LUND UNIVERSITY
Faculty of Science

# Course Analysis for NUMA01/ÄMAD01 Computational Programming with Python, Autumn 2021

## Course Information

**Lecturer**: Claus Führer, Malin Christersson, Robert Klöfkorn
**Teaching assistants**: Daniel Diaz Quilez, Johannes Kasimir, Martin Korsfeldt, Niamh Mc Mullin, Rutger Arend Nieuwenhuis, Anna-Mariya Otsetova

**Number of students**:
  -NUMA01: 86 newly registered and 9 re-registered.
  -ÄMAD01: 29 newly registered.
44 students (38%) answered the course evaluation, 27% are enrolled in the LU Mathematics program, 23% in the LU Physics program, 20% in the Teachers program, and the rest were PhD students or enrolled in other programs.

## Examination

**Project and examination:** In total 87 students passed (65 in NUMA01 and 22 in ÄMAD01).

**Final grades**:
  -NUMA01: In all, 65 students, including 1 re-registered student, have gotten their final grade.
  -ÄMAD01: In all, 22 students have gotten their final grade.

## Course Evaluation

**Summary of student's answers:**
The course got positive feedback with the vast majority attending the lectures and training exercises and also stating that they learned programming during the course and that they got motivated to learn more in the direction of the course. A smaller minority (19%) did not like the topic of the course.

**Teachers' comments**:
The course was given in hybrid fashion with class room lectures which were broadcast over zoom and a recording was made available for the students. At the day of the lecture there was also a training exercise to refresh the content presented during the lecture. During the course there were two homework assignments and one final project. Examination of both, homework and final project, was done orally.

**Changes from the previous course realization**:
Only small changes regarding the teaching content were made.

**Suggestions for the next course realization**:
In the coming instance there will be no hybrid lectures. Otherwise the course will remain largely unchanged with a few minor improvements here and there based on comments from students collected over the duration of the course and in this survey. Also, the students did not seem to use the course book to the extend the teachers would like to see.
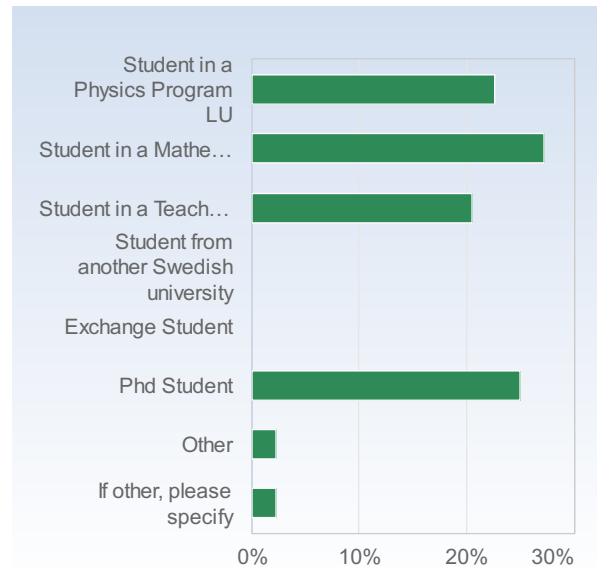
## Your role in the course?

| Your role in the course? | Number of responses |
|---|---|
| Student in a Physics Program LU | 10 (22.7%) |
| Student in a Mathematics Program LU | 12 (27.3%) |
| Student in a Teacher's Program LU | 9 (20.5%) |
| Student from another Swedish university | 0 (0.0%) |
| Exchange Student | 0 (0.0%) |
| Phd Student | 11 (25.0%) |
| Other | 1 (2.3%) |
| If other, please specify | 1 (2.3%) |
| Total | 44 (100.0%) |



| | Mean | Standard Deviation |
|---|---|---|
| Your role in the course? | 3.2 | 2.1 |

| If other, please specify |
|---|
| Student in a Biology program, LU |

# Your participation in the lectures.

| Your participation in the lectures. | Number of responses |
|---|---|
| 0 - 10 | 6 (13.6%) |
| 11 - 21 | 2 (4.5%) |
| 22 - 32 | 3 (6.8%) |
| 33 - 43 | 1 (2.3%) |
| 44 - 54 | 0 (0.0%) |
| 55 - 65 | 0 (0.0%) |
| 66 - 76 | 0 (0.0%) |
| 77 - 87 | 4 (9.1%) |
| 88 - 98 | 9 (20.5%) |
| 99 - 109 | 19 (43.2%) |
| Total | 44 (100.0%) |

| | Mean | Standard Deviation |
|---|---|---|
| Your participation in the lectures. | 73.6 | 35.9 |

