

## Course evaluation ECON3120/4120 Fall 2022

*Course responsible:* Kjell Arne Brekke.

This course is the second course in mathematics and mandatory for master students. The content of the course is as in previous years, with three parts: optimization, integration and differential equations, and linear algebra. But the organization has changed from last year. In earlier years the requirement from micro 3 made it necessary to start the course intensively and give most of the first part (of three) in about two weeks. In coordination with Micro 3, this requirement was dropped so we could give the course at a more even pace. A second change is on groups versus plenary problem solving. Now, students work on problems in groups with teachers available to help, the week after the material has been covered in class. The following week we go through the solution to these problems in plenary. A final change is that we added a “stumble group” open to all.

The result from the nettskjema questionnaire is enclosed. Note that these results have been polluted by responses from another course (ECON4260), my error. It seems like responses from ECON3120 dominate the responses. Comments about the use of Power Point is from the other course. As students in ECON4260 generally are very satisfied with the course, reported satisfaction may be too high.

The more even pace in the beginning I think is a clear improvement. There are few limits to how much we can teach in a short time span but there definitely are limits to how much students can learn over the same time span. My impression, based to a large extent on Mentimeter quizzes in class and feedback from groups, is that many students did not internalize even the points I stressed the most in class, but that they got it when working on problems in groups.

For the first part of the course I thought that students would find a substantial overlap with ECON1100. The feedback from a Mentimeter survey at the end of part 1, however, show that students strongly disagree that there is a lot of repetition from earlier courses. I had expected that the class would be divided on this, with good students thinking that it was much repetition while other disagreed. The response show, see below, that this is the point where students are almost unanimous – they think it is **not** repetition.

The organization groups, stumble group and plenary seminars, I think is successful. I attended one such group and have also discussed with the teachers regularly teaching them. One benefit that I initially did not think of is that it is a social experience for students where they sit together discussing in groups. Some students were already there working on problems when I arrived five minutes early, some arrived much later and had to find a place at a table with other students they probably did not usually interact that much with.

The main benefit is that students actively work on their own and teachers only help out when needed. Direct interaction between students and teachers gives the opportunity to help students with what they are struggling with. While some students are struggling because they misunderstood notation, others struggle because they do not have a developed understanding of the tools they are required to use. Direct student-teacher interaction helps addressing the problems that each student has in learning mathematics in a way that plenary sessions cannot.

When I visited a group, some groups of students worked very independently and rarely asked any questions while others raised their hand much more frequently. One group of students was working on the problems elsewhere and entered the room to ask a question about a problem where they were stuck. Some groups of students completed the whole set of 10 problems during the group and only asked about the most challenging point in the problem set, while others worked for the entire two hours on the 2-3 first problems with frequent input. Some asked question about things that must have been stressed over and over again in class, but which they did not realize that they had not understood until they had to solve problems on their own. I believe that the learning outcome of a teacher being there to help them out at that moment, far exceeds that of multiple repetition in lectures.

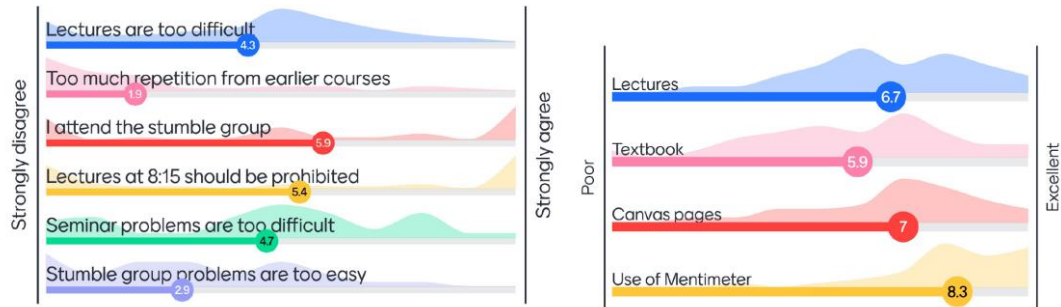
Based on the Mentimeter feedback, see below, the class is divided in the use of stumble groups. This is as expected and intended, the groups are intended for the students who initially knew the least mathematics. It seems like there are three about equally large fractions, one fraction regularly attends these groups, one fraction occasionally goes while the last fraction don't use stumble groups. Feedback from Mihai and Adam, who are teachers on all groups, is that it would be wise for all students to look at stumble group problems first, since some come to the regular group struggling with issues they would have grasped if they had worked through the stumble group problem. The feedback below also indicates that the problems for the stumble groups are at the right level. Since the stumble group is open for everyone, two teachers may have been on the low side, especially in the beginning.

The course has many lectures, two per week in 13 weeks, in total 26. For the first part, where we now could follow a more regular pace I found that the material could be covered in less time than usual, and cancelled 3 lectures out of 12. This was partly due to some minor changes, such as substitution elasticities being covered less extensively, but perhaps also because students had more time to work on the material until next lecture. However, we needed more time to cover the linear algebra, so the total number of lectures is the same as earlier. The additional lectures are used to cover more examples and show how to solve problems, rather than extending the curriculum.

Overall, the changes made in pace and groups/seminars have been very successful and should be continued. As for improvements, there is a request for more lecture notes, and at least for the first part, these notes are now of a form that easily can be made available ahead of lectures.

Kjell Arne Brekke, 4/11 2022.

# Results and comments from Mentimeter



- |  |   |   |
|--|---|---|
| Too many seminars and lectures at 08:15  | Good pace in the lectures, easy to follow!  | Good lecturer   |
| Would like to have lecture notes posted on canvas like what von der Fehr does in micro3  | Would have preferred a faster pace to cover more material, and more proof based content.    | Preferably, we should not cancel lectures   |
| More exam-relevant examples in lectures  | Do some exam tasks in lectures or seminars  | I like that we can get a lot of help in the different seminars. Makes it easier when we get stuck.        |
| Too many 8:15 seminars   | Very useful course, have learned a lot!   | Should have a repetition lecture at the beginning   |
| Good lectures :)   | Way to many seminars and lectures at 08:15  | Its is a good thing that you go through proofs in the lecture.  |
| Was good to have extra time for problemsolving instead of monday lecture   | Good with examples when explaining theory. A bit difficult to think space graphic intuition | I am a bit disappointed at the Norwegian textbooks. Would have preferred only English textbooks.          |
| Hard to connect notes from lectures to seminar problems. More headlines over each theme in the lectures. Improve lecture structure | Takes a long time to get help in stumble group  | Should have more seminar leaders that can help in stumble group and seminar, often long queue to get help |
| Dont like the book   | Lectures should be at U1 at 22:00   | Stop complaining about 8:15   |