Course analysis SK1118, HT23
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Course information
Course code: SK1118
Course name (English): Electromagnetism and waves
Course name (Swedish): Elektromagnetism och vågrörelselära
Points: 7.5
Programme: TCOMK (English, mandatory), CINTE (Swedish), and TIEDB (Swedish)
Period: 2
Responsible: Max Yan
Examiner: Urban Westergren
Teacher of lectures: Max Yan
Teacher of exercises: Richard Schatz
Teacher of Labs: Richard Schatz (coordinator Marina Zelenina)

Course design
Lectures (13), exercises (9), and labs (2). No online teaching, no uploading of previous video recording of lectures. For the two labs, we did upload short video clips in Canvas for introduction purpose. Pre-exam (1 session, 3hrs) and final exam (5 hrs) were held physically. One extra exercise (räknestuga) was coordinated by Richard just before final exam.

Other major changes of the course since its last instance: "Induction" lab is used instead of the "Optical-fiber" lab.

Meeting with students during the course
No special meeting was arranged during the course. Constant feedbacks were obtained during the lectures/exercises or through Email.

Students' results
Registered for course: 59. Registered for exam: 56. Attended for exam: 38
Passed rate: 26/38=68.4% (Re-exam to be held in April is not considered.)
Passed rate (HT22): 32/40=80%
------ Statistics -----
Pre-exam: Attended: 31 (Registered 52)
Final exam: Final exam students: 38 （registered 56）
A: 5
B: 6
C: 8
D: 3
E: 3
Fx: 2 (eventually 1 fail, 1 pass)
F: 11
------ End of statistics -----

Students' opinions

Questionnaire was electronically sent out to students after the course (Appendix). 10 submitted replies (Appendix). The questionnaire comprises of five sections: ***General***, ***Lectures***, ***Exercises***, ***Labs***, ***Others***. Below are summaries of the student's opinions on the sections.

- ***General***: Most students were very clear about the goal of the course in the beginning, satisfied with the course description, and found the course material easily. A few students indicated that "information during the course" was not very clear; this probably means that the reading guideline can be further improved. Like last year, most students (actually 10 out of 10) used the English compendium; among them, 8 students think it's "good" or "very good". Opinions about the Swedish textbook were averaged "neutral" (5 replies in totals). These opinions about textbooks are in line with last year's. Majority of the students super-liked "having a pre-exam".
- ***Lectures:*** Out of 10 students who responded, 7 followed >75% of lectures. Most students think the lectures' tempo and difficulty level are fine, but some think the tempo is a bit fast and difficulty level is slight too high.
- ***Exercise:*** About half number of students surveyed attended >50-75% sessions. They though difficulty level is in general OK but slightly on the difficult side. Tempo were just perfect, as was in last three years.
- ***Labs:*** Difficulty levels, and tempo are all very good. Note that from next year, we will switch the order of the optics lab and the induction lab.
- ***Others:*** When it comes to preparedness to the course, answers were mixed, reflecting dynamic background of the students. A bit less than half who replied said they were not properly prepared by their previous studies. Most of them think mathematics in this course is manageable. The course combines in general well with other course(s) under P2, but a few have problems especially if they need to travel between Kista and AlbaNova. Workload per credit is found to be OK. Time spent on the course per week lands at >15 hrs/week, including lectures and exercises (it seems most of the students who replied the survey have spent quite much time on the course). Difficulty level for pre-exam is found to be just OK. For the final exam, half of the students said it is difficult or too difficult.

Analysis and comments

Issues identified:

- Lecture pace is still found to be fast by some students, sometimes "very fast".
- Most students found there is a big "gap" when lectures move from "electrostatics+magnetostatics" to "electromagnetic waves".
- Some students were weak with math. More intro in the beginning is needed.
- Quite a few students have calculators with plotting and symbolic calculation functionalities. These are in principle not allowed by the exam rules currently defined for this course. This caused some worries for them just before exam.

Positive observations:

- Most students think the course is good, interesting, fascinating. (See attached free-text comments). "I am satisfied with the course. It was very interesting and I feel like I learned a lot from it! One of the best courses I have taken at KTH" – one says.