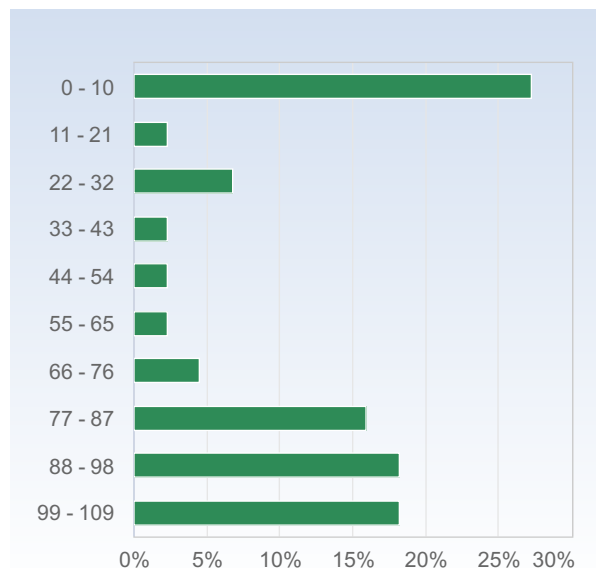| Comment |
|---|
| I have some background knowledge so I didn't spend a lot of time on it |
| Participated digitally. |
| Online and on campus combined. |
| I already knew a fair bit of python before starting the course, so I might not have participated in some of the early lectures with topics that I was already very confident in, honestly don't remember perfectly well |
| I already knew python |
| The lectures I went to didn't seem that well planned and the lecturer didn't seem interested. I also knew some programming before so I didn't really need to go ether. |
| I really enjoyed some of the lectures, specially the ones with professor Klaus, he has a way of explaining that makes it more approachable. |
| none |
| online |
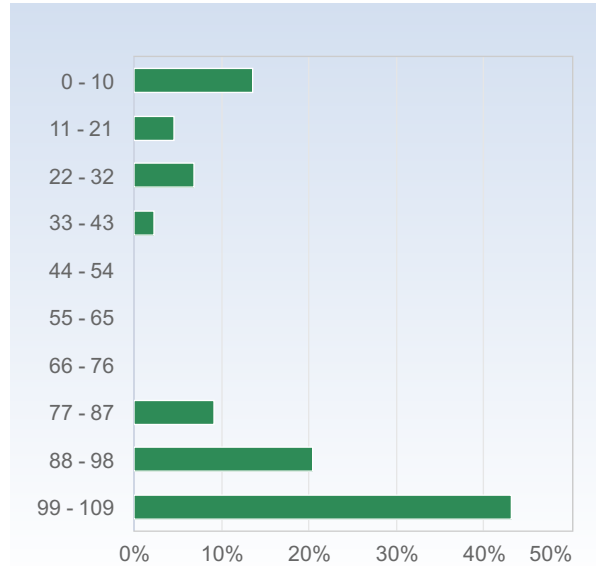
# Your participation in the training exercises.

| Your participation in the training exercises. | Number of responses |
|---|---|
| 0 - 10 | 12 (27.3%) |
| 11 - 21 | 1 (2.3%) |
| 22 - 32 | 3 (6.8%) |
| 33 - 43 | 1 (2.3%) |
| 44 - 54 | 1 (2.3%) |
| 55 - 65 | 1 (2.3%) |
| 66 - 76 | 2 (4.5%) |
| 77 - 87 | 7 (15.9%) |
| 88 - 98 | 8 (18.2%) |
| 99 - 109 | 8 (18.2%) |
| Total | 44 (100.0%) |

| | Mean | Standard Deviation |
|---|---|---|
| Your participation in the training exercises. | 58.5 | 39.8 |

| Comment |
| --- |
| I have some background knowledge so I didn't spend a lot of time on it |
| Didn't want to go on-site at that time, plus did them well on my own. |
| I already knew python |
| I honestly prefer a guided seminar than just asking questions.

It is easier for me to learn from listening and seeing solutions so I can identify patterns that work than to sit down and try things for the first time on my own.

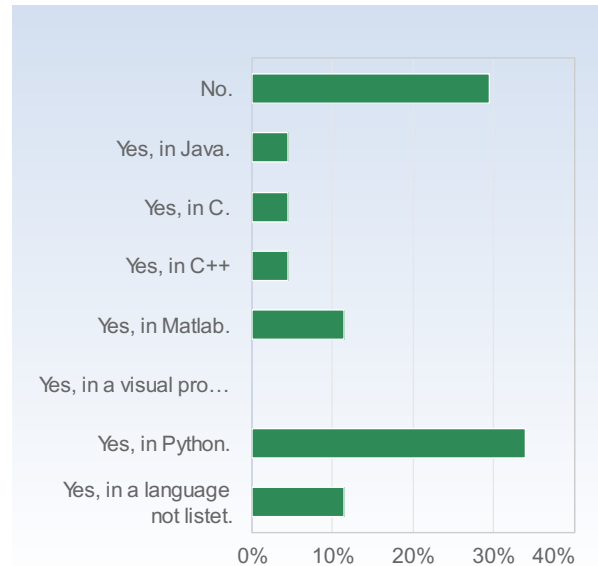I don't think is very efficient for my particular way of learning. |
| I found it most suitable for me to work on my own on the assignments. Therefore my lack of participation in the scheduled training exercises is not due to perceived lack of quality in the training exercises. |
| none |
| I did all the exercises but I was never there for the scheduled times. |

