MATB22HT24 Linear Algebra 2

I have studied this course as part of

I have studied this course as part of	Number of responses
Bachelor´s Programme in Mathematics	3 (7.1%)
Bachelor´s Programme in Physics, Theoretical Physics, Astronomy	34 (81.0%)
Bachelor´s Programme, other specialization	1 (2.4%)
Master's Programme in Mathematics	0 (0.0%)
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	4 (9.5%)
Total	42 (100.0%)
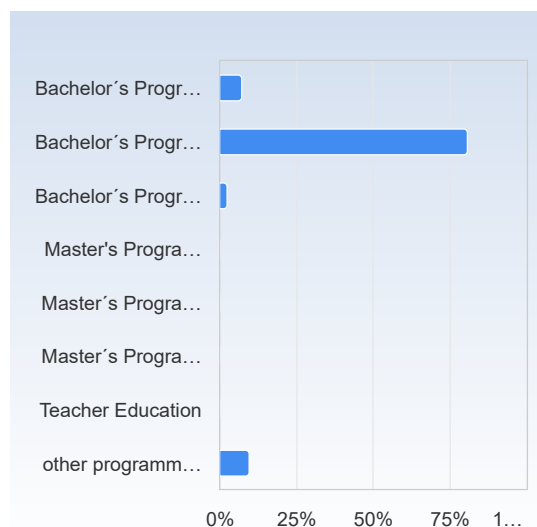
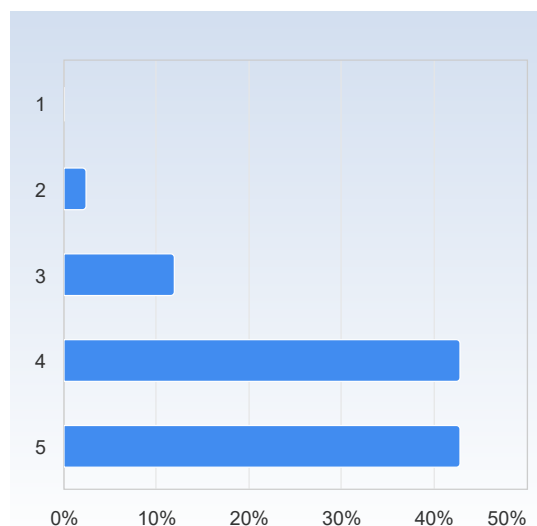|	Mean	Standard Deviation
I have studied this course as part of	2.5	1.8

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 (2.4%)
3	5 (11.9%)
4	18 (42.9%)
5	18 (42.9%)
Total	42 (100.0%)

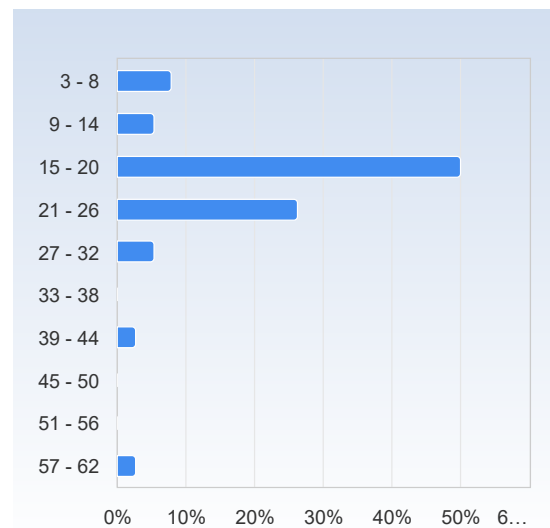|	Mean	Standard Deviation
2. My prior knowledge has been sufficient to assimilate the contents of this course.	4.3	0.8

3. I have participated actively in the course.

3. I have participated actively in the course.	Number of responses
1	1 (2.4%)
2	0 (0.0%)
3	8 (19.0%)
4	12 (28.6%)
5	21 (50.0%)
Total	42 (100.0%)
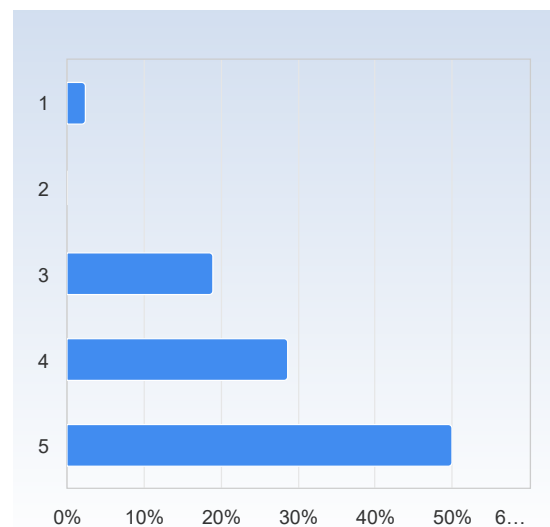
	Mean	Standard Deviation
3. I have participated actively in the course.	4.2	0.9

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
3 - 8	3 (7.9%)
9 - 14	2 (5.3%)
15 - 20	19 (50.0%)
21 - 26	10 (26.3%)
27 - 32	2 (5.3%)
33 - 38	0 (0.0%)
39 - 44	1 (2.6%)
45 - 50	0 (0.0%)
51 - 56	0 (0.0%)
57 - 62	1 (2.6%)
Total	38 (100.0%)

	Mean	Standard Deviation
Average number of hours spent in total on the course per week (including scheduled activities):	20.3	9.8