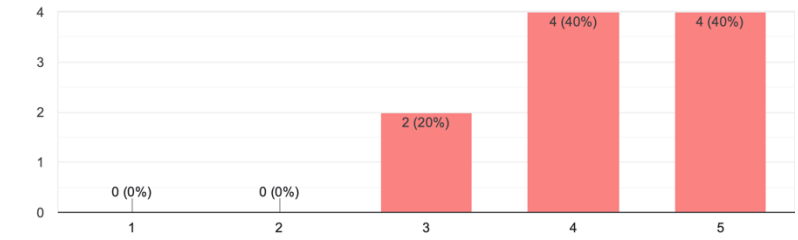
Planned course development

- Two labs, “Interference/diffraction” lab and “Magnetic induction (To build a clamp ammeter)” lab, will be switched in order from HT24 onwards.
- Revise the exam rules so that calculators with plotting and symbolic calculation functionalities can be used. The students do not benefit from such functionalities. And they don’t have to buy another calculator just for this exam.

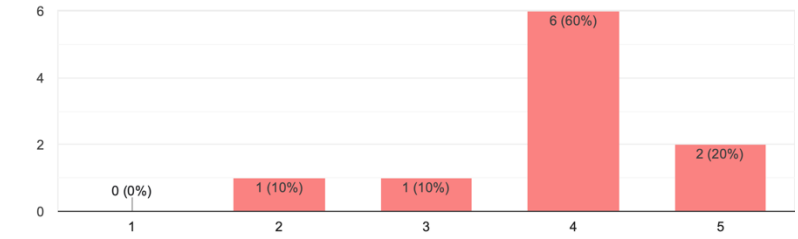
SK1118 HT2022 Course survey results
Sent: 2023-01-12; closed: 2023-01-30
(16 responses in total)

GENERAL (ÖVERGRIPANDE FRÅGOR)

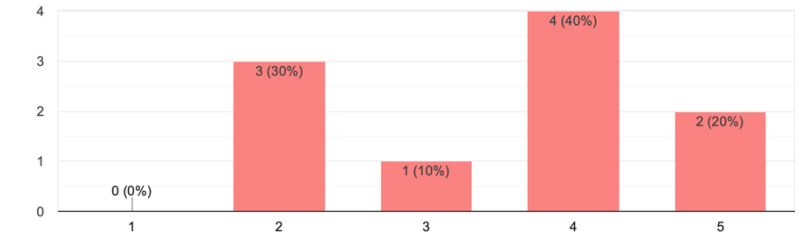
How clear were the goals of the course when it started? (Hur bra framgick kursens mål vid kursstart?) [1-Not clear at all; 5-Very clear]
10 responses



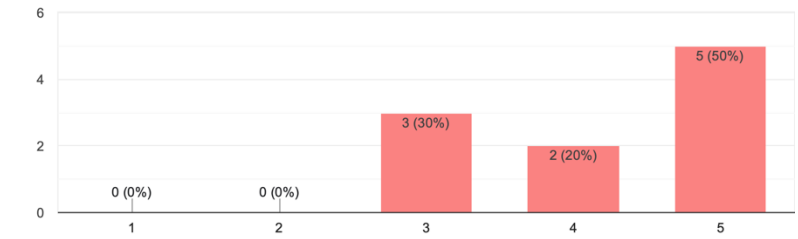
How was the information in the course description? (Hur var information i kursbeskrivningen?) [1-Not clear at all; 5-Very clear]
10 responses



How was the information during the course? (Hur har informationen varit under kursens gång?) [1-Not clear at all; 5-Very clear]
10 responses

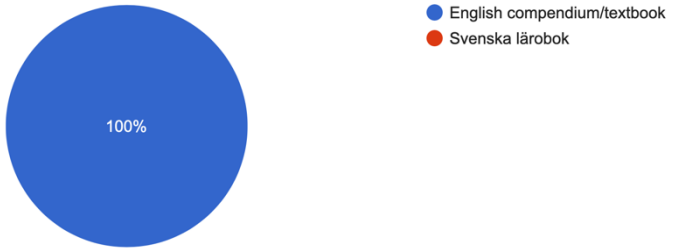


How was the access to the course material? (Hur var tillgången på kursmaterial?) [1-Very difficult to locate; 5-Very easy]
10 responses