# Have you ever have written a computer program before the course start? (Please give the most relevant answer)

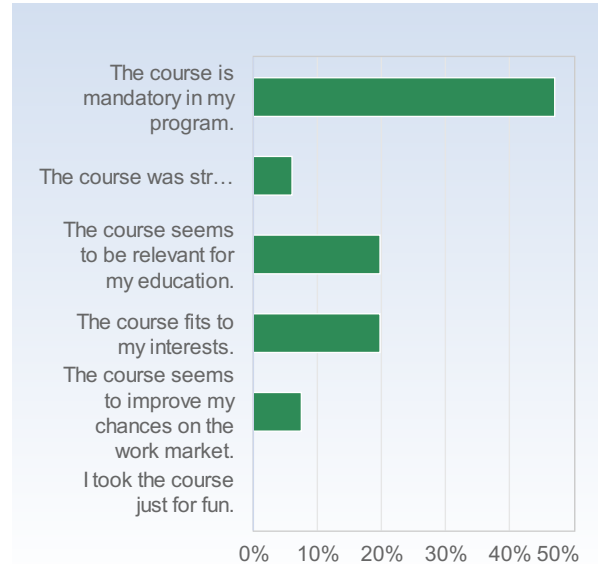| Have you ever have written a computer program before the course start? (Please give the most relevant answer) | Number of responses |
| --- | --- |
| No. | 13 (29.5%) |
| Yes, in Java. | 2 (4.5%) |
| Yes, in C. | 2 (4.5%) |
| Yes, in C++ | 2 (4.5%) |
| Yes, in Matlab. | 5 (11.4%) |
| Yes, in a visual programming language, like Snap! . | 0 (0.0%) |
| Yes, in Python. | 15 (34.1%) |
| Yes, in a language not listet. | 5 (11.4%) |
| Total | 44 (100.0%) |



| | Mean | Standard Deviation |
| --- | --- | --- |
| Have you ever have written a computer program before the course start? (Please give the most relevant answer) | 4.6 | 2.8 |

# Why did you sign up for the course? (several answers possible)

| Why did you sign up for the course? (several answers possible) | Number of responses |
|---|---|
| The course is mandatory in my program. | 31 (70.5%) |
| The course was strongly recommended in my program. | 4 (9.1%) |
| The course seems to be relevant for my education. | 13 (29.5%) |
| The course fits to my interests. | 13 (29.5%) |
| The course seems to improve my chances on the work market. | 5 (11.4%) |
| I took the course just for fun. | 0 (0.0%) |
| Total | 66 (150.0%) |



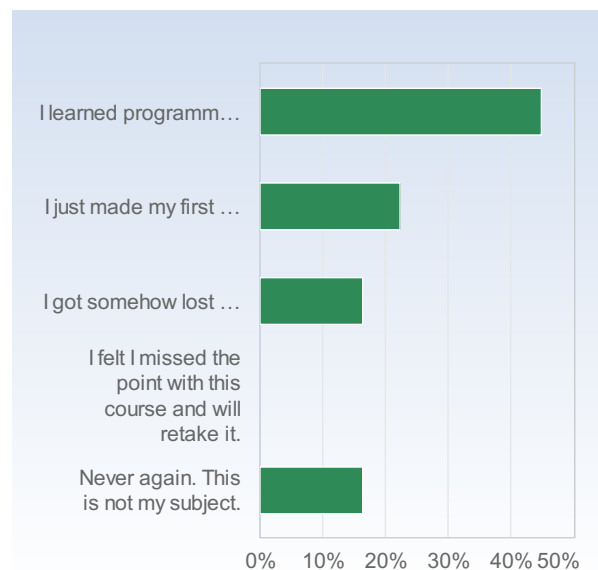| | Mean | Standard Deviation |
|---|---|---|
| Why did you sign up for the course? (several answers possible) | 2.3 | 1.4 |

| Comment |
|---|
| I already knew python but im in a program so |
| Why is the previous question not multiple choice? |
| I took MIT online courses for Python before, I am no expert at all but that's how I quickly realized the course is meant for beginners but there is so much logic and basics missing right at the start of the course. Maybe of my classmates were very lost and I was too despite my previous experience. |

# Now that the lectures are done, my impression is.....

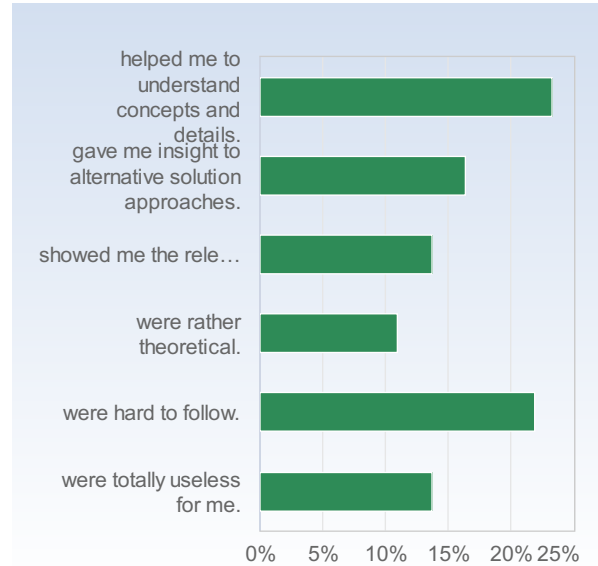| Now that the lectures are done, my impression is..... | Number of responses |
|---|---|
| I learned programming and I feel that can manage to write programs in mathematics and physics. | 22 (52.4%) |
| I just made my first steps and got motivated to dive deeper into the subject. | 11 (26.2%) |
| I got somehow lost during the course, but I think I will catch up. | 8 (19.0%) |
| I felt I missed the point with this course and will retake it. | 0 (0.0%) |
| Never again. This is not my subject. | 8 (19.0%) |
| Total | 49 (116.7%) |



| | Mean | Standard Deviation |
|---|---|---|
| Now that the lectures are done, my impression is..... | 2.2 | 1.4 |

