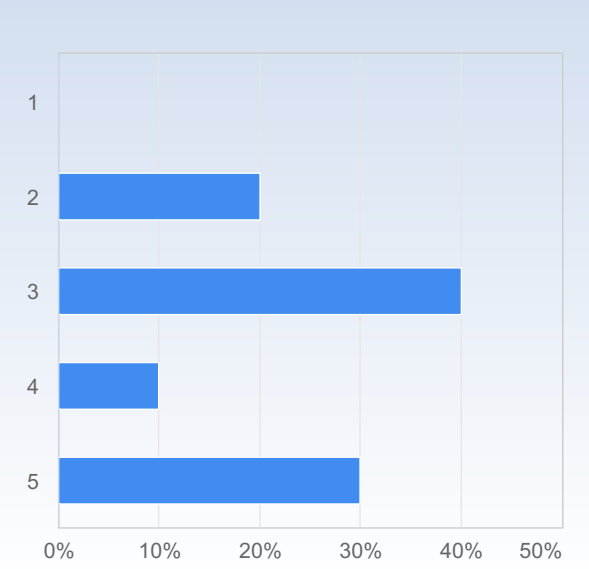
General comments on the format for the seminars
In my experience presenting the problem separately is not particularly helpful
Generally speaking, the seminars were fine -- though the subdivision between "presenter and solver" was a little odd, especially if the problem in question was entirely presented in only a few words which rendered the "presenter" somewhat unnecessary. However, I do appreciate the possibility of someone being solely a presenter as it enables active participation from those who were perhaps unable to solve the problems on their own, or are alternatively perhaps uncomfortable with publicly presenting their solutions thus this may enable a way for them to get more accustomed to such a "public speaking" setting. In summary, I don't really have a strongly formed on opinion on the matter.
Splitting the group was good because I'm a shy person and I was less scared of making mistakes in front of a big group. Of course I know that everyone in the group is very nice and doesn't mean it personal when they criticise and question my solution, but it encourages everyone to ask all of their "dumb" questions.
Presenting an exercise is however not really a task conpared to solving it.

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.

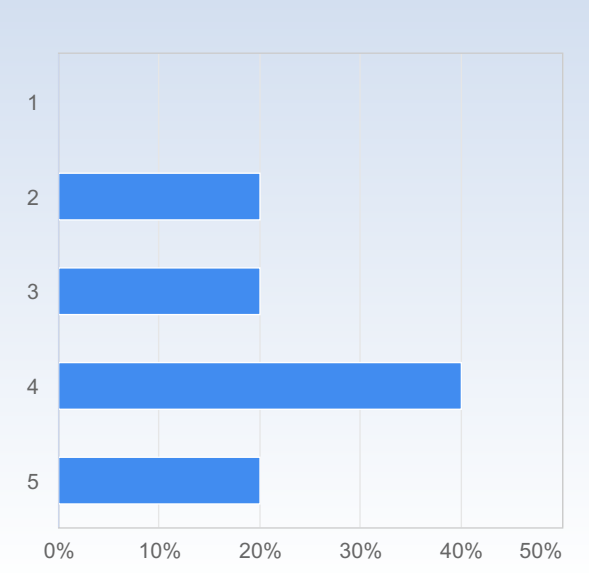
The course has increased my ability to read a mathematical text.	Number of responses
1	0 (0.0%)
2	2 (20.0%)
3	4 (40.0%)
4	1 (10.0%)
5	3 (30.0%)
Total	10 (100.0%)



	Mean	Standard Deviation
The course has increased my ability to read a mathematical text.	3.5	1.2

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

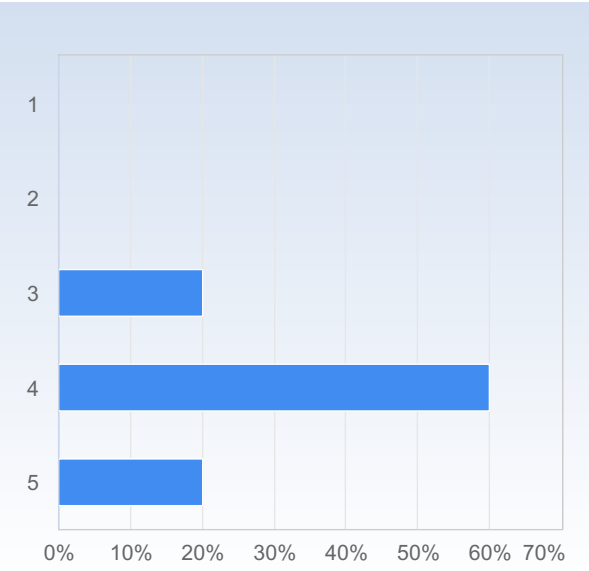
The course has increased my ability to communicate the subject in writing.	Number of responses
1	0 (0.0%)
2	2 (20.0%)
3	2 (20.0%)
4	4 (40.0%)
5	2 (20.0%)
Total	10 (100.0%)