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

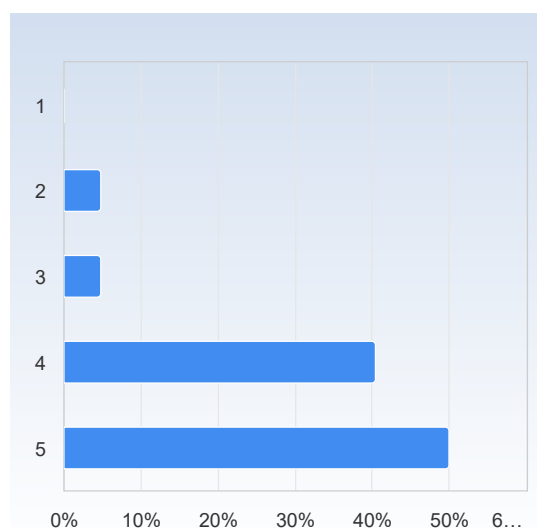**The way the course was taught and organised suited me.**

The way the course was taught and organised suited me.	Number of responses
1	0 (0.0%)
2	5 (11.9%)
3	13 (31.0%)
4	15 (35.7%)
5	9 (21.4%)
Total	42 (100.0%)
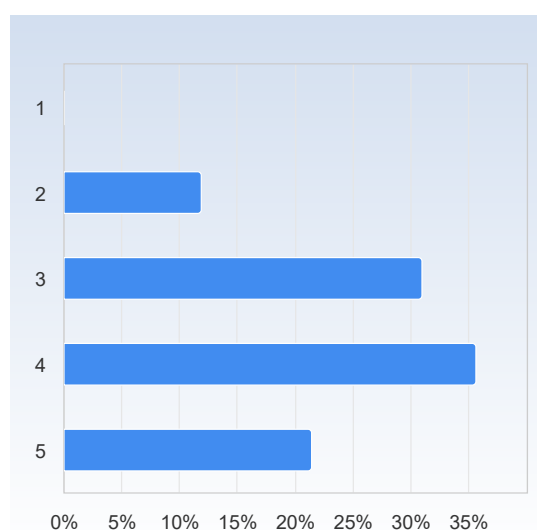
	Mean	Standard Deviation
The way the course was taught and organised suited me.	3.7	1.0

**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	2 (4.8%)
3	2 (4.8%)
4	17 (40.5%)
5	21 (50.0%)
Total	42 (100.0%)

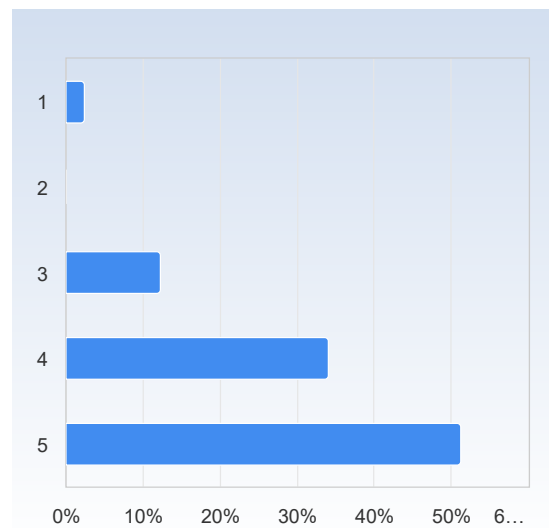|	Mean	Standard Deviation
The number of teacher lead activities (lectures, seminars etc.) has been satisfactory.	4.4	0.8

The lectures were valuable for my learning.

The lectures were valuable for my learning.	Number of responses
1	1 (2.4%)
2	6 (14.3%)
3	8 (19.0%)
4	16 (38.1%)
5	11 (26.2%)
Total	42 (100.0%)
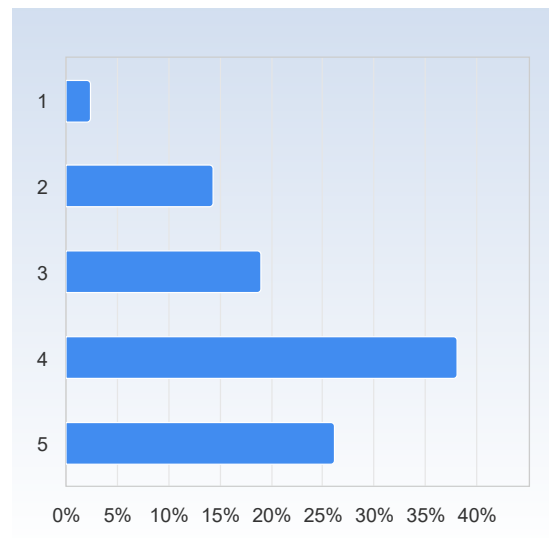
	Mean	Standard Deviation
The lectures were valuable for my learning.	3.7	1.1

The seminars were valuable for my learning.