# The lectures ....

| The lectures .... | Number of responses |
|---|---|
| helped me to understand concepts and details. | 17 (39.5%) |
| gave me insight to alternative solution approaches. | 12 (27.9%) |
| showed me the relevance of programming in mathematics/physics. | 10 (23.3%) |
| were rather theoretical. | 8 (18.6%) |
| were hard to follow. | 16 (37.2%) |
| were totally useless for me. | 10 (23.3%) |
| Total | 73 (169.8%) |



| | Mean | Standard Deviation |
|---|---|---|
| The lectures .... | 3.3 | 1.8 |

Comment

Out of the three Lecturers, I felt the most engaged and like I was learning a lot. In some lectures with Robert it felt like the information was presented in a confusing order - i.e it felt like it was aimed at people who already knew the material that was being taught

I already knew python so...

Boring and didnt really help that much with the homeworks

This a personal opinion, but I would have enjoyed to have more Math related examples were I could follow the logic behind the code.
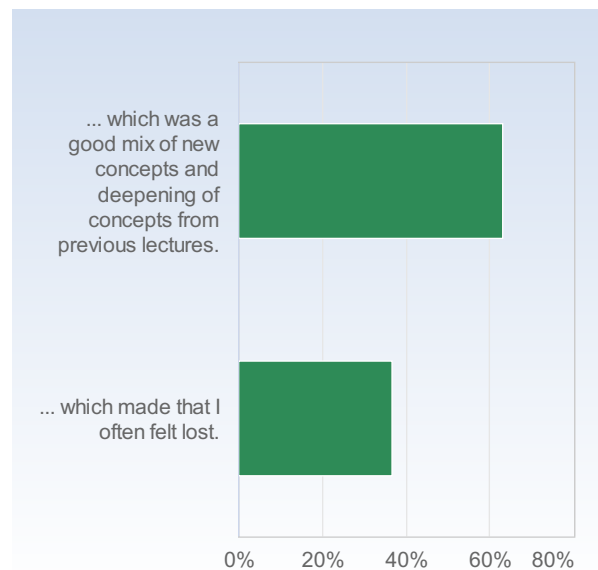
I do not mean theoretical in a negative sense

except for Malin's lectures

did not attend lecutres

They helped me, but they were bad with a few exceptions. The start of the course was super confusing. It was a good thing that they were uploaded as videos cos one really had to stop and go back tons of times, I think that if I had fallowed them in real time they would be pretty close to useless.

# The material used during lectures was ordered in a way ...

| The material used during lectures was ordered in a way ... | Number of responses |
|---|---|
| ... which was a good mix of new concepts and deepening of concepts from previous lectures. | 24 (63.2%) |
| ... which made that I often felt lost. | 14 (36.8%) |
| Total | 38 (100.0%) |



| | Mean | Standard Deviation |
|---|---|---|
| The material used during lectures was ordered in a way ... | 1.4 | 0.5 |

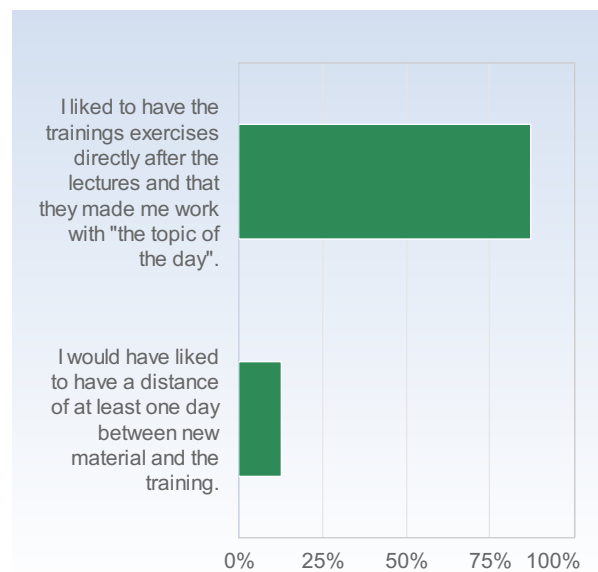| Comment |
|---|
| Neither. I already knew python |
| It was a good mix but I think I did not have enough knowledge to get anything from them and only left me feeling more lost. |
| It felt like the course are missing the first two weeks. There was no introduction to what a programming language was, or even what a for loop, string, integer etc are, we were somehow supposed to know that before the course started. I think that this is a good course for learning your second programming language, but it was pretty unhelpful for the many students that this was the first time they programmed in their life. |
| often.. rather always |
| I believe the concepts were very useful, but I have to say I felt there was something missing from the concepts, the underlying structure and the logical path. |
| I mean we had excercises where we should make graphs before we learned how to make it. I think it was mostly a hot mess and the pacing was jarring for people who never programmed. |
| Note: I don't usually attend lectures because I have a learning disability that makes it hard for me to remain focused for a longer period of time. |

# Trainings Exercises

| Trainings Exercises | Number of responses |
|---|---|
| I liked to have the trainings exercises directly after the lectures and that they made me work with "the topic of the day". | 27 (87.1%) |
| I would have liked to have a distance of at least one day between new material and the training. | 4 (12.9%) |
| Total | 31 (100.0%) |



| | Mean | Standard Deviation |
|---|---|---|
| Trainings Exercises | 1.1 | 0.3 |

| Comment |
|---|
| I didn't attend many exercises. |
| I didn't attend. Sounds good to have them directly after though. |
| I already knew pytjon so idk |
| I would have liked to have more time for the exercises, there was a huge difference in difficulty between the lectures and the exercises, you expected us to be able to use the methods in way that has never been explained to exist which makes it very hard to complete the exercises |
| The distance is very important to me. I feel I was not able to grasp everything during the lecture and had no time to review the book, Google or the lecture slides.