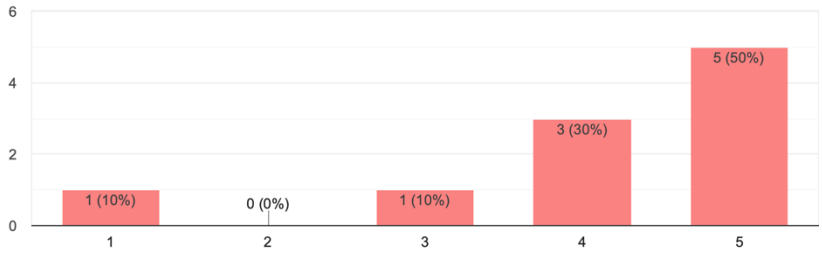
Which textbook have you used mostly? (Vilken lärobok har du mest använt?)

10 responses



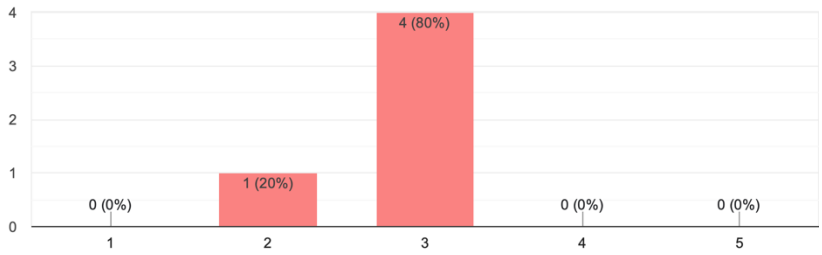
What do you think about the English compendium? [1-Not good at all; 5-Very good]

10 responses



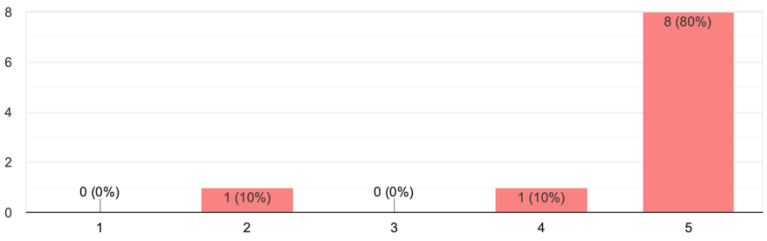
Vad tycker du om den svenska läroboken? [1-Mycket dåligt; 5-Mycket bra]

5 responses



What do you think about having a pre-exam? (Vad tycker du om att det finns en kontrollskrivning?) [1-Not helpful; 5-Very helpful]

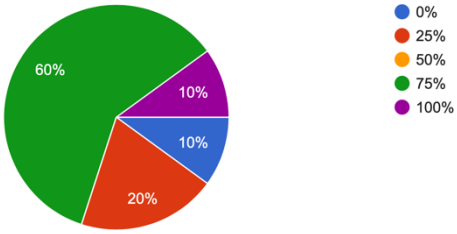
10 responses



LECTURES (FÖRELÄSNINGARNA)

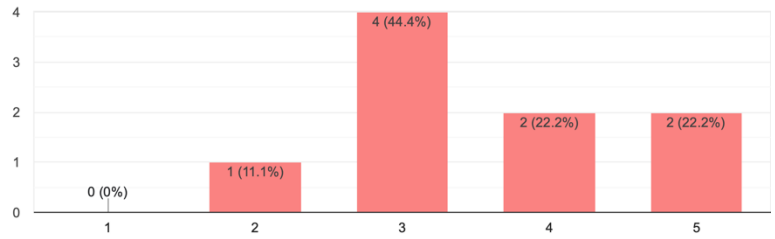
How many per cent of the lectures did you participate in? (Hur stor procentdel av föreläsningarna deltog du i?)

