LUND UNIVERSITY

Centre for Mathematical Sciences
Division of Mathematics and Numerical Analysis

Centre for Mathematical Sciences
Faculty of Science

Course Analysis for MATA32 Algebra and Vector Geometry, Autumn 2024

Course Information

Lecturer: Anna-Maria Persson
Teaching assistants: Frej Weiström Dahlin, Raul Hindov, Jorge Farina Asategui
Number of students:
There were 95 registered students in total; 79 students have been registered within a Bachelor programme specialisation (mathematics and physics) and 16 students took the course as part of the course package Mathematics 1.
19 students answered the course evaluation. The majority of respondents were from the Bachelor's Programme in Physics, Theoretical Physics, and Astronomy (57.9 %), followed by the Bachelor's Programme in Mathematics (31.6 %). One factor that could have contributed to the low response rate is the unfortunate fact that the original evaluation survey, that has been automatically sent on the course website through canvas Survey, contained no questions. One this error has been noticed, a new evaluation survey was set up manually, but despite several announcements send to the students, the response rate remained low.

Examination

The examination consists of group and individual assignments (1.5 credits) and a final written examination (6 credits).
Assignments: 79 students passed.
Written examination:
- Ordinary examination 11/12 2024:
  75 students participated and 66 students passed; 28 obtained the grade Pass (P) and 38 with the grade Pass with distinction (PWD)
- Resit examination 15/01 2025:
  11 students participated and 5 of them passed, 4 with the grade P, 1 with PWD

Final grades
In all, 70 students have got their final grade. 39 passed with distinction and 31 passed.

Course Evaluation

Summary of student's answers:
The course received a mean satisfaction score of 4.3 out of 5. The way the course was taught and organized received a score of 3.8. The number of teacher-led activities were rated 4.2, indicating general satisfaction with lectures and seminars.
Lectures were rated 3.8 for their value in learning, while seminars received a lower score of 2.4, suggesting room for improvement. The exercise classes and the mentor meetings were rated 2.8, showing

Please, turn over!

that students found them somewhat helpful. Finally, self-studies were highly rated with a score of 4.4 for their value in learning.
The course literature was rated 3.5, indicating that some students found it useful while others did not. The Canvas platform was well-received with a score of 4.3.
Regarding communication and feedback, both the pre-course information and communication with teaching staff were rated 4.5, showing that students felt well-informed before the course started and indicating good interaction and suppor during the course. The assignments were highly valued (4.6), but feedback from teachers was rated slightly lower at 3.6.
The workload was generally considered reasonable, with a score of 4.3. The students expressed that the examination matched the course content well (4.5).
Regarding skill development, the students's answers indicate that the course helped improve their reading of mathematical texts with a score of 3.9 and was effective in enhancing problem-solving skills, with a score of 4.2. Regarding improving writing and communication skills, the course was rated 3.7 and 3.6 when it comes to cooperation.
It is worth noting that a significant number of the respondents (52.6 %) took the refresher course MNXA21 before starting this course. However, there were mixed responses regarding prior knowledge of linear algebra and geometry, with a mean score of 2.5.
In general, students appreciated the friendly and approachable teaching style, well-structured lectures, and the availability of resources. Regarding areas of improvement, their suggestions included better seminar structure, more intuitive and visual teaching methods, and clearer connections between algebra and linear algebra topics.

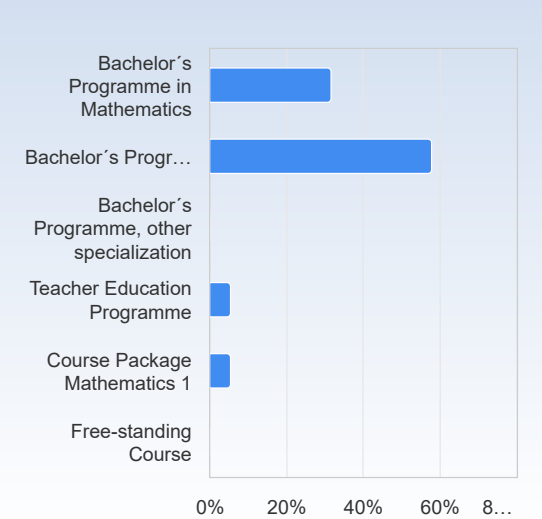
Teachers' comments:
Changes from the previous course realisation:
The course was given for the first time this semester and it covers topics from two old courses, namely MATA22 Linear algebra 1 and MATA23 Foundations of Algebra. Some of the content from MATA22 and MATA23 has been moved to new upcoming courses in Linear algebra and Discrete mathematics. The course was allocated a higher number of teacher-lead activities than the old course MATA22, but in proportion with a 7.5 credits course at basic level.
Course implementation:
The course has been given at quarter study pace during the semester, in parallel to MATA31 Analysis in One Variable and NUMA01 Computational programming in Python.
The teaching was structured in a rather classical manner, with lectures introducing new material from a theoretical perspective, followed by non-mandatory exercise classes where the students could work with the material and solve related problems, and then by seminars dedicated mainly to problem solving presentations. Mentor meetings have been arranged during the semester for smaller groups of students. The mentor meetings focused partly on study management and general skills but they were in general more tightly linked to the parallel course MATA31. The lectures had in general a higher attendance rate than the seminars which have been rated as less efficient.
We would like to mention that the passing rate for this course was significantly higher than the average passing rate of the old courses MATA22 and MATA23 in the past years.
Suggestions for the next course realisation:
For the next course realisation, especially since the course will be given at 50% study pace during one half of the semester, we recommend to reduce the number a lectures by 3-4 lectures and incorporate some small parts of material covered in the lectures into the corresponding seminars connecting these directly to problem-solving. Regarding the literature, recommend some supplementary resources with a lower level of abstraction than the main compendia.

