

Course analysis SK1118, HT19

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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: CINTe (Swedish), TCOMK (English)

Period: 2

Responsible: Max Yan

Examiner: Urban Westergren

Teacher of lectures: Max Yan

Teacher of exercises: Richard Schatz

Teacher of Labs: Richard Schatz

Course design

Change of the course since its last instance: Before, the course was given in two parallel versions, one in English and one in Swedish. From HT19 it is given only in English, while exercises/pre-exams/exam are available in both English and Swedish. Textbooks in both languages are being used for students from the two programmes. Since the two textbooks lack of coherence in contents, I have tried to prepare an English compendium which aims to cover the topics in the Swedish textbook at the right complexity level. Student would then have a common ground for reading and discussion. Since I started course preparation after summer, the compendium was just half complete before the course start and not 100% complete at the end of the lectures.

Meeting with students during the course

No special meeting was arranged during the course. There were conversations made during lectures. Some feedbacks were then obtained.

- English textbook contains too much formulas and lack of proper physical explanation. Some students came with even another book which is highly praised on the Internet, asking if they can read that one instead.
- One student came and asked if modules can be created in Canvas for easier tracking of the course.
- Some CINTe students reported that they couldn't see some exercise sessions that are seen by TCOMK students.

Students' results

Registered: 61 (active ~54)

Exam: 44

Pass rate: 22 (50%)

Students' opinions

Questionnaire was electronically sent out to students after the course. Only eight replied to the survey. The questions and answer statistics are appended at the end of the report. The

questionnaire comprises of five sections: **General, Lectures, Exercises, Labs, Others**. Below are summaries of the student's opinions on the sections.

- **General:** The students are in general clear about the goal of the course in the beginning. However, the course description shall be more clearly specified. Half of the students also replied that information during the course are not clear at all. Most found easy access to course material, but two found it is difficult. Most from the replies used the Swedish textbook. Out of five who replied, three found the English textbook is not good. Seven commented on the Swedish textbook – the book quality is barely OK. Feedback on the three-“pre-exam” system is in general very positive. Most students thought the English compendium is of some help.
- **Lectures:** Out of the eight students, one is repeating student who did not attend lectures at all; one has 25% attendance rate; two have 50% attendance; two has 75% attendance; and two have 100% attendance. Most students thought the lectures were difficult to follow, and tempo was fast.
- **Exercise:** Attendance to the exercise sessions is found to be OK – most attend 100%. Difficulty level and tempo are found to be just fine.
- **Labs:** Lab instructions, difficulty levels, and tempo are all very good.
- **Others:** There is a huge variation in answering the question “How well have your previous studies prepared for this course?” This reflects the diverse backgrounds of the students in this course. Four out of eight think they are prepared poorly. Regarding mathematics, in general they think they have adequate knowledge. The course combines with other course(s) in P2 easily. Workload per credit is found to be OK. Five out of eight specified they spent 10-15 hours per week on the course (the recommended “40 hours/1.5 credits” workload would suggest 18 hours/week!). Pre-exams are said to be difficult; the same for the final exam.

Analysis and comments

Issues identified:

- There have been some administrative “bugs” in combining previous two parallel versions of the course into a single course. Students under two programmes (CINTE and TCOMK) saw some discrepancies in their course schedules. There were also logistic issues with pre-exams and the final exam, which were initially planned at Kista. Administration at Kista did not want to take care of the exams. After some struggling, the final exam was moved to campus.
- Canvas turns out to be a central platform for exchange of course information and materials. Its use was not fully exploited either before the course start or during the course. This might be the reason some students felt they were not well informed during the course and it was hard to find the course materials. “Modules” categorized by lectures should have been created and updated throughout the course.
- Some students showed limited knowledge on operations of phasors, and also general mathematical expression of waves.
- P2 is effectively a short period, considering there are Christmas and New Year holidays. 13 lectures, 10 exercises, and 3 pre-exams were happening within 1.5 months. Many 8-10am lectures even made the situation worse. One has to limit the amount of information to be taught, which is especially true for “electromagnetism”.

- Some students mentioned that there is disconnection between lectures and exercises, and also that exercises are not closely connected to the pre-exam or exam questions. Exam questions also differ a bit from previous exam questions. This is simply due to the fact that I took the initiative to change some exam questions more towards physical understanding of the concepts learned, instead of almost direction application of the formulas.
- Most students found that the lectures are hard to follow, and proposed some better structure for the lectures to their opinions. Two students commented directly or indirectly that derivation of the formulas is not critical for them to learn new things. Either we skip derivation in the lectures, or we include some derivations in exercises.
- Regarding final exam: TCOMK students had much better exam statistics than CINTE students. Among those who took part in pre-exam no. 3, all except two TCOMK students passed the final exam. Final course grade is in general very much dependent on students' participation of pre-exams.

Positive observations:

- Most students are attending exercises, which showed their willingness to pass the course. A side comment - the same exercises were used for many years, and previous exams kept a close resemblance to the exercise problems. There could be a wide-spread mindset that one can well pass the course if one can solve the exercise problems.