The seminars were valuable for my learning.	Number of responses
1	1 (2.4%)
2	0 (0.0%)
3	5 (12.2%)
4	14 (34.1%)
5	21 (51.2%)
Total	41 (100.0%)

	Mean	Standard Deviation
The seminars were valuable for my learning.	4.3	0.9

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	3 (7.1%)
4	14 (33.3%)
5	25 (59.5%)
Total	42 (100.0%)
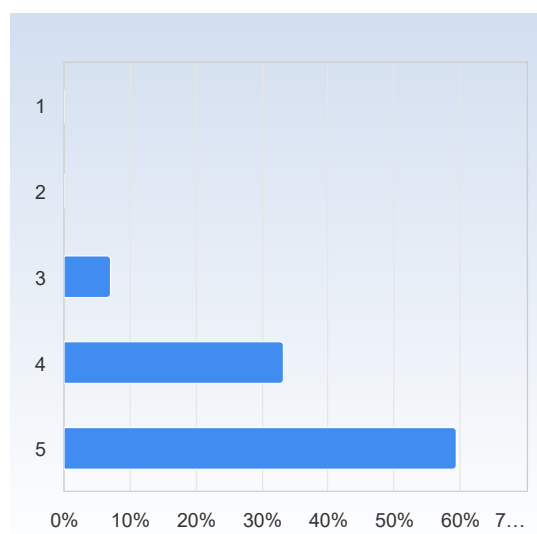
	Mean	Standard Deviation
Studying on my own was valuable for my learning.	4.5	0.6

The course literature/material was a valuable learning resource.

The course literature/material was a valuable learning resource.	Number of responses
1	2 (4.8%)
2	4 (9.5%)
3	14 (33.3%)
4	16 (38.1%)
5	6 (14.3%)
Total	42 (100.0%)
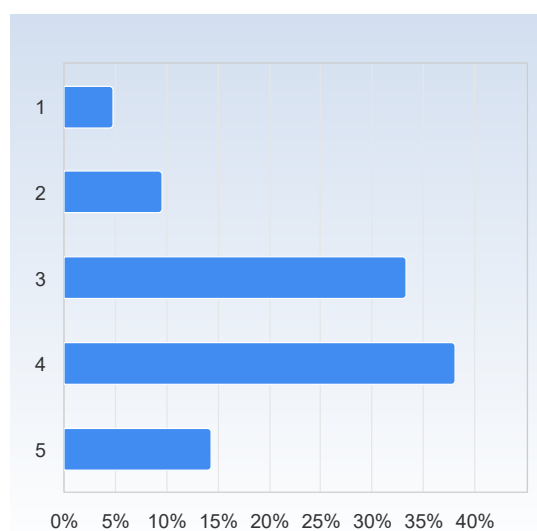
	Mean	Standard Deviation
The course literature/material was a valuable learning resource.	3.5	1.0

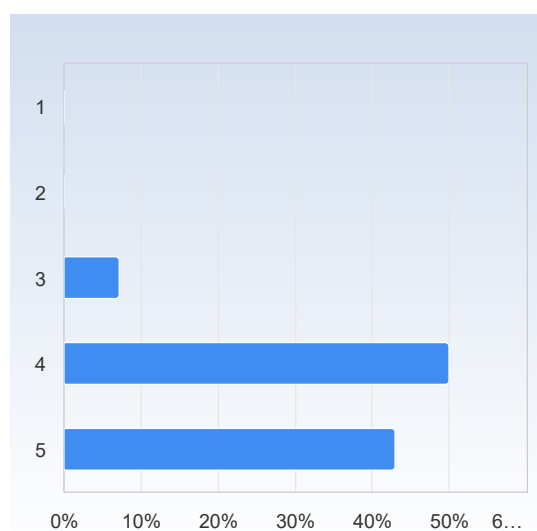**The information I received before the course start was satisfactory.**

The information I received before the course start was satisfactory.	Number of responses
1	0 (0.0%)
2	1 (2.4%)
3	7 (16.7%)
4	19 (45.2%)
5	15 (35.7%)
Total	42 (100.0%)
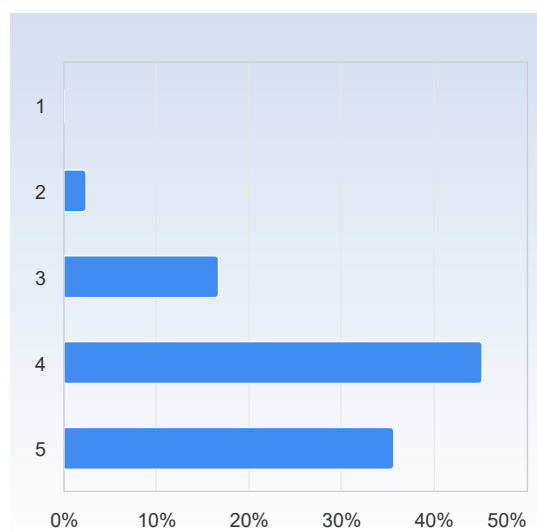
	Mean	Standard Deviation
The information I received before the course start was satisfactory.	4.1	0.8

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	3 (7.1%)
4	21 (50.0%)
5	18 (42.9%)
Total	42 (100.0%)

	Mean	Standard Deviation
The communication with the teaching staff during the course was good.	4.4	0.6

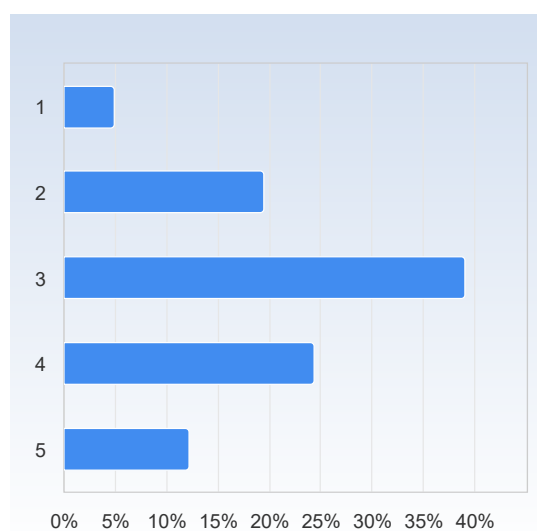## It was clear throughout the course what was expected of me.