MATA32HT24 Algebra and Vector Geometry

Respondents: 113
Answer Count: 19
Answer Frequency: 16.81%

I have studied this course as part of

I have studied this course as part of	Number of responses
Bachelor´s Programme in Mathematics	6 (31.6%)
Bachelor´s Programme in Physics, Theoretical Physics, Astronomy	11 (57.9%)
Bachelor´s Programme, other specialization	0 (0.0%)
Teacher Education Programme	1 (5.3%)
Course Package Mathematics 1	1 (5.3%)
Free-standing Course	0 (0.0%)
Total	19 (100.0%)

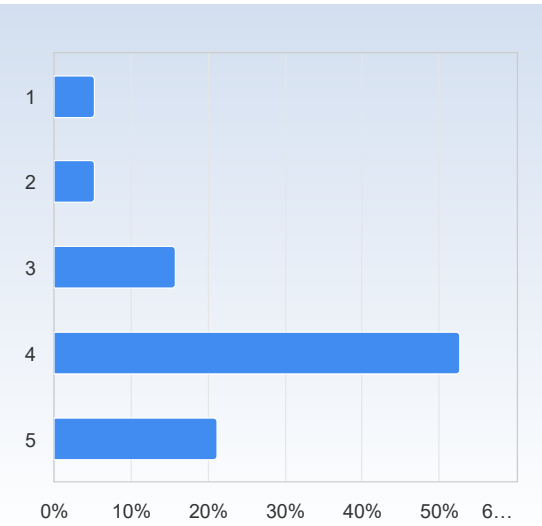


	Mean	Standard Deviation
I have studied this course as part of	2.3	1.9

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 has been satisfactory.

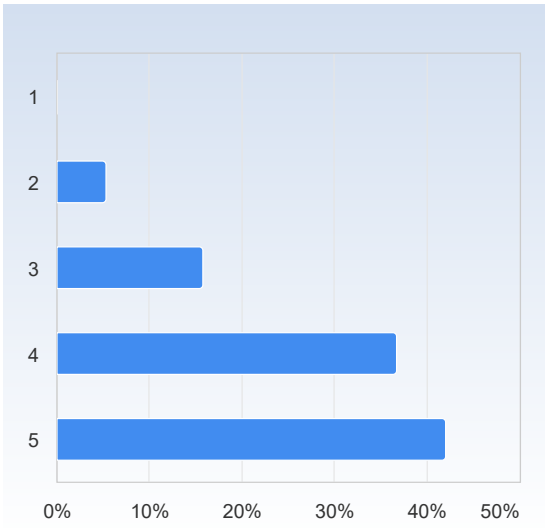
The way the course was taught and organised has been satisfactory.	Number of responses
1	1 (5.3%)
2	1 (5.3%)
3	3 (15.8%)
4	10 (52.6%)
5	4 (21.1%)
Total	19 (100.0%)



	Mean	Standard Deviation
The way the course was taught and organised has been satisfactory.	3.8	1.0

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

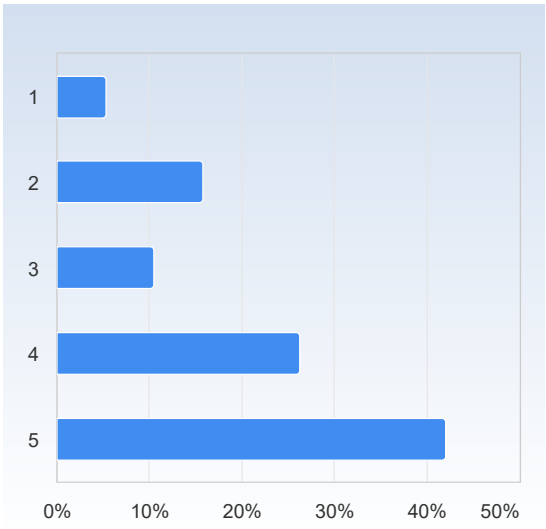
The number of teacher lead activities (lectures, seminars etc.) has been satisfactory.	Number of responses
1	0 (0.0%)
2	1 (5.3%)
3	3 (15.8%)
4	7 (36.8%)
5	8 (42.1%)
Total	19 (100.0%)



	Mean	Standard Deviation
The number of teacher lead activities (lectures, seminars etc.) has been satisfactory.	4.2	0.9

The lectures were valuable for my learning.

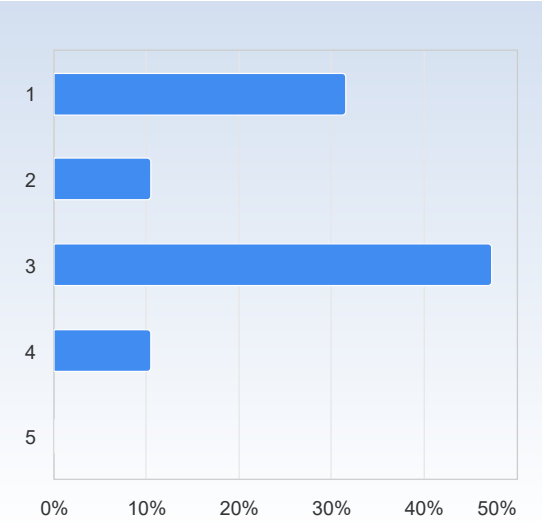
The lectures were valuable for my learning.	Number of responses
1	1 (5.3%)
2	3 (15.8%)
3	2 (10.5%)
4	5 (26.3%)
5	8 (42.1%)
Total	19 (100.0%)



	Mean	Standard Deviation
The lectures were valuable for my learning.	3.8	1.3

The seminars were valuable for my learning.

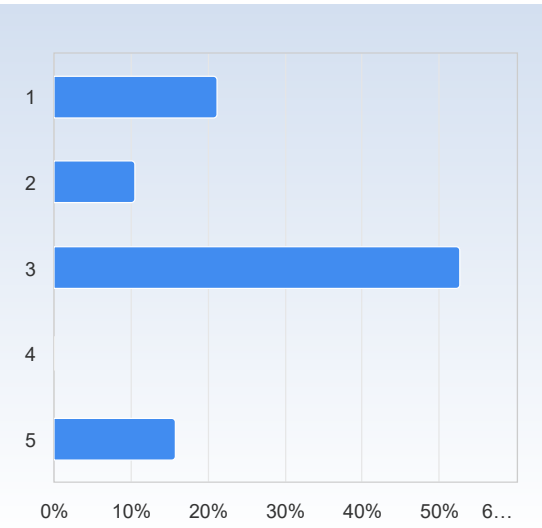
The seminars were valuable for my learning.	Number of responses
1	6 (31.6%)
2	2 (10.5%)
3	9 (47.4%)
4	2 (10.5%)
5	0 (0.0%)
Total	19 (100.0%)



	Mean	Standard Deviation
The seminars were valuable for my learning.	2.4	1.1

The exercise classes were valuable for my learning.