Planned course development

- Course description will be improved.
- Continued writing of English compendium. Basic mathematic knowledges, including phasor and expression for waves, will be given in the beginning.
- Lecture content will be better tailored - the most important and relevant concepts will be emphasized more. Efforts will be made to ensure lecture information can be contained within the 1.5-month effective teaching period in P2.
- Lecture structure will be improved with better connection between lectures. Each lecture will try to comprise of introduction, explanation of laws, summary, and application.
- Derivations will be kept minimum in lectures. Intuitive explanation and applications of laws and formulas will be focused more. Examples will be given regarding how the formulas can be applied.
- Lecture slides with reading instructions will be prepared and uploaded to Canvas before course start.
- Canvas shall be more utilized, specially with modules created for each lecture.
- Exercise problems will be updated slightly.

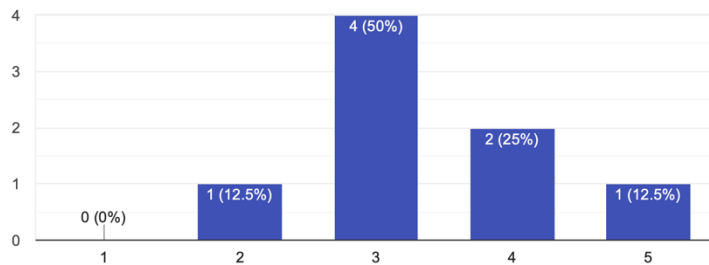
SK1118 Questionnaire/Enkät

Sent: 2020-02-11; closed: 2020-02-18

GENERAL (ÖVERGRIPANDE FRÅGOR)

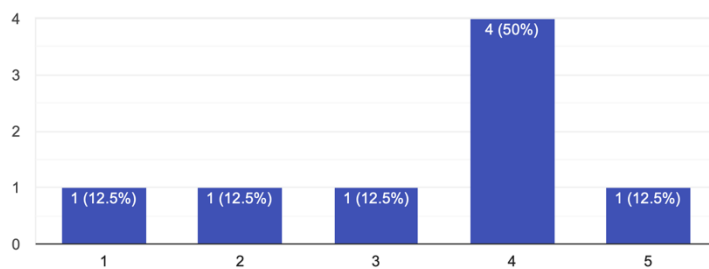
How clear were the goals of the course when it started? (Hur bra framgick kursens mål vid kursstart?)

8 responses



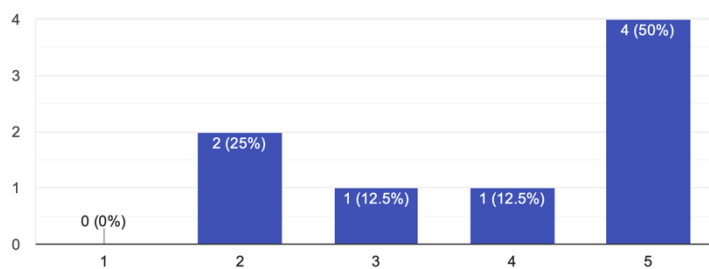
How was the information in the course description? (Hur var information i kursbeskrivningen?)

8 responses



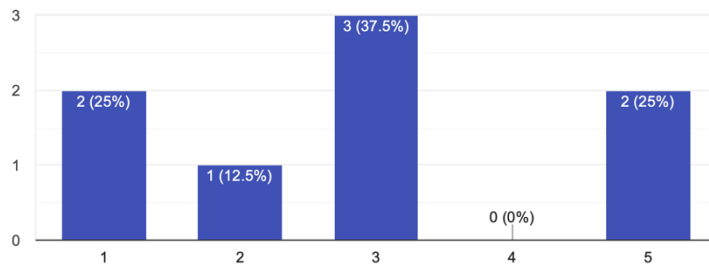
How was the information during the course? (Hur har informationen varit under kursens gång?)

8 responses



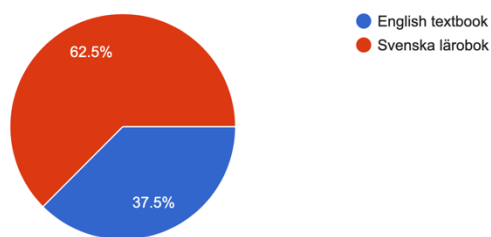
How was the access to the course material? (Hur var tillgången på kursmaterial?)

8 responses



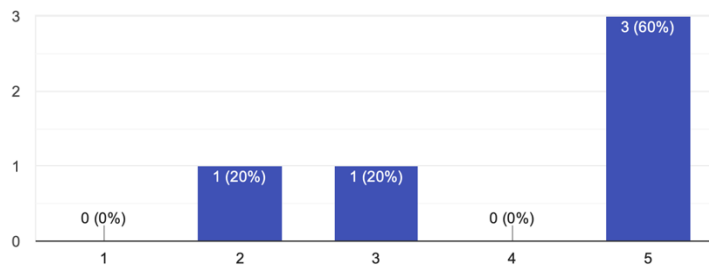
Which textbook you have used mostly? (Vilken lärobok har du mest använt?)

