

Kursrapport MM5021 Mathematics III - Foundations of Analysis ST25

Antal respondenter: 1
Antal svar: 1
Svarsfrekvens: 100,00 %

. Beskrivning av kursupplägget.

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This is an "epsilon-and-delta" course covering most of Rudin's text Principles of Mathematical Analysis. It does not include the Lebesgue integral, and only briefly mentions differential forms. The rest of the book is covered more or less in detail (real numbers, least upper bound, Archimedean property, density of rational numbers; countable and uncountable sets; metric spaces, basic topology; sequences and series; continuity, compactness, connectedness; derivatives, mean value theorem and consequences; the Riemann-Stieltjes integral; uniform convergence, approximation by polynomials; power series, elementary functions; contraction mapping theorem, inverse/implicit function theorem). This summer, we skipped a few topics such as rearrangements of series.

. Kursens fördelar, beakta studenternas uppfattning i kursutvärderingar.

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The main benefit of the course is learning how to read and write rigorous proofs. Many of the concepts are also important for later courses (and retroactively as well, this course justifies things that earlier courses might not have done in detail). From the evaluation, it seems that many students appreciated the systematic way the course starts from the foundations and develops a theory. Some also found the homework assignments stimulating.

There are some benefits to the summer version of the course. Students gain flexibility to take fewer courses during the autumn and spring, or to take advanced courses earlier. Some students needed to take the course this summer in order to enter a master's program afterward. Students from outside Stockholm gain access to a course that might not be offered in their regular programs. The course makes financial sense as well, both for students who want to be enrolled during the summer, and for the department to save money by not renting classrooms.

. Kursens nackdelar, beakta studenternas uppfattning i kursutvärderingar.

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The worst-looking histogram in the evaluation seems to be point 3 "The teaching gave me good conditions to achieve the intended learning outcomes." Two of the 12 respondents disagreed, giving either 1/5 or 2/5. From the answers in point 7, it seems that what they had in mind to improve the conditions would be to have more video lectures. I assume the students meant pre-recorded lectures, but maybe some of them also wanted more live lectures on Zoom.

From my point of view, participation was very low. Perhaps this is to be expected from a summer course. During the summer, there were 3 to 10 participants in most Zoom sessions. From point 5 in the evaluation, it looks like most students were not putting many hours into their studies. One student in point 7 mentions being unable to attend the Zoom lectures, but nobody took me up on my repeated offers to schedule other times. On a more positive note, many students did seem to be actively working on the homework and quizzes, and in the end the exam went fine for most.

. Slutsatser samt förslag till förbättringar.

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Video lectures seem to be a popular suggestion from the students. I agree this would help to understand many concepts. On the other hand, I don't think it would help with the true goal of the course: teaching students to read and write proofs. I fear that some students might trick themselves that it is enough to watch videos instead of reading Rudin (or another text).

In addition to my deliberate reasons for limiting the supply of videos, there may simply be some error on my part. I think I deleted some video lectures by mistake when I was editing the course page from last year. I found some later on video.su.se, but I had the impression there might be more. I found some links to YouTube but then there were advertisements. One suggestion (with apologies if it has already been done and I simply do not know where to look) would be for the department to review what videos have been made already and collect them together in one place if we want to use them again.

There are pros and cons to having an oral exam. Since it was a distance course, many students were not in Stockholm. If I taught the course again, I would probably prefer to have only a written exam. On the other hand, especially for a distance course, instructors may prefer to have an oral exam to double-check how well students understand.