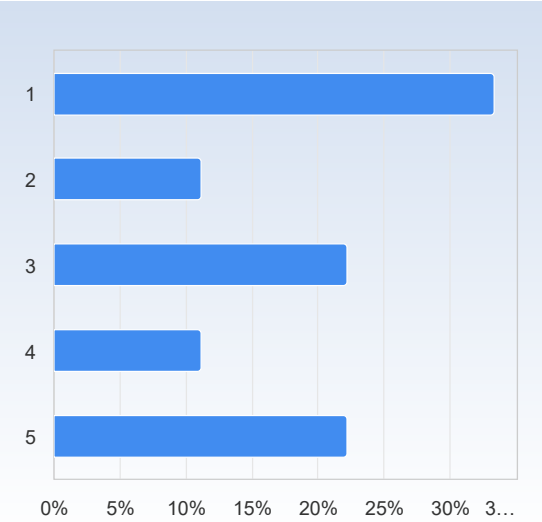
The exercise classes were valuable for my learning.	Number of responses
1	4 (21.1%)
2	2 (10.5%)
3	10 (52.6%)
4	0 (0.0%)
5	3 (15.8%)
Total	19 (100.0%)



	Mean	Standard Deviation
The exercise classes were valuable for my learning.	2.8	1.3

The mentor meetings were valuable for my learning.

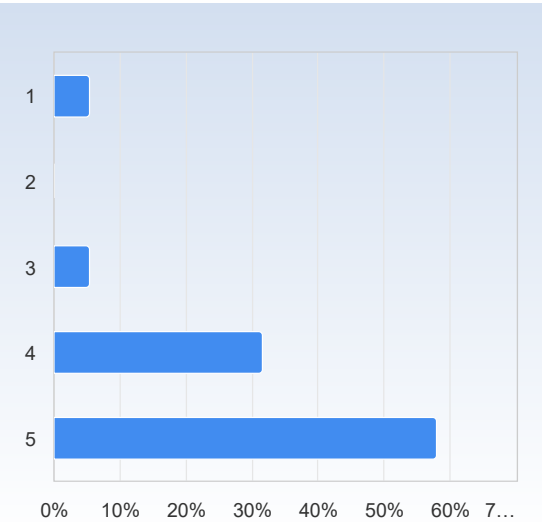
The mentor meetings were valuable for my learning.	Number of responses
1	6 (33.3%)
2	2 (11.1%)
3	4 (22.2%)
4	2 (11.1%)
5	4 (22.2%)
Total	18 (100.0%)



	Mean	Standard Deviation
The mentor meetings were valuable for my learning.	2.8	1.6

Studying on my own was valuable for my learning.

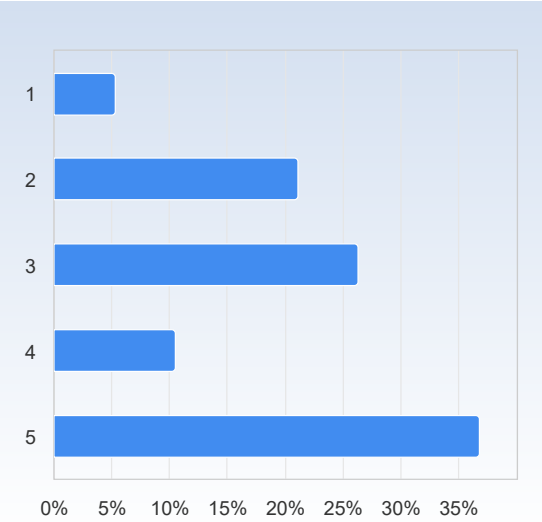
Studying on my own was valuable for my learning.	Number of responses
1	1 (5.3%)
2	0 (0.0%)
3	1 (5.3%)
4	6 (31.6%)
5	11 (57.9%)
Total	19 (100.0%)



	Mean	Standard Deviation
Studying on my own was valuable for my learning.	4.4	1.0

The course literature/material was a valuable learning resource.

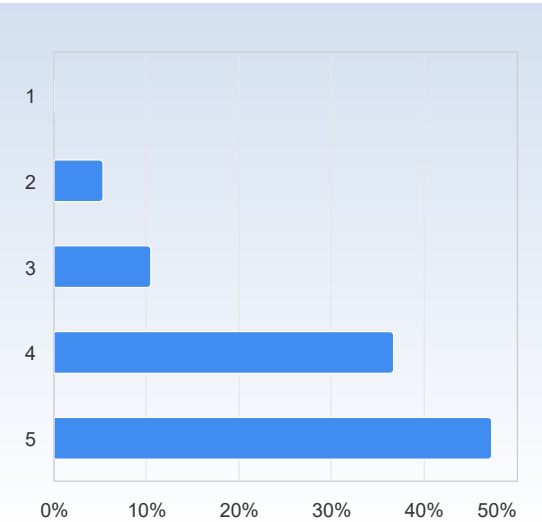
The course literature/material was a valuable learning resource.	Number of responses
1	1 (5.3%)
2	4 (21.1%)
3	5 (26.3%)
4	2 (10.5%)
5	7 (36.8%)
Total	19 (100.0%)



	Mean	Standard Deviation
The course literature/material was a valuable learning resource.	3.5	1.3

The course website in Canvas worked well as a learning platform.