It was clear throughout the course what was expected of me.	Number of responses
1	1 (2.4%)
2	3 (7.1%)
3	7 (16.7%)
4	21 (50.0%)
5	10 (23.8%)
Total	42 (100.0%)
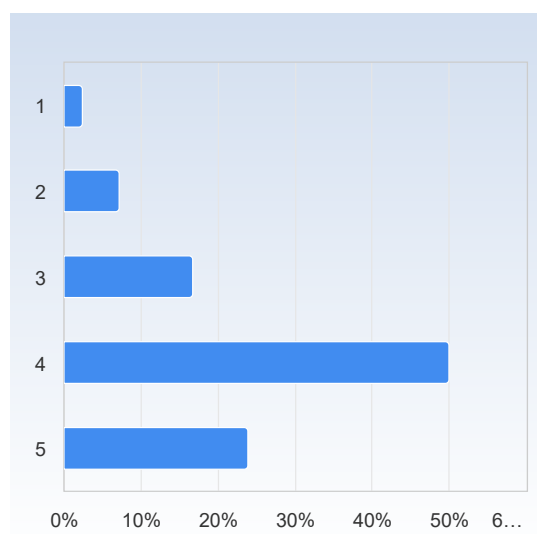
	Mean	Standard Deviation
It was clear throughout the course what was expected of me.	3.9	1.0

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	2 (4.9%)
2	8 (19.5%)
3	16 (39.0%)
4	10 (24.4%)
5	5 (12.2%)
Total	41 (100.0%)

	Mean	Standard Deviation
I have received valuable feedback from my teacher/teachers during the course.	3.2	1.1

The course had a reasonable workload.

The course had a reasonable workload.	Number of responses
1	1 (2.4%)
2	2 (4.8%)
3	12 (28.6%)
4	19 (45.2%)
5	8 (19.0%)
Total	42 (100.0%)
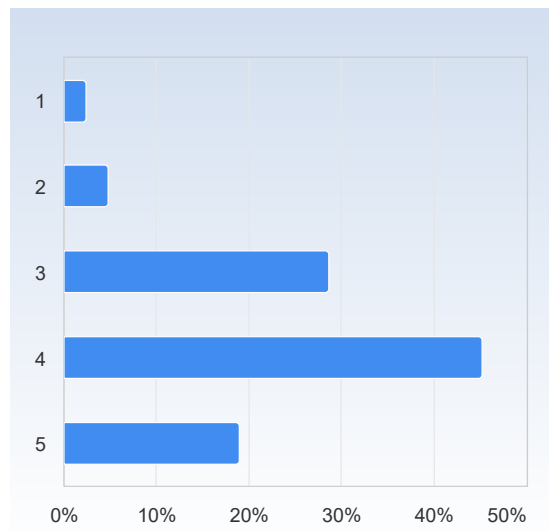
	Mean	Standard Deviation
The course had a reasonable workload.	3.7	0.9

The workload was evenly distributed throughout the course.

The workload was evenly distributed throughout the course.	Number of responses
1	0 (0.0%)
2	6 (14.3%)
3	10 (23.8%)
4	16 (38.1%)
5	10 (23.8%)
Total	42 (100.0%)
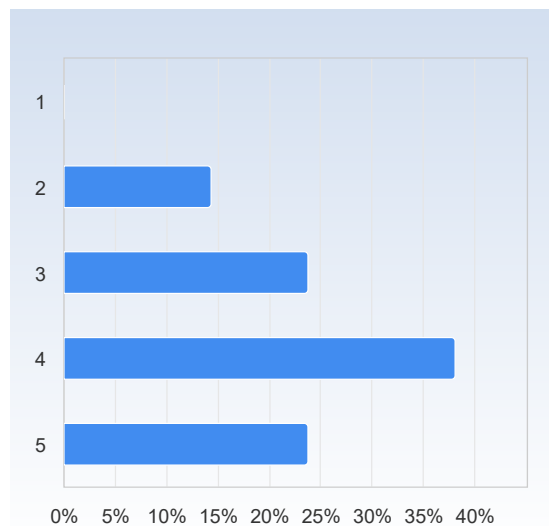
	Mean	Standard Deviation
The workload was evenly distributed throughout the course.	3.7	1.0

The examination matched the contents and level of the course.

The examination matched the contents and level of the course.	Number of responses
1	1 (2.4%)
2	3 (7.1%)
3	12 (28.6%)
4	12 (28.6%)
5	14 (33.3%)
Total	42 (100.0%)
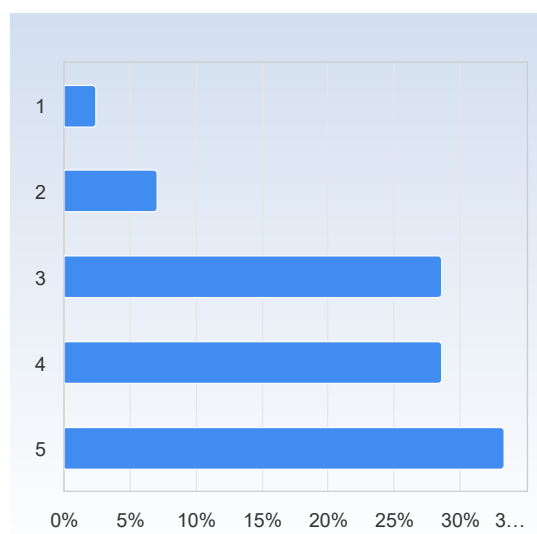
	Mean	Standard Deviation
The examination matched the contents and level of the course.	3.8	1.1

Overall, I am satisfied with the course.