10 responses



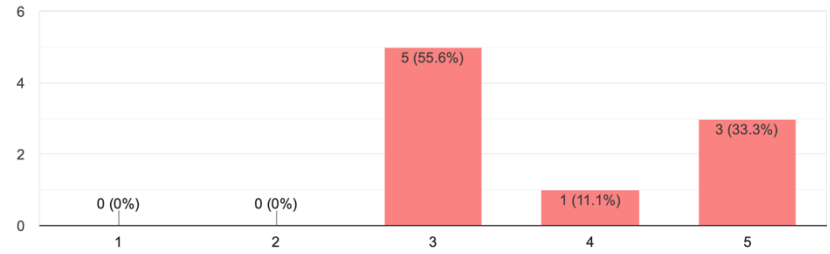
How was the difficulty level of the lectures? (Hur var svårighetsnivån på föreläsningarna?) [1-Too easy; 5-Too difficult]

9 responses



How was the tempo of the lectures? (Hur var takten på föreläsningarna?) [1-Too slow; 5-Too fast]

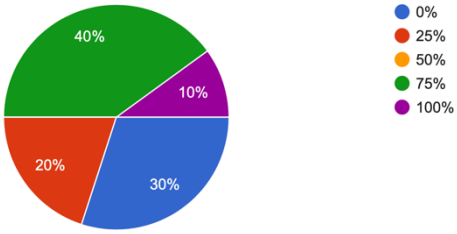
9 responses



EXERCISES (ÖVNINGARNA)

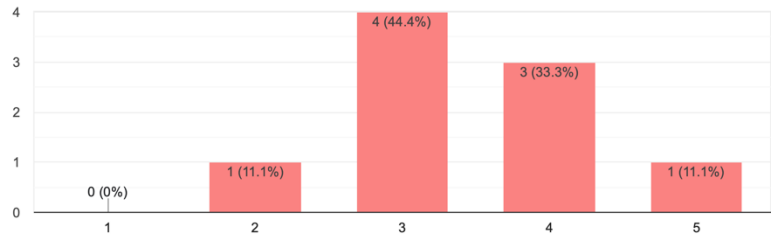
How many per cent of the exercises did you participate in? (Hur stor procentdel av övningarna deltog du i?)

10 responses



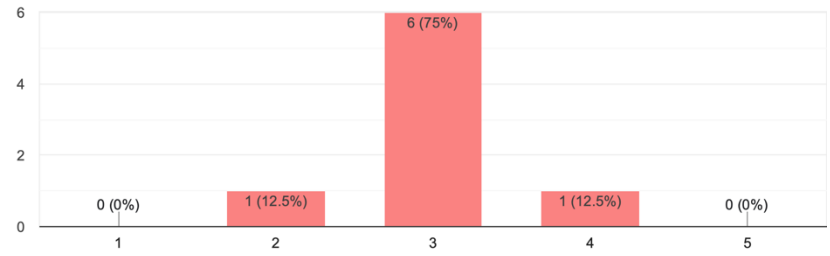
How was difficulty level of the exercises? (Hur var svårighetsnivån på övningarna?) [1-Too easy; 5-Too difficult]

9 responses



How was the tempo of the exercises? (Hur var takten på övningarna?) [1-Too slow; 5-Too fast]

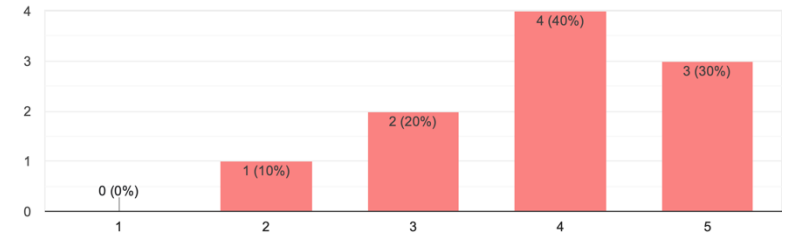
8 responses



LABS (LABORATIONERNA)

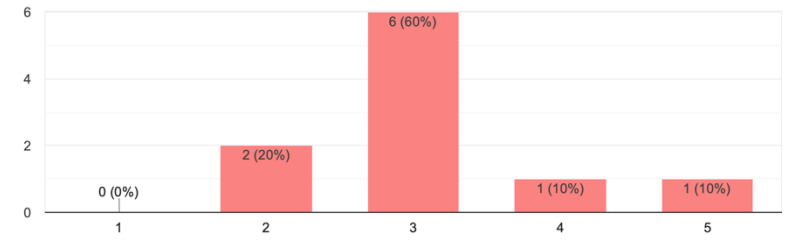
What do you think about the laboratory instructions? (Vad tycker du om laborationsanvisningarna?) [1-Very poor; 5-Very good]