	Mean	Standard Deviation
The course has increased my ability to communicate the subject in writing.	3.6	1.1

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

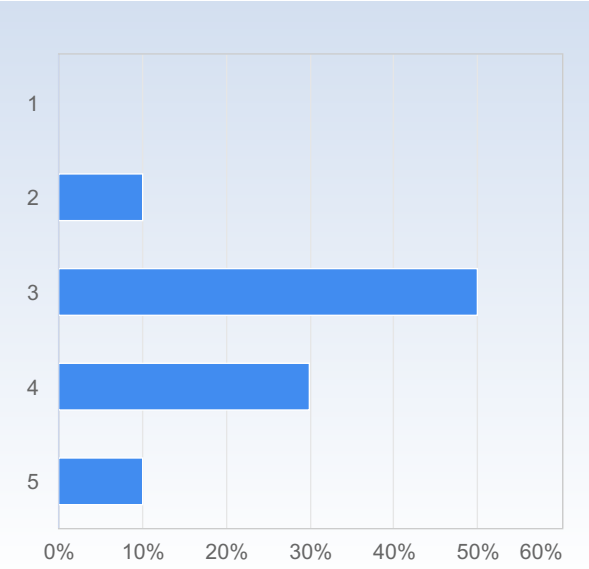
The course has increased my ability to communicate the subject orally.	Number of responses
1	0 (0.0%)
2	0 (0.0%)
3	2 (20.0%)
4	6 (60.0%)
5	2 (20.0%)
Total	10 (100.0%)



	Mean	Standard Deviation
The course has increased my ability to communicate the subject orally.	4.0	0.7

The course has increased my ability to cooperate.

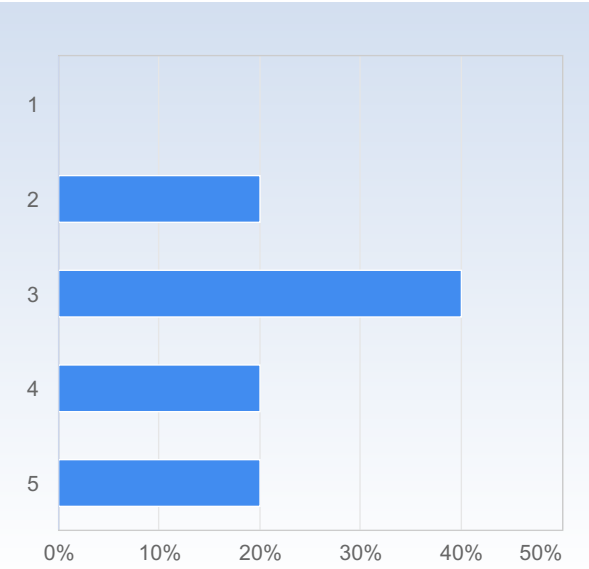
The course has increased my ability to cooperate.	Number of responses
1	0 (0.0%)
2	1 (10.0%)
3	5 (50.0%)
4	3 (30.0%)
5	1 (10.0%)
Total	10 (100.0%)



	Mean	Standard Deviation
The course has increased my ability to cooperate.	3.4	0.8