Overall, I am satisfied with the course.	Number of responses
1	0 (0.0%)
2	1 (2.4%)
3	12 (28.6%)
4	17 (40.5%)
5	12 (28.6%)
Total	42 (100.0%)
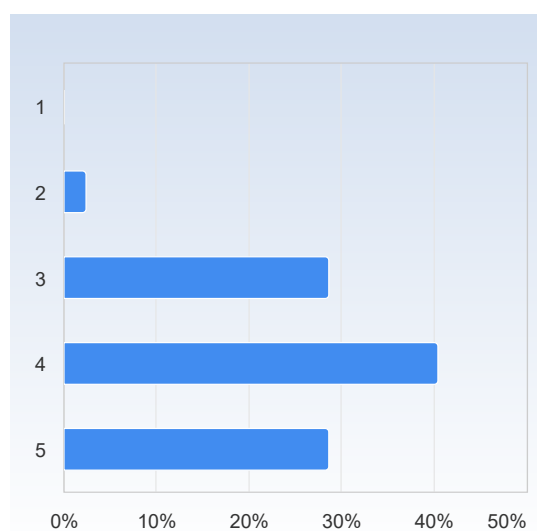
	Mean	Standard Deviation
Overall, I am satisfied with the course.	4.0	0.8

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.

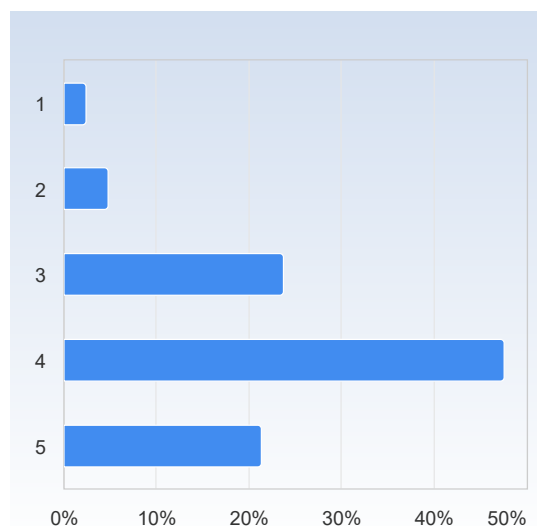| The course has increased my ability to read a mathematical text.	Number of responses
1	1 (2.4%)
2	2 (4.8%)
3	10 (23.8%)
4	20 (47.6%)
5	9 (21.4%)
Total	42 (100.0%)

	Mean	Standard Deviation
The course has increased my ability to read a mathematical text.	3.8	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	2 (4.8%)
2	3 (7.1%)
3	11 (26.2%)
4	20 (47.6%)
5	6 (14.3%)
Total	42 (100.0%)
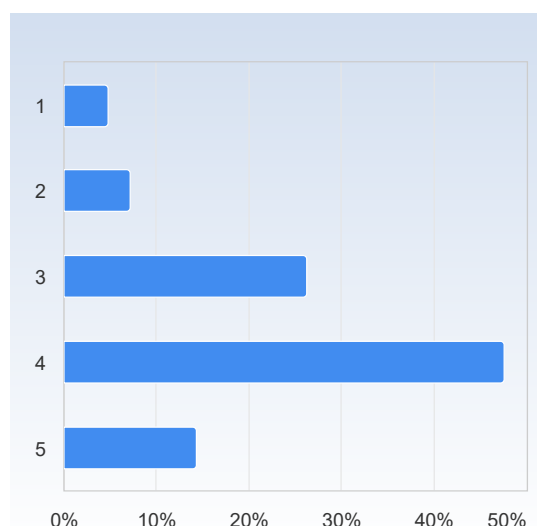
	Mean	Standard Deviation
The course has increased my ability to communicate the subject in writing.	3.6	1.0

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	3 (7.3%)
2	9 (22.0%)
3	10 (24.4%)
4	13 (31.7%)
5	6 (14.6%)
Total	41 (100.0%)
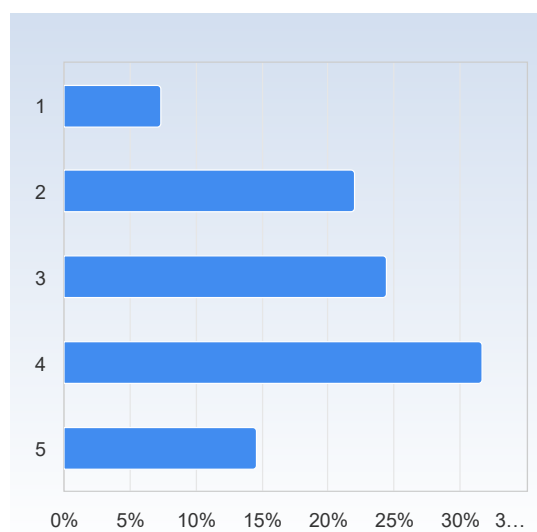
	Mean	Standard Deviation
The course has increased my ability to communicate the subject orally.	3.2	1.2

The course has increased my ability to cooperate.