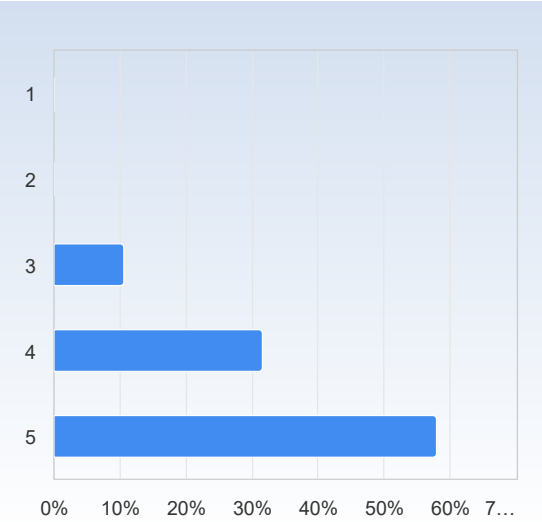
The course website in Canvas worked well as a learning platform.	Number of responses
1	0 (0.0%)
2	1 (5.3%)
3	2 (10.5%)
4	7 (36.8%)
5	9 (47.4%)
Total	19 (100.0%)



	Mean	Standard Deviation
The course website in Canvas worked well as a learning platform.	4.3	0.9

The information I received before the course start was satisfactory.

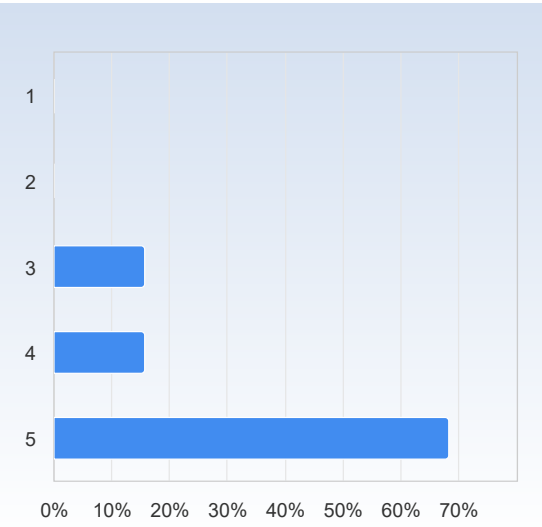
The information I received before the course start was satisfactory.	Number of responses
1	0 (0.0%)
2	0 (0.0%)
3	2 (10.5%)
4	6 (31.6%)
5	11 (57.9%)
Total	19 (100.0%)



	Mean	Standard Deviation
The information I received before the course start was satisfactory.	4.5	0.7

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

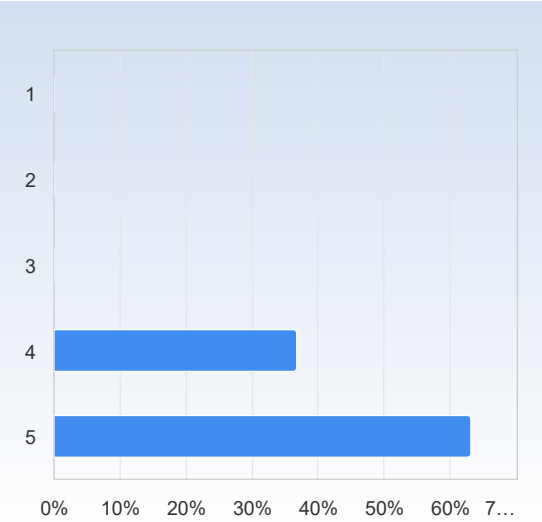
The communication with the teaching staff during the course was satisfactory.	Number of responses
1	0 (0.0%)
2	0 (0.0%)
3	3 (15.8%)
4	3 (15.8%)
5	13 (68.4%)
Total	19 (100.0%)



	Mean	Standard Deviation
The communication with the teaching staff during the course was satisfactory.	4.5	0.8

The assignments have been valuable for my learning.

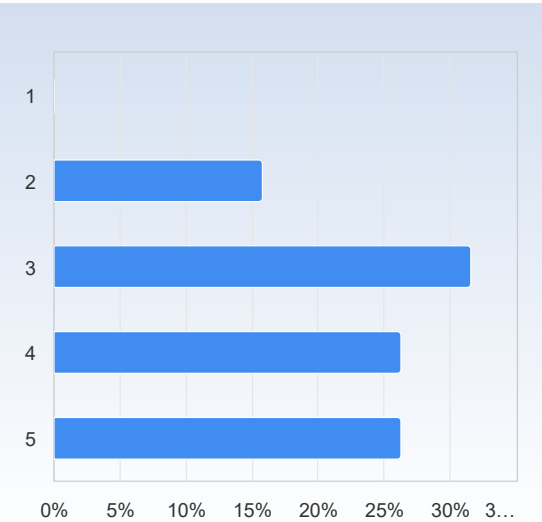
The assignments have been valuable for my learning.	Number of responses
1	0 (0.0%)
2	0 (0.0%)
3	0 (0.0%)
4	7 (36.8%)
5	12 (63.2%)
Total	19 (100.0%)



	Mean	Standard Deviation
The assignments have been valuable for my learning.	4.6	0.5

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

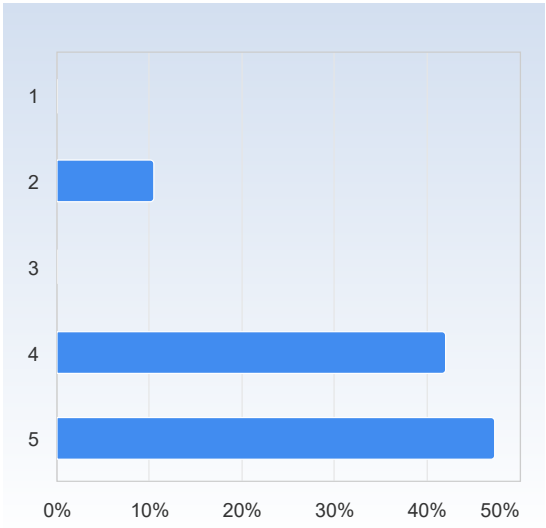
I have received valuable feedback from my teachers during the course.	Number of responses
1	0 (0.0%)
2	3 (15.8%)
3	6 (31.6%)
4	5 (26.3%)
5	5 (26.3%)
Total	19 (100.0%)



	Mean	Standard Deviation
I have received valuable feedback from my teachers during the course.	3.6	1.1

The course had a reasonable workload.