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

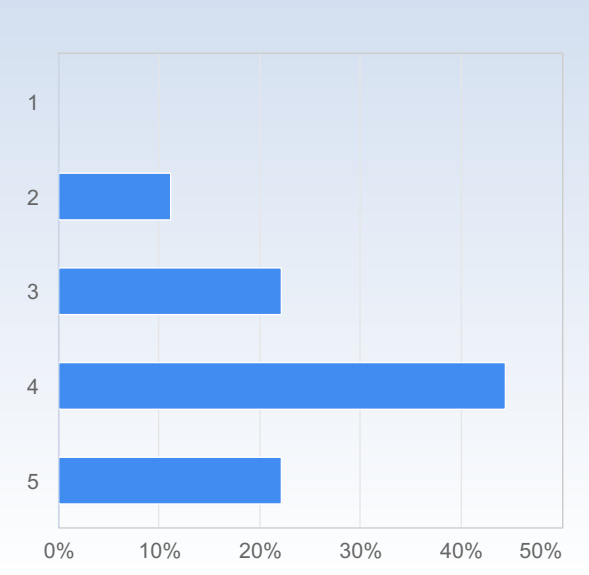
The course has increased my ability to search and process information.	Number of responses
1	0 (0.0%)
2	2 (20.0%)
3	4 (40.0%)
4	2 (20.0%)
5	2 (20.0%)
Total	10 (100.0%)



	Mean	Standard Deviation
The course has increased my ability to search and process information.	3.4	1.1

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

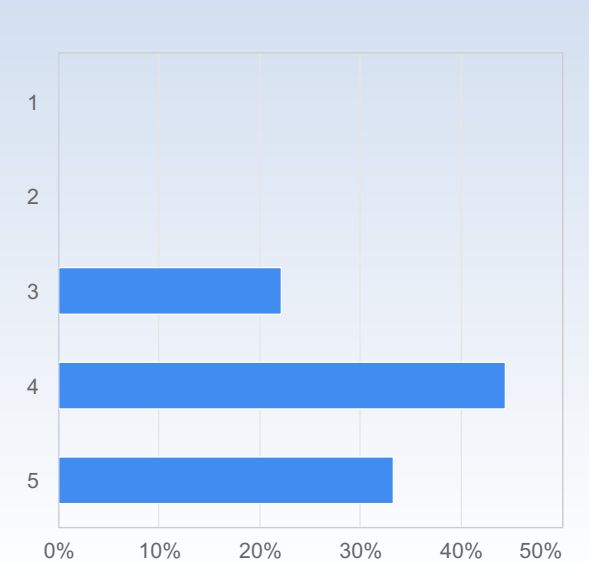
The course has increased my ability to analyze and solve problems.	Number of responses
1	0 (0.0%)
2	1 (11.1%)
3	2 (22.2%)
4	4 (44.4%)
5	2 (22.2%)
Total	9 (100.0%)



	Mean	Standard Deviation
The course has increased my ability to analyze and solve problems.	3.8	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 (22.2%)
4	4 (44.4%)
5	3 (33.3%)
Total	9 (100.0%)



	Mean	Standard Deviation
As a result of this course, I feel confident about tackling unfamiliar problems.	4.1	0.8

What did you appreciate most with the course?

What did you appreciate most with the course?
I was not expecting to enjoy this subject coming in, but a combination of good lectures and (especially) engaging exercises changed my mind, and it ended up being one of my favorite courses of the semester. The challenging problems in particular were a great motivation to think a bit more carefully about the course content.
Relaxed learning atmosphere, speed and content of lectures
Interesting topics and the challenging exercises were good level of difficulty
There are two that come to mind here. Firstly, the lecturer is very good. Secondly, abundance of optional ("graded/bonus") content (seminars, challenge problems) is great as it encourages active participation from students without coercing them into actively participating. Overall though the course is quite enjoyable.
You really put a lot of effort in the teaching and were very approachable.
I liked the way the seminars were run.

What do you think should be improved?

What do you think should be improved?
The division into groups for presenting and solving problems respectively seemed a little pointless. I can definitely see the motivation for it, but in practice I think it makes more sense for the student solving to also present.
Some written solutions for the exercises from the teacher would be nice, you could still keep the point system for presenting problems
I think there are a few minor points in the course which seem a tad incoherent -- though admittedly this is more a fault of the course book rather than any external influence. For instance, the chapter on Fibonacci numbers just doesn't really seem to "fit" with the rest of the course. I think instead of the Fibonacci segment it would make more sense to include the part of chapter 6 on the floor function as it is utilized in several proofs relating to quadratic reciprocity.
You could be clearer about what is expected in the oral, also it wasn't quite fair that there were mistakes in the questions of the written exam. That happens of course, but I hope you were more lenient in the grading then.
Not sure

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, super friendly teacher!
Nope.
not at all
No