The course has increased my ability to cooperate.	Number of responses
1	5 (12.2%)
2	4 (9.8%)
3	18 (43.9%)
4	12 (29.3%)
5	2 (4.9%)
Total	41 (100.0%)
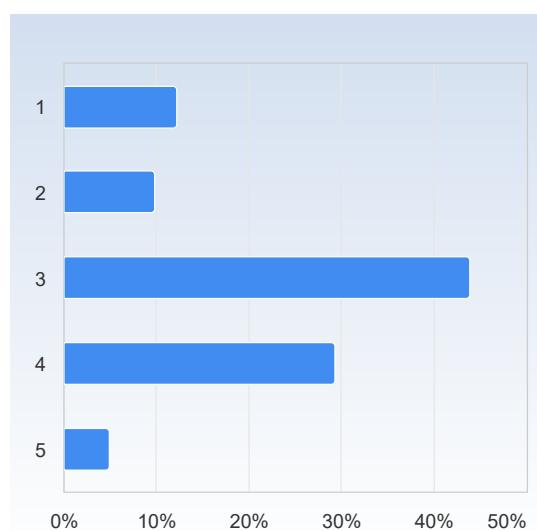
	Mean	Standard Deviation
The course has increased my ability to cooperate.	3.0	1.0

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	4 (9.5%)
2	8 (19.0%)
3	14 (33.3%)
4	11 (26.2%)
5	5 (11.9%)
Total	42 (100.0%)
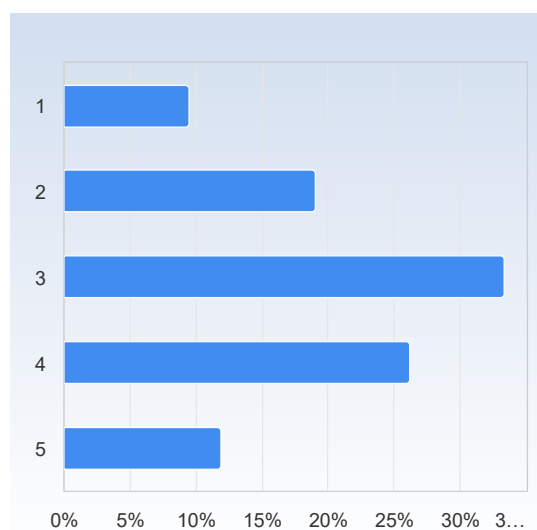
	Mean	Standard Deviation
The course has increased my ability to search and process information.	3.1	1.2

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	1 (2.4%)
2	3 (7.1%)
3	9 (21.4%)
4	22 (52.4%)
5	7 (16.7%)
Total	42 (100.0%)
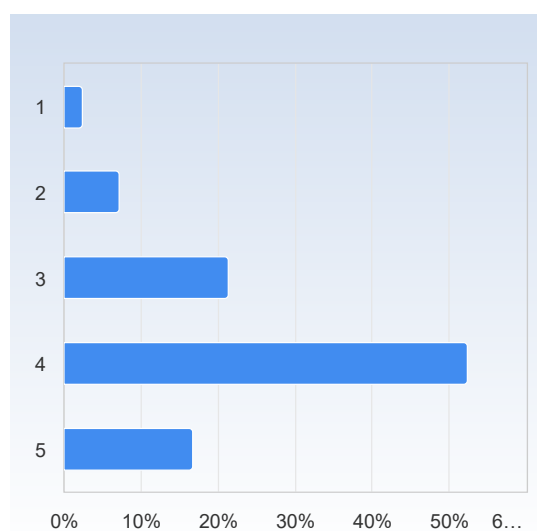
	Mean	Standard Deviation
The course has increased my ability to analyze and solve problems.	3.7	0.9

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	2 (4.8%)
2	5 (11.9%)
3	21 (50.0%)
4	13 (31.0%)
5	1 (2.4%)
Total	42 (100.0%)
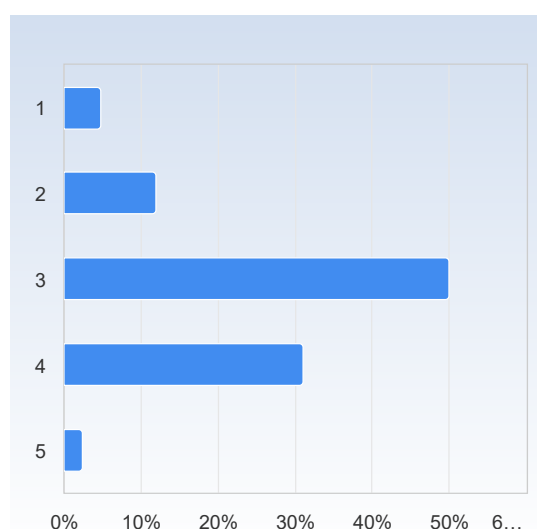
	Mean	Standard Deviation
As a result of this course, I feel confident about tackling unfamiliar problems.	3.1	0.8

What did you appreciate most with the course?