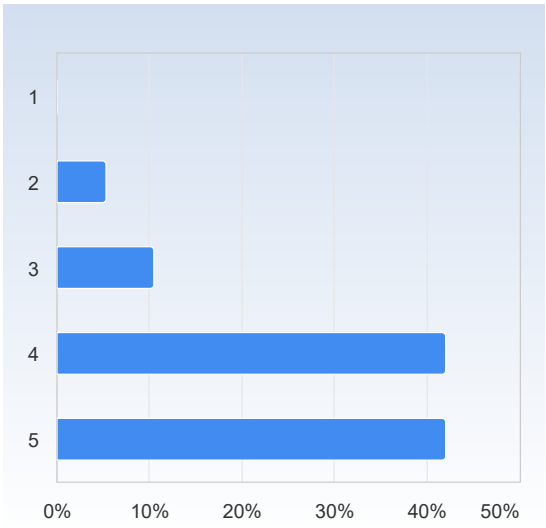
The course had a reasonable workload.	Number of responses
1	0 (0.0%)
2	2 (10.5%)
3	0 (0.0%)
4	8 (42.1%)
5	9 (47.4%)
Total	19 (100.0%)



	Mean	Standard Deviation
The course had a reasonable workload.	4.3	0.9

The workload was evenly distributed throughout the course.

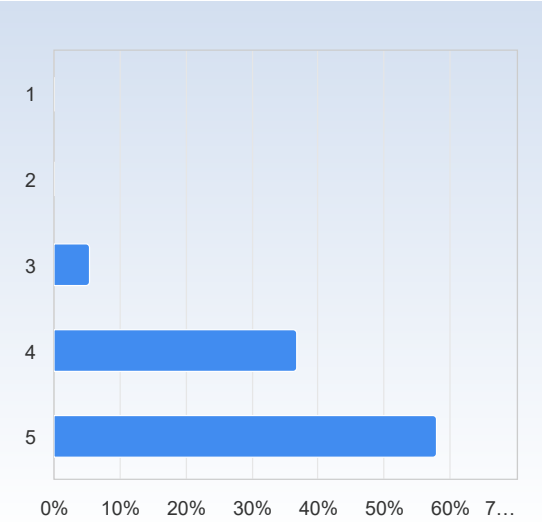
The workload was evenly distributed throughout the course.	Number of responses
1	0 (0.0%)
2	1 (5.3%)
3	2 (10.5%)
4	8 (42.1%)
5	8 (42.1%)
Total	19 (100.0%)



	Mean	Standard Deviation
The workload was evenly distributed throughout the course.	4.2	0.9

The examination matched the contents and level of the course.

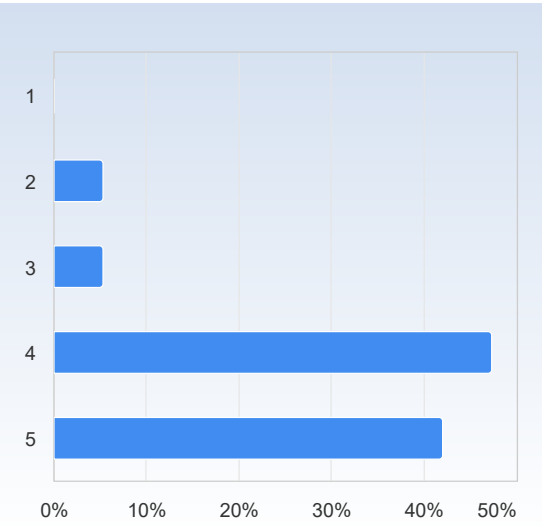
The examination matched the contents and level of the course.	Number of responses
1	0 (0.0%)
2	0 (0.0%)
3	1 (5.3%)
4	7 (36.8%)
5	11 (57.9%)
Total	19 (100.0%)



	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	1 (5.3%)
3	1 (5.3%)
4	9 (47.4%)
5	8 (42.1%)
Total	19 (100.0%)

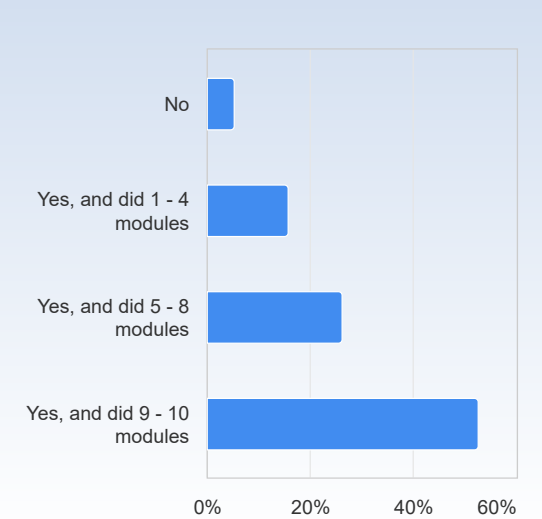


	Mean	Standard Deviation
Overall, I am satisfied with the course.	4.3	0.8

Kommentar
I feel like the lectures could have focused more on the intuition behind the maths we were learning. Like the geometrical meaning of multiplication with complex numbers, matrix multiplication, especially since the course material was so formal. And not only for the geometrical stuff, but also how to think about the more "abstract" proofs of the course, and why they intuitively make sense.
This is arguably one of the most visual fields of mathematics. It lends itself very easily to digital illustations of key concepts. I did not feel like the lectures reflected that. Anna Maria is lovely, and very helpful if you have any question, but sometimes the lectures confused me in a way that one simple illustration could have avoided. For instance talking about and seeing a matrix as a linear transformation of space just made so much more sense to me once I found out about it. The lectures did not cover this, so I found it online. It's a shame because I think some of the technical and tedious proofs of matrix multiplication, for instance, makes a lot of sense intuitively and visually, though it does not algebraically. Leaning into an intuitive and visual approach will, I am convinced, definitely prime students for easier digestion of the more involved elements of this course.

Did you take the refresher course MNXA21 before starting this course?