Plus, the training exercises did not fulfill my needs as a beginner. I needed the guidance from the TA, to visualize ways to approach a problem set. |
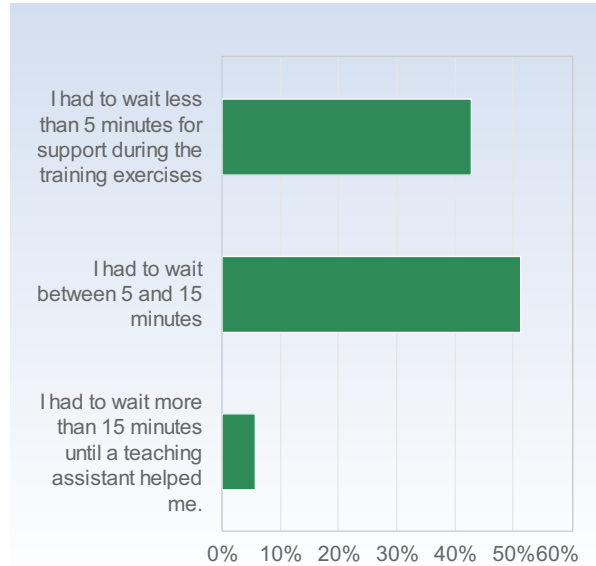| As i did the exercises on my own I can not answer which would be better. |
| Didn't go to them cos the last time I took this course it was often like half an hour wait. |
| I did not attend the training exercises I did the problems by myself in my own time. Which worked just fine for me. |

# Support

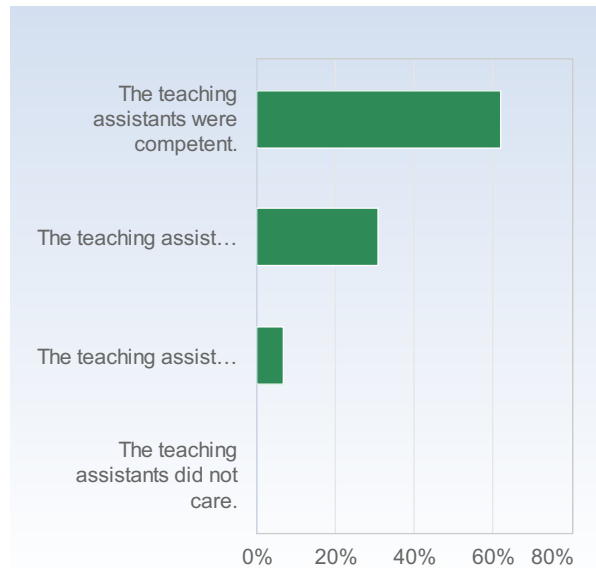| Support | Number of responses |
|---|---|
| I had to wait less than 5 minutes for support during the training exercises | 15 (42.9%) |
| I had to wait between 5 and 15 minutes | 18 (51.4%) |
| I had to wait more than 15 minutes until a teaching assistant helped me. | 2 (5.7%) |
| Total | 35 (100.0%) |



| | Mean | Standard Deviation |
|---|---|---|
| Support | 1.6 | 0.6 |

# Competence

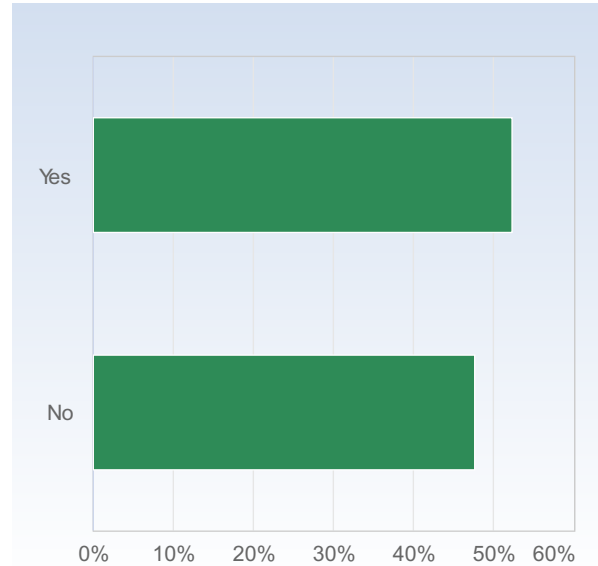| Competence | Number of responses |
|---|---|
| The teaching assistants were competent. | 18 (62.1%) |
| The teaching assistant sometimes could not answer but found another one to help. | 9 (31.0%) |
| The teaching assistents tried there best but gave me often wrong answers. | 2 (6.9%) |
| The teaching assistants did not care. | 0 (0.0%) |
| Total | 29 (100.0%) |



| | Mean | Standard Deviation |
|---|---|---|
| Competence | 1.4 | 0.6 |

# Taining exercises. I worked in a group.

| Taining exercises. I worked in a group. | Number of responses |
|---|---|
| Yes | 23 (52.3%) |
| No | 21 (47.7%) |
| Total | 44 (100.0%) |



| | Mean | Standard Deviation |
|---|---|---|
| Taining exercises. I worked in a group. | 1.5 | 0.5 |