What did you appreciate most with the course?
I think Adem did a good job with the lectures.
Adem was a good teacher who seemed happy to teach, which easily rubs off on the students and stimulates learning
The way of communicating the material, both by the lecturer and the seminar teachers. It was clear and understandable the whole way through
The seminars and Adems humour.
The seminar group in Room 332B was the most active, partially thanks to the TA there, and therefore the most beneficial to learning among all that have already seen at LU. Additionally, the lecturer was overall better than average and could explain some concepts in a non plain way.
The teaching staff was genuinely interested in the well being and interests of the students, seminars were amazing
Bra kommunikation och struktur
Good workload, good lectures, nice seminars
Adem is an amazing "up-and-coming" professor. You can tell he wants to engage with students and better his teaching. I appreciated his jokes during class.
The lectures and the seminars.
The professor was very pedagogical.
Tom the seminar teacher
The lecturers engagement with the students, he is positive and realy making the best of the difficult subject. Allways helpfull when you need extra help or ask questions :)
The lectures were well structured and coverd the material in a great way.
Adem was great! I really loved the lectures but there could be some improvements which I'll highlight below.
The lectures and the seminars.
Exercise sheets, lectures
Nice lectures, it felt like everyone actually wanted the students to understand the material, I didn't feel left alone and there were lots of opportunities to ask questions.
Seminars and seminar teachers
The lecturer and the teaching assistants
I liked the fixed schedule with lectures in the morning and a seminar after. I felt like it contributed to a smooth workflow. I liked the seminar leaders who did not rely only on participation from students, but also showed their own approach to solving certain problems. This often helped clarify the solution. I also liked how the lectures were structured around the course material. It made it easy to follow along in the compendium after class. I also thought the lecturer was good at explaining unfamiliar concepts.
The course was well-structured and had a good pace. Lectures were clear and taught well, I especially appreciated that when the proofs from the book were too dense, the lecturer adapted them. Seminars were great too.
The lectures were very valuable for my learning. The lecturer spoke clear and in a good pace so everyone could follow along.
The exam was what I expected, I could easily see what parts of the course the teacher found most important
I mostly enjoyed the pace of the course. I think Adem is good at covering a lot of material in a short and understandable way. He was also kind when answering questions from students during lectures, and didn't assume everything was obvious, which was very nice.
The lectures were very good. The lecturer was good at explaining the material in a way that you will remember so you dont just sit there confused every lecture trying to just write down everything.
I appreciated the amount of help that was available
The wellstructured lectures that reflected the contents of the book
I liked the pace of the lectures and sometimes Adem was kinda funny which is uncommon for math teachers?! I really liked that we could get the lecture notes and that the lectures actually used the literature.
The seminars.
The seminars and the personality of Adem
The proofs

What do you think should be improved?

What do you think should be improved?

I think that the workload should be looked at because like it is now programming project is like an add on to an already full 100% course. Which means that one will have to work overtime to be able to manage both the programming and the regular course material and frankly i don't think that is okay. This leaves less time for resting which is also important for learning and other stuff that needs to be done and makes it really stressful. It also isn't a recuirement to know programming before taking the course (as far as i know) and this also makes it unfair to those people and the people in their project groups who will either have to spend time helping the ones who don't know or doing their parts too which increases their workload for the course. In comparison I've taken i programming course before and I've spent more time on the programming project for this course then i did for the final programming project in the programming course. This shouldn't be the case.

Not much really, everything was at the very least good. If anything I would like a little more time to process the material, since it sometimes was a bit much.

I think the lectures could be improved by adding more intuitive and visual explanations of the materials, rather than repeating the theorems and proofs word-for-word from the compendium.

The added value of the lectures compared to the textbook was not very important.

if we are told there will be two proofs on the exam, there should be two proofs on the exam. as physics student, the proofs are (hopefully…) unimportant for my further education and are just something that I need to memorize for the exam. while I understand that the fundamentals of the theorems are important for further courses in algebra, I would rather not spend time memorizing them when I instead could focus on the methods and calculations the theorems allow. failing the exam from not knowing the exact proofs and making making a single mistake on the computational exercises might make sense for a maths student, but it doesn't make sense to me. two proofs fine, but half the exam is too much in my opinion:-)

also, the programming project is stressful, we have no extra time to do both exercises and keeping up with the programming. perhaps it would be nice to get a few days to finish it at the end of the course.

Its a hard course cause of the proofs, they are important but it is difficult to learn the methods, get an intuitive understanding AND learn thje important proofs. Its important but finding the time to do all three is a challange. I dont know how this could be solved, it may have been a cumulative issue cause of MATB21 that is taken at the same time for bachelor students. That MATB21 course is... well... :(

Don't have a programming project…. And specially not when the presentations are after the course has ended! I have other courses now and will feel stressed about this instead. I would recommend having a project in the middle of the course (so it also don't overlap with the time we want to study for the exam) where we don't program

To teach the way of how to proof something, i.e. some lecture dedicated to teach the way of proving things.

Kanske inte behöver presentera alla bevis på tavlan. Intresserade kan läsa själva.

It was said from the beginning of the course, and it was written on Canvas that the exam would have a maximum of 2 proof questions. The exam, however, had more than 2. Having half of the exam be proofs and the other half being calculations is not what we were told we were going to get. As a physics student, this much focus on proofs is not relevant for my education and it only felt necessary to remember proofs because I knew they would be on the exam, and not because it would benefit me in the future. For the future I think it would be better if the exam matched what was taught and what was said to appear on the exam. I mostly liked the course literature but it heavily focused on proofs and seemed more like a collection of proofs rather than learning material. Some proofs were also "left as an exercise to the reader" which might be fine except that as physics students we are not taught how to do proofs. We also had less than a week between the last new content in the course and the exam. This made it a bit stressful.

Better ways of teaching and examining proofs. Less theoretical course and more focus on physics students

I feel like the course book was unnecessarily complicated formulated. I understand that being able to read mathematical texts is a skill that should be sharpened during the course but some more intuitive descriptions in between would help my general understanding of the material.