Did you take the refresher course MNXA21 before starting this course?	Number of responses
No	1 (5.3%)
Yes, and did 1 - 4 modules	3 (15.8%)
Yes, and did 5 - 8 modules	5 (26.3%)
Yes, and did 9 - 10 modules	10 (52.6%)
Total	19 (100.0%)

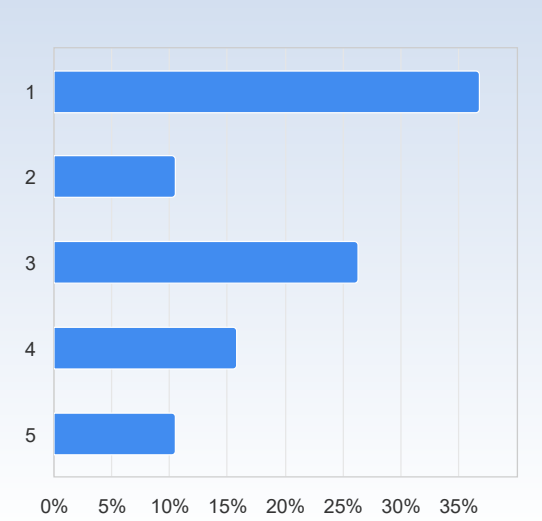


	Mean	Standard Deviation
Did you take the refresher course MNXA21 before starting this course?	3.3	0.9

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

I had studied Linear Algebra and Geometry prior to this course.

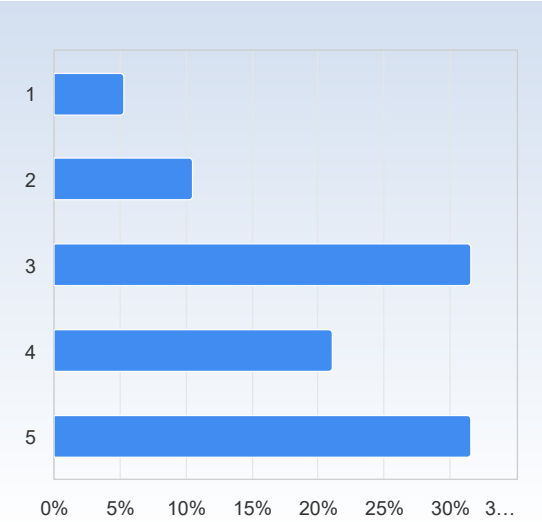
I had studied Linear Algebra and Geometry prior to this course.	Number of responses
1	7 (36.8%)
2	2 (10.5%)
3	5 (26.3%)
4	3 (15.8%)
5	2 (10.5%)
Total	19 (100.0%)



	Mean	Standard Deviation
I had studied Linear Algebra and Geometry prior to this course.	2.5	1.4

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

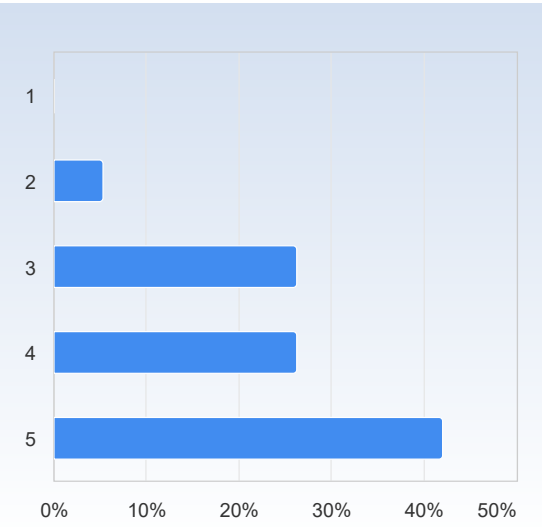
My prior knowledge has been sufficient to assimilate the contents of this course.	Number of responses
1	1 (5.3%)
2	2 (10.5%)
3	6 (31.6%)
4	4 (21.1%)
5	6 (31.6%)
Total	19 (100.0%)



	Mean	Standard Deviation
My prior knowledge has been sufficient to assimilate the contents of this course.	3.6	1.2

I have participated actively in the course.

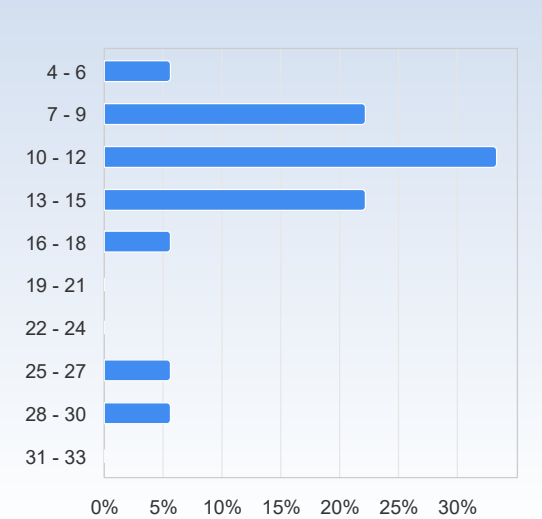
I have participated actively in the course.	Number of responses
1	0 (0.0%)
2	1 (5.3%)
3	5 (26.3%)
4	5 (26.3%)
5	8 (42.1%)
Total	19 (100.0%)



	Mean	Standard Deviation
I have participated actively in the course.	4.1	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
4 - 6	1 (5.6%)
7 - 9	4 (22.2%)
10 - 12	6 (33.3%)
13 - 15	4 (22.2%)
16 - 18	1 (5.6%)
19 - 21	0 (0.0%)
22 - 24	0 (0.0%)
25 - 27	1 (5.6%)
28 - 30	1 (5.6%)
31 - 33	0 (0.0%)
Total	18 (100.0%)



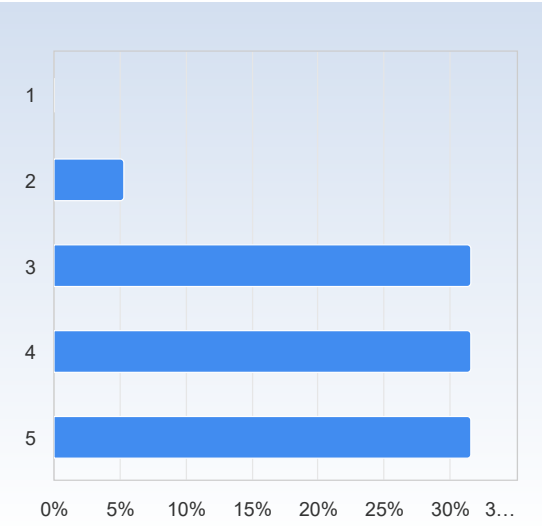
	Mean	Standard Deviation
Average number of hours spent in total on the course per week (including scheduled activities):	12.7	6.2

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.

