

STK-FYS 1110: Short overview, concerns and recommendations

Author: Judith Reindl

Date: 23.05.2025

Summary:

For the first Lecture, math and physics students get separate lectures. This year unfortunately less information dedicated to physics students was given, which made confusion and added stress for the students. This can easily be changed.

Starting from 2. Lecture until easter, both physics and math students attend lectures given by Department of Mathematics. In the meeting 20.11.2024 at Department of physics, it was decided to add physics questions in the weekly exercises. This was done and in general appreciated by the physics students. The problem was that it was not possible to reduce the number of weekly questions from the math department's side, as they claimed every single question was important. Due to the high workload (up to 11 questions from math department), physics question was no longer added after week 6. The physics students handed in the same oblig. As the math students and had the same midterm exam.

After Easter starting the week of 21.4., the physics students were separated from the math students. In the following 5 weeks the students learned the application of the statistics theory in physics squeezed into 5 lectures, which were given in parallel with 3 labs, which they also had to attend. The students also need to hand in labreports. This year due to late easter it was not possible to finish the assignment in time for the approval of the students for the exam. The physics students had lectures and labs several weeks after the lectures for the math students had stopped, which gave the physics students less time to prepare for the exam.

Concerns:

Students need to attend lectures, which are not tailored to our teaching goals and they shift to physics lectures in the middle of the semester, so they don't get all content from the theory. This is taken into account by removing one question related to the math lectures in the final exam.

Furthermore, the Department of Physics wants to have teaching methods aligned with the newest pedagogic developments, which are not used in the lectures taught by the Department of Mathematics.

After easter, the students had a huge workload from learning the applied statistics and doing labs and the labreports. This is overall not very good for them to be able to learn and understand, but even worse was that the final assessment of the course for which they have to prepare parallel to the labs will mainly test their theoretical knowledge from the first part of the course, which was already tested in the midterm exam and the obligatory question. In the final exam, three Questions are joint questions for math and physics and only the last question is for physics. This question tries to test whether the students learned how to use statistics in a physics context. However, the exam does not align with the list of learning goals defined for STK-FYS1110.

Last concern is about the language. The course is meant to be taught in Norwegian, but the teaching book is in English. Furthermore, the weekly exercises from math department are in

English as well. At the end, the exams are in Norwegian. This makes it very confusing and stressful for the students.

Suggestions:

1. Collect proper course evaluation data

The STK-FYS course has 117 students enrolled for the final exam. The STK course from math department has additionally approx.. 180 students. In the lectures from Math Department I joined there was a max of 80 students out of these approx..300. In the first physics lecture after easter there were 50 students present.

The collection of feedback from students is ongoing. For the first part until easter, meaning only lectures from Math Department and weekly exercises lead by Tas from Department of Physics, the evaluation is already collected, the data for the last part and the general course will be collected after the exam using the official form as a template. There will be additional questions asked, as part of the project I have to do for the university teaching course.

The evaluation of the first part was answered by 66 students and at most 37 students answered to each question.

First question was how good the students think their achievement of the learning goals were in the first part of the course. This only included lectures given by Department of mathematics and group work with tutors from Department of Physics.

1. you know about the concept of probability and master the basic rules of probability: 6.2/10
2. you know about random variables, and are able to find expectation, variance and covariance: 6.1/10
3. you know about the law of large numbers and the central limit theorem: 4.6/10
4. you know about the most common probability models: 6.7/10
5. have knowledge of simple methods for estimation, construction of confidence intervals and hypothesis testing: 4.1/10
6. are you able to use regression analysis for model fitting: 4.2/10
7. are you able to use programming to obtain and analyze data from physics experiments and present findings in the form of statistical quantities and as graphs and tables: 4.8/10

Question two was how good the following elements were for the understanding

1. Lecture: 5.0/10
2. Weekly exercises Mathe: 4.7/10
3. Weekly exercises additional Physics: 4.6/10
4. Midterm Exam: 7.1/10
5. Obligatory Question: 6.8/10
6. Pensum: 5.0/10

Question three was How the students rate the use of the following teaching methods in the lectures

1. Activation and interaction with the students: 5.0/10
2. The use of feedback tools (e.g. Mentimeter): 6.5/10

3. Lectures with Computer and tools like Powerpoint: 6.4/10
4. Group discussion: 4.3/10

The next one they should grade how much time they used for some of the things and whether they have learnt something

1. General: Overall the outcome was not much time but also not much learnt, but the responses spread through all four possible sectors
2. Lectures: Not much time and not much learnt, a few students have invested time and learnt something. No students with much time invest claim they haven't learnt something. The rest is distributed for not much time but the spread of the learning outcome is large.
3. Exercises. Same as for lectures
4. Preparation before the lecture and reflections after the lecture: Students don't seem to do that, as most of them claim they invested very less time on that.

The next question was about the access to the teachers, their help and whether that actually helped.

1. General: Overall the access to help seems ok and helpful. Some students find it hard to get help and also claim that this help was not helpful.
2. Group teachers: The help of the group teachers was always helpful to different values, but some students find it hard to get help.
3. Physics teachers: The help of the physics teacher in that part of the course seems to be not very good. A few students find it not helpful and overall the tendency was that it was hard to get help.
4. Math teachers: Same as for physics teachers with a slight tendency for better access but less helpfulness.

In the comment section 18 comments were received and there were several topics mentioned, the comments can be found at the end of the document.