# Homework

| Homework | Number of responses |
|---|---|
| The homework made me improve my knowledge. | 33 (75.0%) |
| The homework was just for getting a grade. | 11 (25.0%) |
| Total | 44 (100.0%) |



| | Mean | Standard Deviation |
|---|---|---|
| Homework | 1.2 | 0.4 |

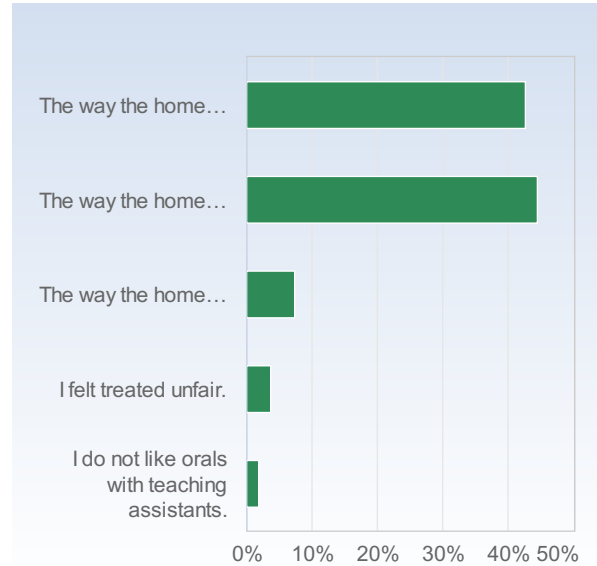| Comment |
|---|
| I think the homework is well designed. |
| For me the homework was just for getting a grade - but that's mostly because I knew most of the material from the course already. |
| I already knew oython so most of these questions dont even make sense. |
| It forces me to verify that I'm on the right path. |
| both |
| I wouldn't been able to complete the homework if not for the TAs |
| Here, I have to say both of the options. We want the knowledge but we also want to pass, there is a performance pressure thing involved. |
| I mean we only did the first one and god damn it was hard, I'm not sure I could have solved it unless the girl I was doing it with had a boyfriend that programmed. With the course done I have learned and could probobly program it just fine now... however the graph things we needed we didn't learn until the end of the course. |
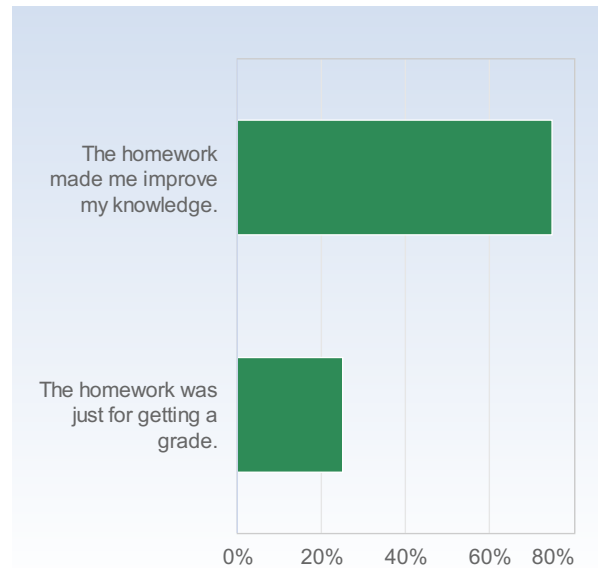
# The homework presentations.

| The homework presentations. | Number of responses |
|---|---|
| The way the homeworks were presented gave me a chance to get extra feedback. | 23 (60.5%) |
| The way the homeworks were presented gave me a chance to show and test my knowledge. | 24 (63.2%) |
| The way the homework was presented did not match to my effort I put into this work. | 4 (10.5%) |
| I felt treated unfair. | 2 (5.3%) |
| I do not like orals with teaching assistants. | 1 (2.6%) |
| Total | 54 (142.1%) |



| | Mean | Standard Deviation |
|---|---|---|
| The homework presentations. | 1.8 | 0.9 |