The lectures

The time consumption of the exercise sheets has been varying throughout the course, in the sense that there sometimes was enough time to solve the whole paper twice, but some other times we barely managed to do all of the tasks in the designed time of the seminar. So, I would try to balance them out

Course literature, how proofs are approached throughout the course, maybe more adapted to what is actually useful when studying physics

there was just one thing about the examination which threw me off. before it was stated that there would be a maximum of two proofs on the exam, but there were three prooflike questions. I understand these questions are important for the course, i just think that then we should have been told that there would be a maximum of 3 proofs, and not 2.

I felt like the course material restricted Adem from teaching the course in his own way which I feel like is a problem. I think the course material should be held as a supplement for the lectures and not have the lectures be centered fully around the course material, but even this should be taken with a grain of salt. Also I think that lectures should be held for longer periods while not extending the learning goals of the day; not only does it give the lecturer more time to take things slow, it also allows the students time to fully grasp the material during the lecture itself.

Since the course literature is very heavy on theorems, definitions and proofs - perhaps the lectures should ease some of this and focus more on application and examples, giving a different perspective to tough concepts

The text was quite dense and was at times difficult to understand, maybe a more pedagogical text would be better. The lectures could at times just feel like a read-through of the text, I think explaining the logic behind the proofs/the overall steps would be better, as well as maybe a few more examples.

The siminars. I think the TA should show first how they would have solved the problem, and then ask the students if they agree or have any optional solutions, which they then can show.

The course is too proof heavy and the requirement to memorise proofs for exam is ridiculous

The course book (by Kjell Elfström) really lacked in examples. It would have been helpful to have more worked through examples to follow when trying to solve problems.

The organisation of lectures. Why do you need to spend half of the lecture writing (mostly) the same theorems and examples that are in both lecture notes online and in the course companion? Make use of the projectors hanging in the lecture hall and spend more time explaining and discussing (potentially including peer to peer discussions) the concepts and focus more on the reasons WHY we do certain operations. This is my suggestion on how to improve the understanding of the material and be more time-efficient.

I think, since the course apparently was so centered around proofs, that we should've spent more time in lectures actually understanding the proofs. I did not appreciate how we were just shown them and expected to understand them. I also didn't appreciate how we were told to learn many proofs, over 30 of them, from the course material, and then only one of them ended up on the exam. It was an unreasonable workload for what the exam actually ended up being, in my opinion. Also, don't write that there will be "at most two" proofs on the exam, then make half the exam proofs. Be clear on the contents, so one can study appropriately.

Less long computations, one's ability to do arithmetic is not a valuable or necessary skill for this nor coming courses/work.

I think the programming was a too big workload and took up too much time. It was too difficult for the required knowledge about programming and it was bad that there were no real resources or help throughout the assignment

Excersise classes as well as seminars.

I think it should be a less focus on proving theorems and showing different statements. Doesnt feel useful in my physics education. I also think it is a bit unreasonable having such a substantial and difficult python project when it's not even a prerequisite to know how to code. It took so much time that would have been better spent on actually understanding the content.

Change textbook(!), solutions to exercise sheets, less python tasks, show how to solve a problem and then explain why rather than doing proofs before examples

The workload was too heavy. For me and many students I have spoken with the number of hours spent per week exceeded that of normal workload for a halfspeed course. The main reason for this was the programming project which took alot of time especially around exam week since the lectures needed for the task were at a later time in the course. Furthermore although it was necessary to do the project to pass the course, it was not necessary to know python to enter which makes no sense in my opinion. The presentations were also placed the week after the course should have ended when most students are excpected to attend new courses…

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

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no
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Nothing of the sort
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No

Centre for Mathematical Sciences
Division of Mathematics and Numerical Analysis

Centre for Mathematical Sciences
Faculty of Science

Course Analysis for MATB22 Linear Algebra 2, Autumn 2024

Course Information

Lecturer: Adem Limani

Teaching assistants: Jorge Farina Asategui, Joakim Cronvall and Thomas Munn. The programming project will be held by Valentina Schüller and Jimmy Kornelije Gunnarsson.

Number of students:

87 newly registered and 28 re-registered.

42 students answered the course evaluation, 34 of them were enrolled in Bachelor's Programme in Physics, Theoretical Physics, Astronomy, 3 of them were enrolled in Bachelor's Programme in Mathematics, 1 Bachelor's Programme, other specialization, and 4 other programme or as stand alone.

Examination

Written examination: 85 students passed.

– Ordinary examination 29/10 2024: 99 students participated and 70 of them passed.
– Resit examination 16/11 2024: 30 students participated and 15 of them passed.

Final grades

In all, 85 students, including xx re-registered students, have got their final grade.

24 passed with distinction.

61 passed.

Course Evaluation

Summary of student's answers:

See above

Teachers' comments:

A majority of the participants in MATB22 in Autumn 2024 were enrolled in the Bachelor's programme in Physics. As such, several students complained about the concept of proofs involved in the course, as they find it irrelevant for their further purposes. Some students found the course literature being too abstract. The lecture notes were uploaded on Canvas. For each seminar, a given list of exercises were to be discussed. The participation in the lectures and seminars were good. The examination was carried out on campus

Please, turn over!

Changes from the previous course realisation:
No substantial changes were made from the previous course realisation.
Suggestions for the next course realisation:
The amount of material covered in the lectures, particularly from Chapter 2, could be slightly reduced. A tuned collection of the results therein will suffice and further improve understanding. Overall, it might be helpful to optimize the lecture content by systematically incorporating more illustrative examples before presenting formal proofs. In addition, placing greater emphasis on thoroughly explaining key concepts, rather than primarily introducing material already available in the textbook and previous lecture notes, could improve student engagement and clarity.