10 responses



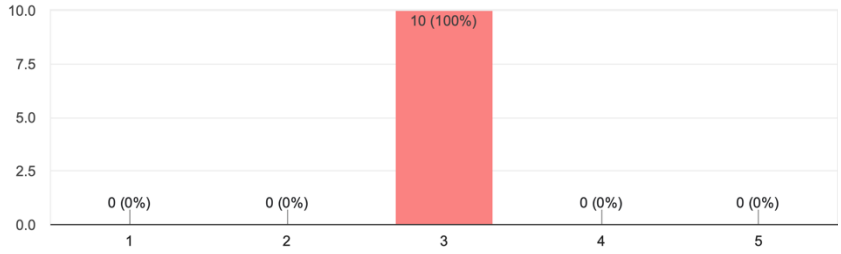
How was the difficulty level of the labs? (Hur var svårighetsnivån på labbarna?) [1-Too easy; 5-Too difficult]

10 responses



How was the time length for the labs? (Hur var tiden på labbarna?) [1-Too short; 5-Too long]

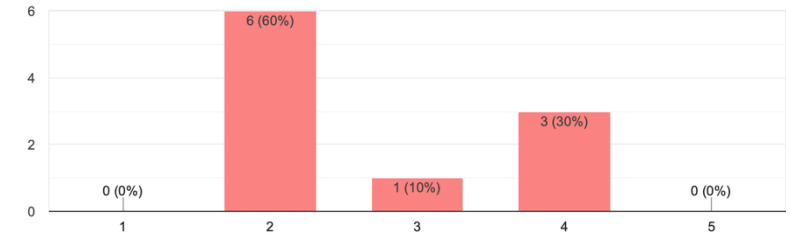
10 responses



OTHER QUESTIONS (ÖVRIGA FRÅGOR)

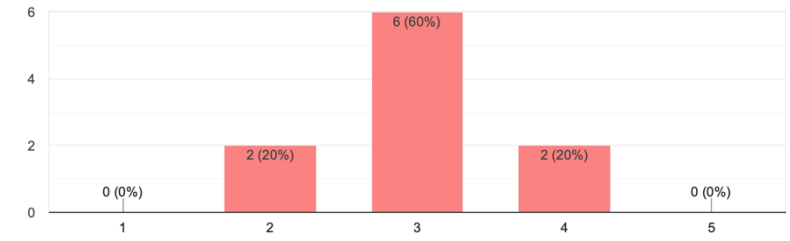
How well have your previous studies prepared for this course? (Hur bra var dina förkunskaper?) [1-Very poorly; 5-Very well]

10 responses



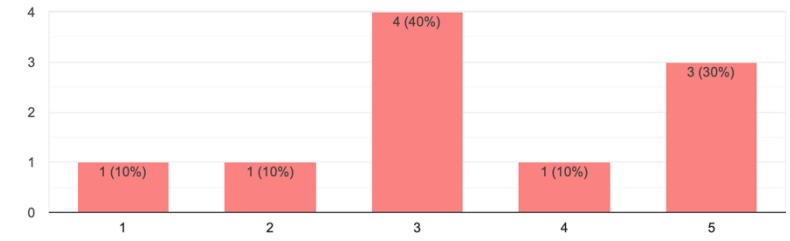
How was the level of mathematics in the course? (Hur var den matematiska nivån i kursen?) [1-Too easy; 5-Too difficult]

10 responses



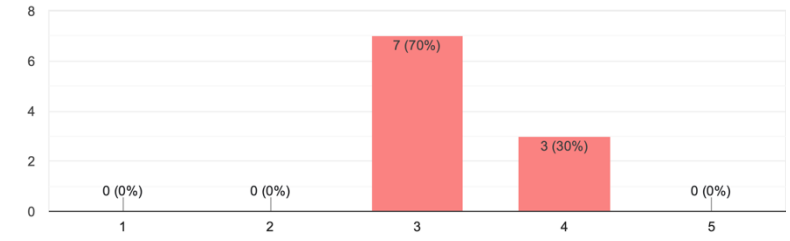
How was the combination with other parallel course(s) in period 2? (Hur gick studierna att kombinera med den parallella kursen i period 2?) [1-Difficult to combine; 2-Easy to combine]