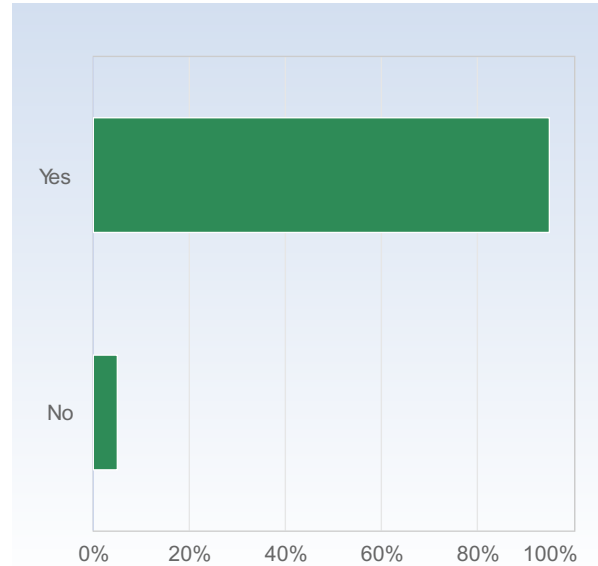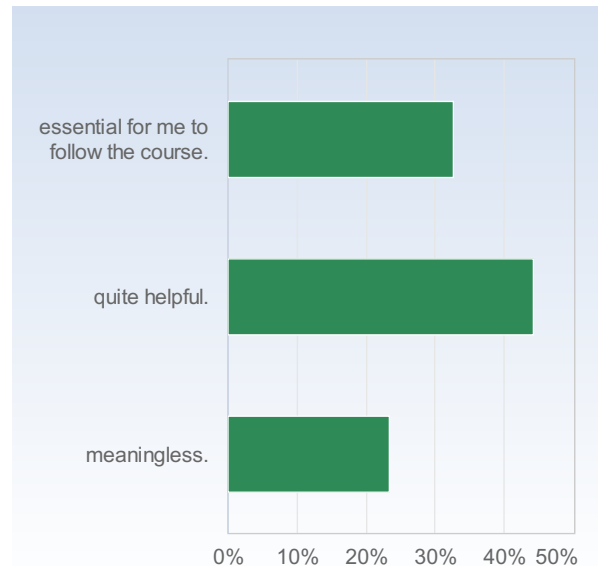| Comment |
|---|
| They were good |
| Too much time has gone so I don't remember |
| Too long ago to remember |
| The TAs were very helpful and polite, they asked interesting questions that made me realize little things we could have done differently to optimize the code. I think oral presentations are useful because once you have to explain what you did, you realize if you actually understand (Feynman Technique type of approach) |
| I would have prefered a more section by section examination. Instead we are asked a single, short, semi-related question for the entire homework. The "presentation" took less than 5 minutes. |

# I found it helpfull to work in groups for the homework

| I found it helpfull to work in groups for the homework | Number of responses |
|---|---|
| Yes | 39 (95.1%) |
| No | 2 (4.9%) |
| Total | 41 (100.0%) |



| | Mean | Standard Deviation |
|---|---|---|
| I found it helpfull to work in groups for the homework | 1.0 | 0.2 |

# Course material. The slides and Jupyter Notebook files were ...

| Course material. The slides and Jupyter Notebook files were ... | Number of responses |
|---|---|
| essential for me to follow the course. | 14 (32.6%) |
| quite helpful. | 19 (44.2%) |
| meaningless. | 10 (23.3%) |
| Total | 43 (100.0%) |



| | Mean | Standard Deviation |
|---|---|---|
| Course material. The slides and Jupyter Notebook files were ... | 1.9 | 0.8 |

# The course book.

| The course book. | Number of responses |
|---|---|
| I never used the course book. | 18 (40.9%) |
| I consulted the book rarely. | 10 (22.7%) |
| I consulted the book occasionally. | 6 (13.6%) |
| I reread the actual sections of the lecture in the course book. | 5 (11.4%) |
| I used it for further reading and deepening. | 5 (11.4%) |
| Total | 44 (100.0%) |



| | Mean | Standard Deviation |
|---|---|---|
| The course book. | 2.3 | 1.4 |
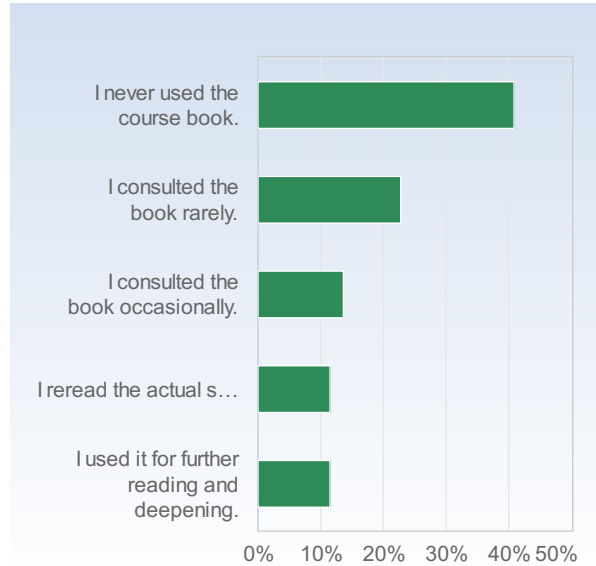
# Course style. Language

| Course style. Language | Number of responses |
|---|---|
| The course language was to "mathematical". | 9 (22.0%) |
| I got used to a more mathematical language. | 8 (19.5%) |
| I saw no problem in the way the material was communicated. | 14 (34.1%) |
| I liked the way the material was communicated. | 10 (24.4%) |
| Total | 41 (100.0%) |