2. Work to improve the course

There are several options, which one can consider. We should very well read our teaching goals and from that go in the direction of course design. The learning goals are already very well defined and, in my opinion suitable for the course :

After having completed the course

- you know about the concept of probability and master the basic rules of probability
- you know about random variables and are able to find expectation, variance and covariance
- you know about the law of large numbers and the central limit theorem
- you know about the most common probability models
- are you able to use Monte Carlo simulations to simulate simple stochastic processes of relevance to physics or measurements including uncertainties
- have knowledge of simple methods for estimation, construction of confidence intervals and hypothesis testing

- are you able to use regression analysis for model fitting
- are you able to plan, carry out and analyze data from physics experiments
- are you able to distinguish between random and systematic errors from insights into experimental procedures, results and data analyses
- are you able to use programming to obtain and analyze data from physics experiments and present findings in the form of statistical quantities and as graphs and tables.

The learning goals can be splitted into ones more related to theory (1, 2, 3, 4, 6, 7) and ones more related to application in physics (5, 7, 8, 9, 10). As we can see from the evaluation the first part is currently not doing well on meeting our goals.

My suggestion would be to design a course which matches our teaching goals. The optimal solution would be a course tailored for our students along our teaching goals and taught in full by Dep. Of Phys. This would allow for labs and application to be taught in connection with the relevant theory, not afterwards. If this is not possible, a plan could be to design for a continuation of the first part being taught by Dep. of Math., but with a reduction in the number of lectures by the Dep. Of Math. But I think there is an urgent need that the course from Dep. Of Math. Is tailored to the physics students. That is unavoidable.

This would mean to split the course half and half in a theoretical part and a practical part. The course could start with the theoretical part, where they learn everything to meet our goals and get prepared for the practical part. We can attribute 5 study points to part each. The first part can be concluded by a written exam. The practical part can start with some experimental lab as well as some small simulation tasks. In the last 4 weeks or so the students could in groups select a project topic they want to work on (one could think about like 10 different topics) and then they work on that and hand in a report at the end. This can be done by each student. The workload for us will not be more as we are currently also grading everybody's lab reports. Easy approach here could be to make a pass or a fail, but I honestly think it is possible to make grades as well, when we prepare a good template and system for grading. From what I have learnt in the pedagogics course that would be the best way on how to do teaching tailored to our learning goals and make the assessment tailored to the learning goals and teaching as well. Furthermore, we would avoid that the students are working in the lab, while they need to prepare for the theoretical exam in parallel.

This is just a rough idea about how the course could be developed. I will continue working on it in my pedagogics project, to get a good basis for my suggestions. Both solutions would require the Dep. of Phys. to get in touch with the Dep. of Math. to discuss how the physics students can get the best education in dataanalysis.

Comments from students for the section of the course taught by Math Department:

Ikke bruk PowerPoint, sjukt dritt å følge med på!

Synes mer tid kunne blitt brukt på fys delen av stk-fys. Det kom et sjokk idet vi begynte med den delen, og følte det ble litt overveldende

Kaotisk lagt opp, dårlig kommunikasjon fra STK-FYS foreleser. Vanskelig å kommunisere med og frekk i tonen når man ber om hjelp, eller å avklare praktiske ting

The book being in english and the lectures being in Norwegian makes it a little bit difficult to connect the lessons to the tasks. Also important to learn statistics in more languages but still

Lower the volume on the lecturers microphones in the lectures Got a headache every time, it was so loud

I think that you should start with lab earlier. So it doesn't crash with exams

Likte veldig godt at det ble lagt ut presentasjon før timen. Vanskelig å følge pensum på grunn av boka var litt rotete. Vanskeligere med oppgaver på engelsk(boka), bra formelae som er enkelt å følge,

Ha bedre kommunikasjon med MN fakultet og for mye arbeidsmengde av BÅDE vanlige stk oppgaver PLUSS stk-fys oppgaveme og mange varslinger på canvas, mister helt oversikt over hva som er viktig

Lecturers microphone is way too loud

mer koordinerte gruppeoppgaver. komplisert at noe skal være på norsk og oppgavene på engelsk. Kunne vært mer samarbeid me stkfys slik at det ikke blir så mye etter påske

Less attitude in the lectures please... We are students and we're learning, please have some patience with our questions :)

When we ask questions we don't want to be met with attitude. I understand that this is a difficult course and it's very chaotic, BUT that's not the students fault. Be kind please!

mer koordinerte gruppeoppgaver. komplisert at noe skal være på norsk og oppgavene på engelsk. Kunne vært mer samarbeid me stkfys slik at det ikke blir så mye etter påske

We need more precise information, we often get at least three wrong messages before the correct one. Make a decision you can stick to before sending out messages please.

Et språk for undervisning og bøker, det er veldig vanskelig å måtte lære seg nytt stoff på to forskjellige språk. Bedre kommunikasjon mellom matte og fysikk. Bedre informasjon og tilgang til info

Powerpoint er veldig vanskelig å følge med på når slides er stappet med vanskelege formler og tekst, skulle ønske det var mer tavleundervisning, og gjerne informerte hva som var d viktigste

Det har vært vanskelig å få helt grep på hva som en pensum inn mot eksamen og hva man skal øve på. Å ha flere/bedre ukesoppgaver og kanskje inkludere de mer i forelesningene hadde vært fint:)

Når dere hadde spørsmål i timen der vi måtte regne var bra, man ble mer koblet på og trur man har god læringseffekt av det