10 responses



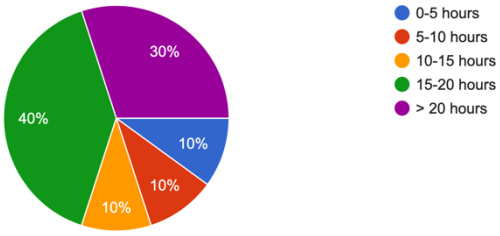
How was the workload in comparison to the number of credits? (Hur var arbetsbördan i förhållande till kurspoängen?) [1-Too little work; 5-Too much work]

10 responses



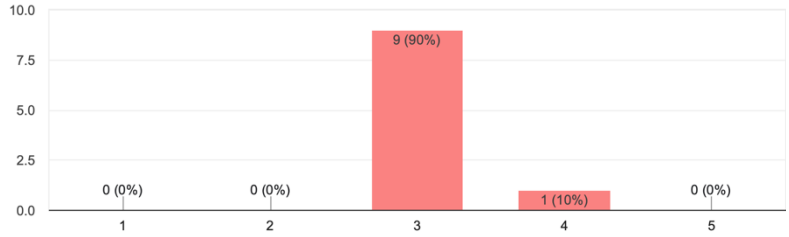
How many hours per week did you study during the course? Include lectures etc. (Hur många timmar per vecka studerade du under kursen? Inkludera föreläsningar etc.)

10 responses



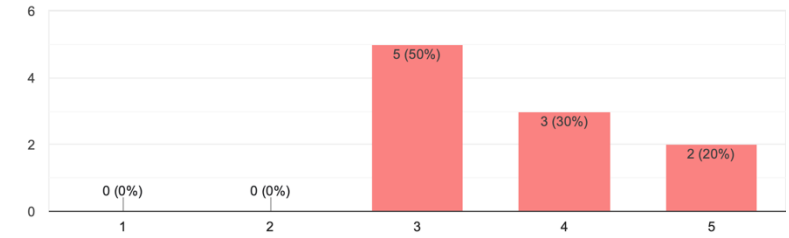
What do you think about difficulty of the pre-exam? (Vad tyckte du om svårighet av kontrollskrivningen?) [1-Too easy; 5-Too difficult]

10 responses



What do you think about difficulty of the final exam? (Vad tyckte du om svårighet av tentan?) (1-Too easy; 5-Too difficult)

10 responses



SK1118 HT2022 Course survey results
Sent: 2023-01-12; closed: 2023-01-30
(16 responses in total)

Are you satisfied with the course generally? In what way would you like to improve the course? (Är du nöjd med kursen generellt? På vilket sätt skulle du vilja förändra kursen till det bättre?)

The course taught me a lot about geometry and some very interesting physics. I am very satisfied with how much i learned. The course however was a bit too fast in the beginning and assumes you know physics integrals and how you derive things. Once i got that figured out the rest of the course was a lot easier, until the TE and TM modes which was very confusing in the start, (maybe a more intuitive explanation than jumping right into it), but the sunglasses explanation helped a lot. I still dont quite get the waveguides

I am very satisfied with the course. I learned a lot of things and I think it was very well reached!

the flow is too and unstandardly fast. usually this course is being taught in 4 months instead of 1 month (5 weeks)

Not at all. The exam was too difficult in comparison with the exercises that we did throughout the course. There was a big gap between the course materials and the exam. We haven't had the chance to learn a systematic way to solve physics problems which made the course too difficult. But the biggest problem was the exam difficulty.

Very interesting subject and I've learnt super much! Thank you! The labs could be improved, they didn't give me much at all.. Too much focus on instructions and were just stressful. Also bad timing on the optics lab where we hadn't covered the subject yet.

The course being Albanova made it very difficult for me to get there. Bus/train connections are pretty poor to there, especially if you want to quickly go from there to Kista or back. I also had some lectures that were in parallel that i could obviously not go to, but also a lot of lectures were back to back with a course in Kista, which, because of the bus connections made it impossible to get to both lectures in time.

I am satisfied with the course. It was very interesting and I feel like I learned a lot from it! One of the best courses I have taken at KTH