| | Mean | Standard Deviation |
|---|---|---|
| Course style. Language | 2.6 | 1.1 |
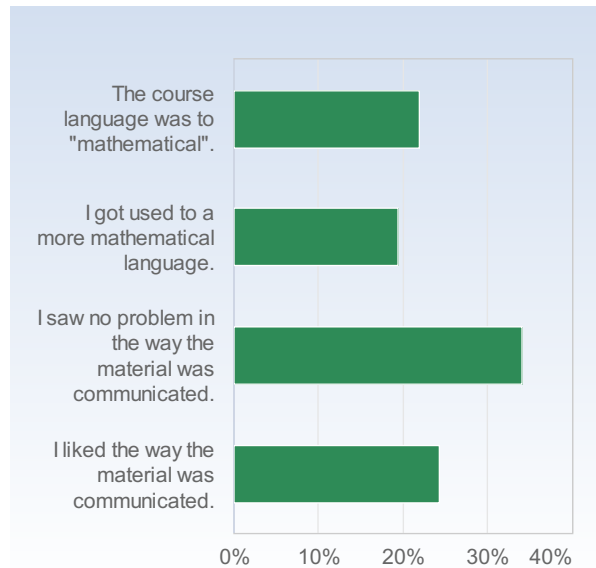
# Here you can give final and summarizing comments, if you like

We were treated really badly during our homework and the teacher said we didn't understand python and that I actually never worked on the homework by myself, which wasn't true. The teacher made me really uncomfortable with their questions and it seemed like they criticized girls more than guys

the complaints communicated by the student representatives where not respondet to in an accommodating manner

I have learned a lot, even if I have had basic knowledge. The course helped my research.

I didnt reqlly do anything apart from mandatory exercises/handins since i knew python already. Sorry my answers are kinda random for the questions about teaching etc

I think the course and I did not match and that I were lost from the beginning.

This course was bad :)

The three head teachers seemed rather disinterested in holding the course, please at least change the dates when you reuse projects. I got very demotivated and it made me feel like the course is unimportant.

You said in the beginning that it was a course for beginners with no experience in programming. It is not. There are a lot of things you just assume people know, which makes it very hard if you know nothing about programming.

(To the TAs: Thank you, you're are the main reason I managed to pass this course)

First of all the survey is too late, i can't remember much other than that i very dissapointed in the course.

The final homework was obviously reused for several years with code suggestions that were obsolete and using maths that we haven´t learned yet. This led to the students focusing on working around poor instructions and finding new ways of finishing the assignment and in the end missing some of the points of the work.

This is also reflected by the fact that other professors mentioned some of the professors teaching this course being stubborn and that they won´t uppdate their way of teaching and their examination assignments.

Finally we were told the course was suited for beginners, people who have never done programming before, that was not the case. Even i had huge difficulties understanding even though i have studied programing for several years.

This felt more like a learn your second language course than a begginers programming course. The course was impossible to pass if you had no prior knowledge without heavily relying on your friends to teach/help you instead of learning from the teachers/lectures, because they started at a far too high level.

This courseevaluation is the worst formated I have seen. Most of the questions you cant anwser what you actually think because that is not one of the options. Agree with/do not agree with questions are better, because then you will actually find out what people think.

To start with I was very excited for this course because I've always wanted to learn more programming, but that changed quite fast after the first lectures.. this should be a beginner course, but it's not. I understand that this is the university and here we should be learning stuff fast and on our own, but that just doesn't work here so if you want to continue like this, at least don't say that it's for beginners. I also hated that the teachers got some critique and instead of changing anything, they just kind of told us to be better.  I've heard that before, this course was set much later in our programme which makes totally sense seeing the math that we were supposed to know for this course. The teachers assumed that we know math that we will only learn in a few years! This have to be changed because this is definitely unacceptable. And the programming that we were supposed to use did not longer exist. Bad, that's what this course was.

I want to thank Robert, Malin and Klaus for your patience and of course, the TAs that graded our homeworks.

To me, learning how to programme is essential for the career I want to build and I really appreciate everything I learned during this course.

I truly hope more logic behind the concepts can be involved to engage the students on a more intuitive ground.

I really like the course project (Newton Fractals) and my group was extremely helpful, so I think group assignments are good. Also, Klaus was very helpful when we were not understanding the tasks for the project and the fact that a professor takes the time and patience to explain means so much to us.

Personally, I often feel overwhelmed in this programme and a helping hand is very needed to keep pursuing the goal of completing this bachelor.

Thank you for considering my opinion through this survey.

The course was very disappointing. Way to hard to understand if you haven't programmed before. None of the things startet on a basic level. Didn't learn anything.

The book was the only thing that helped the slightest but wasn't really any time to learn.

Question 18 is stupid, the language was not to "mathematical" the math elements where just fine it was the programming things that were hard to fallow. The lecturers were unstructured and hard to fallow. It feels ridiculous to have the same course for people with no prior programming knowledge as the people who just need to learn a new language, it was fucking confusing.

The slides where essential. The course was hard and annoying, going at a blistering speed and certainly demanded a lot of time. I watched quite a few videos before the course started and practiced python on the web before the course start but it was still extremely hard to fallow. I had a mate reading python at another university and their pace where nothing close to ours, although we read at the same official speed I could easily help him with all his assignments and solve them.

I don't think I could have managed the course if I had not prepared before hand and had some help from people with experience in python.

I felt as thought the course mixed material better suited for beginners and material better suited for people with some experience programming in a kind of weird way sometimes. Otherwise, I liked the course.