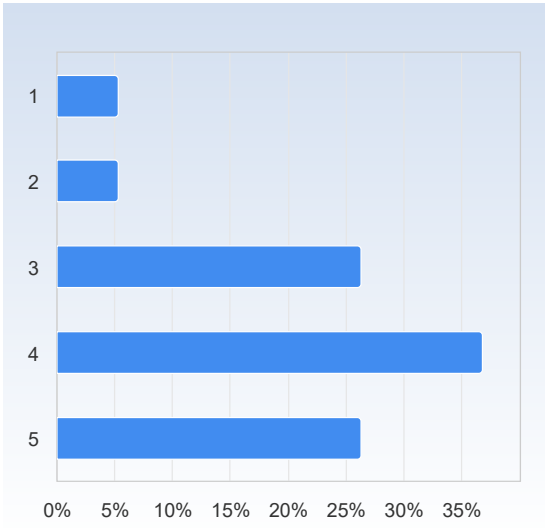
The course has increased my ability to read a mathematical text.	Number of responses
1	0 (0.0%)
2	1 (5.3%)
3	6 (31.6%)
4	6 (31.6%)
5	6 (31.6%)
Total	19 (100.0%)



	Mean	Standard Deviation
The course has increased my ability to read a mathematical text.	3.9	0.9

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

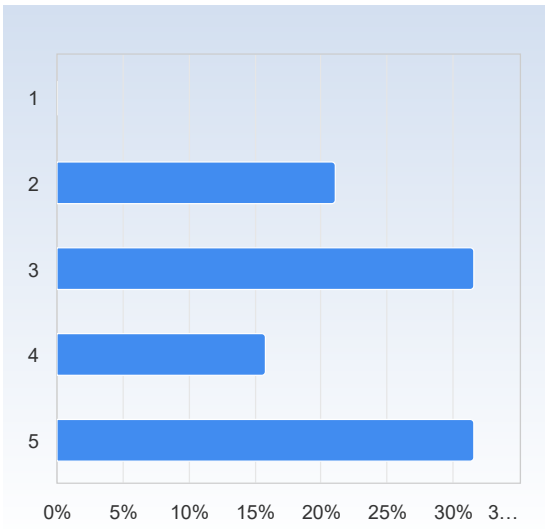
The course has increased my ability to communicate the subject in writing.	Number of responses
1	1 (5.3%)
2	1 (5.3%)
3	5 (26.3%)
4	7 (36.8%)
5	5 (26.3%)
Total	19 (100.0%)



	Mean	Standard Deviation
The course has increased my ability to communicate the subject in writing.	3.7	1.1

The course has increased my ability to cooperate.

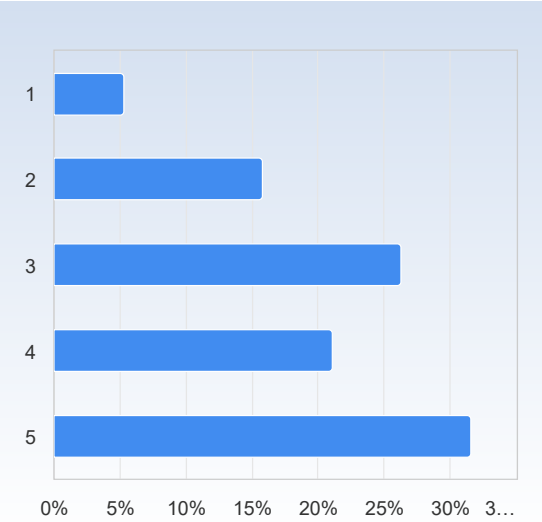
The course has increased my ability to cooperate.	Number of responses
1	0 (0.0%)
2	4 (21.1%)
3	6 (31.6%)
4	3 (15.8%)
5	6 (31.6%)
Total	19 (100.0%)



	Mean	Standard Deviation
The course has increased my ability to cooperate.	3.6	1.2

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

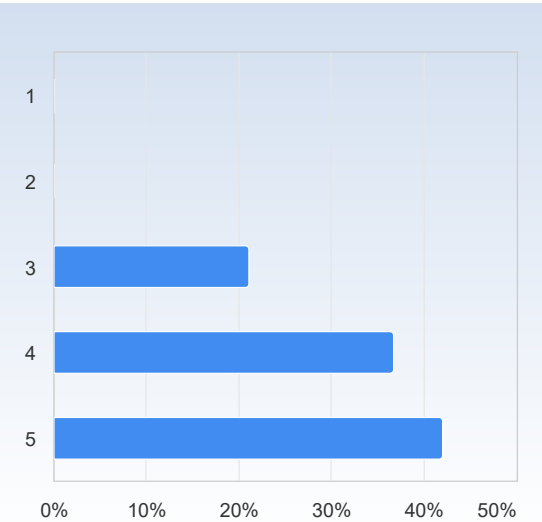
The course has increased my ability to search and process information.	Number of responses
1	1 (5.3%)
2	3 (15.8%)
3	5 (26.3%)
4	4 (21.1%)
5	6 (31.6%)
Total	19 (100.0%)



	Mean	Standard Deviation
The course has increased my ability to search and process information.	3.6	1.3

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

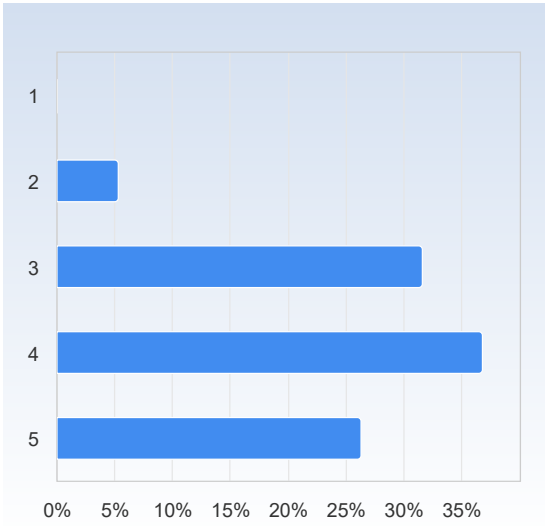
The course has increased my ability to analyze and solve problems.	Number of responses
1	0 (0.0%)
2	0 (0.0%)
3	4 (21.1%)
4	7 (36.8%)
5	8 (42.1%)
Total	19 (100.0%)



	Mean	Standard Deviation
The course has increased my ability to analyze and solve problems.	4.2	0.8

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	1 (5.3%)
3	6 (31.6%)
4	7 (36.8%)
5	5 (26.3%)
Total	19 (100.0%)



	Mean	Standard Deviation
As a result of this course, I feel confident about tackling unfamiliar problems.	3.8	0.9

What did you appreciate most with the course?

What did you appreciate most with the course?
Lecture and exercise classes
The lectures, very good and well structured.
The mock examinations.
The homeworks were a nice collaborative process, but that largely depends on the student you're working with.
The friendly and welcoming approach of the professor. I liked that the lectures were lead in a very friendly way. Even íf i forgot to do the reading before the lecture I was never afraid to come to the lecture since they were lead in a way that you could still follow them even without the prior reading. I also appreciated the lessons before the exam where we revised everything very quickly, I feel like that helped me alot. But once again the thing I liked the most is that the whole course felt very friendly, I felt like I could always ask quesetions without being afraid, I really appreciated the whole atmosphere of it all.
The way the teacher felt very approachable and nice.
The exercises in the compendium and the assignments.
The brute force repetition by going through so many mock exams in the last week was extremely useful.
The lectures where good and the resources given in preparation for the exam felt relevant.
The number of resources available to address our questions.
lectures for revision were really efficient and helpful
the topics
Lector, some seminar teachers, exam structure
A lot of useful math that will help me in my further studies.
I appreciated that the lectures were well-structured and the lecturer was friendly. I also liked that she was clear with her expectations for passing the class.

What do you think should be improved?

What do you think should be improved?
Seminar structure, perhaps include a little problem solving aside from just reviewing homework to engage more people.
Returning to the algebra part for a quick refresher in the middle of the course would have been nice
I am not sure if this is because the algebra course was merged with linear algebra, but I feel like this course was too much in terms of content. Maybe we did not go in as much depth but that might have been actually detrimental to understanding. Personally I found the textbook and lecture notes mostly impossible to understand and follow, so I had to resort to looking for other material online. However this was also exceptionally difficult, since this course doesn't really follow the structure of similar courses elsewhere, and so it left me really confused and demotivated. Unfortunately the seminars were also of no help. If I couldn't do particular task at home I could not hope to have it explained during the seminar, since the harder tasks were usually solved by one particularly knowledgeable student and I don't think anyone really felt comfortable asking for clarification of what just happened on the blackboard. And so despite many honest attempts to study properly, do the work, come to seminars and lectures I always ended up dissapointed and demotivated. Maybe this is also the reason for the low seminar attendance? Now my other complaint is I believe closely related to merging of the two courses. I believe that the information that was 'missing' and left for the LA2 course might have been in many cases crucial to understanding the topic. I kind of feel like we were given some information that should have been connected by this logical underlying structure but wasn't. We were left in the dark, with some terms mentioned on multiple occasions but never properly explained, since this is for the next course. In terms of lectures - maybe it is just me but I also found them hard to follow. On many occassions I decided not to attend and just try to teach myself the topic at home because that was just more time efficient. I think one important thing that could be improved is first giving a really simple example, then moving on to theory, because personally I cannot understand what is happening when I'm shown a lot of symbols at once, especially if they are related to a concept I never studied before.
the seminars. they are too one-dimensional. we only went through the solutions on the suggested problems. i would have loved to see us put some time into solving new problems together to get the feel for how it is in exams when we have to sit there and work through problems. The exercise classes already took care of the things we did in seminars.
In lecture it would have been very good if desmos or any other graph constructor was incorporated in the linear algebra. Specific areas are when talking about planes and shapes. Also some exercise about spheres would have been good In the lecture notes.
Even though this was a 7.5 credit course, we almost had more lectures than in our 15 credit analysis course. It felt like the size of the course was not reflected in the amount of lecture time we had, and that made me feel kind of stressed out.
It felt like two 7,5 HP courser mashed together and shaved off slightly. So like two 6 HP courses togheter, but honestly in the end (once I realized the super hard algebra stuff wouldn’t be on the exam) it felt quite manageable.
1. The main course literature for the algebra part of the course did not feel very pedagogical and as a result the time I spent studying those parts of the course was mostly spent using other resources, for example youtube or the swedish book recommended in the course literature. The lecture notes for the linear algebra part was good however. 2. The structure of the course was not that great in regards to how it split up the algebra and linear algebra part. When we had the final exam which contained questions from both the linear algebra and algebra parts of the course, we had not had any lectures covering the algebra parts of the course since the first half of the semester. I would have much preferred having individual exams for each of the main parts of the course, one given halfway through the semester when the algebra part is concluded and one given at the end of the course covering the linear algebra.
I found the task of having to learn both the linear algebra material and the foundations of algebra material in a 7.5 credit course to be somewhat overwhelming. We could have gone deeper into either if we just did one of them.
Seminars and exercises for revision, as well as exercises for lab after lecture
I missed having a clear view of all the formulas we could have used, which would have simplified our computations significantly, for example, the projection formula. Additionally, during the exam, some numbers were not particularly easy to compute without a calculator (e.g., sqrt (4624)).
I think that generally, you should do a little less of fully-fleshed-out calculations on the blackboards during the lectures. I caught myself zoning out in those moments, and think it would've been more useful to spend this time on intuition, or addressing questions, and leave the computations mostly to us.
The lectures and seminar format. Maybe let us work in smaller groups, where we discuss problems and solution strategies with the possibility of getting help from a phd student.
I feel as the lectures were sometimes rushed. Many examples that were solved on the blackboard were solved extremely fast and it was hard to follow the steps in order to actually understand it.

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.)?
Not at all
No. Not at all. Everything felt very comfortable and welcoming.
Fortunately, no.
No
No.
No
No
nope.
No
No
No.
No
no.
No.