8 responses



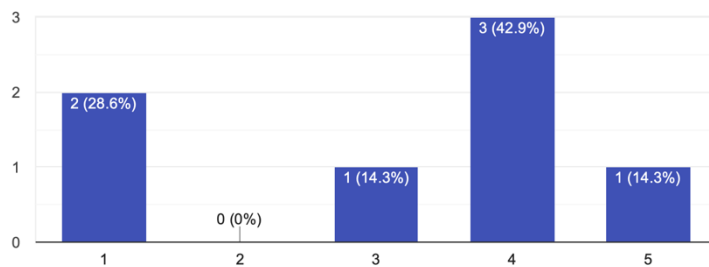
What do you think about the English textbook?

5 responses



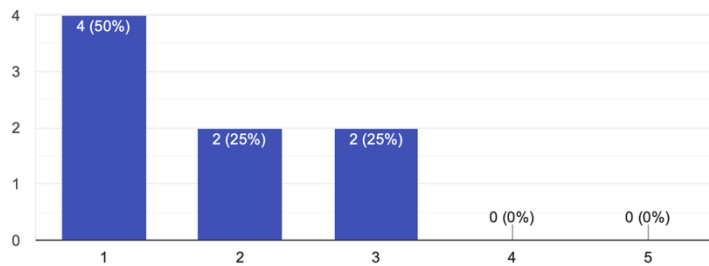
Vad tycker du om den svenska läroboken?

7 responses



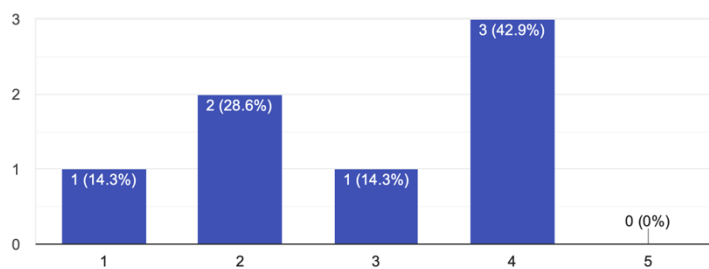
What do you think about the system with 3 pre-exams? (Vad tycker du om systemet med 3 kontrollskrivningar?)

8 responses



Was the English compendium helpful? (Leave it empty if you have not read it).

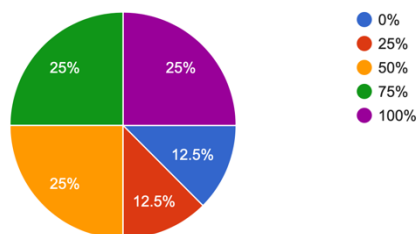
7 responses



LECTURES (FÖRELÄSNINGARNA)

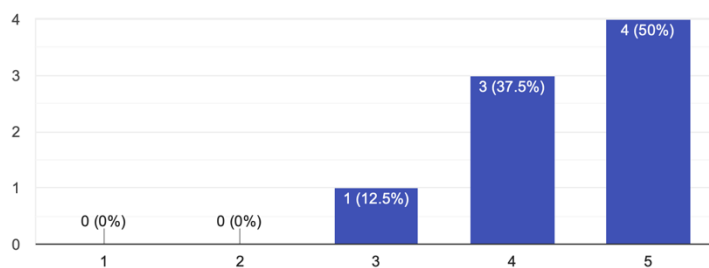
How many per cent of the lectures did you participate in? (Hur stor procentdel av föreläsningarna deltog du i?)

8 responses



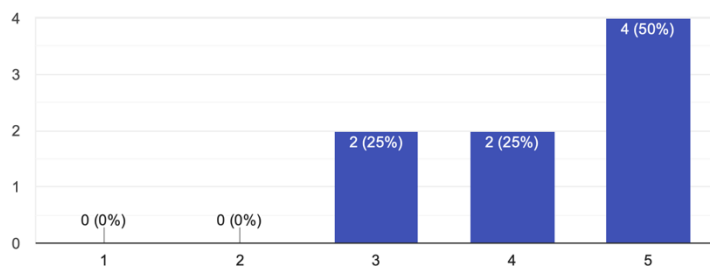
How was the difficulty level of the lectures? (Hur var svårighetsnivån på föreläsningarna?)

8 responses



How was the tempo of the lectures? (Hur var takten på föreläsningarna?)

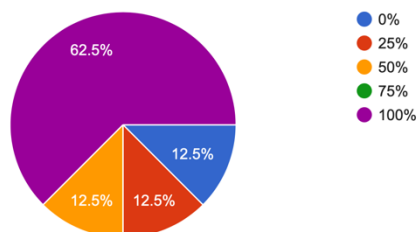
8 responses



EXERCISES (ÖVNINGARNA)

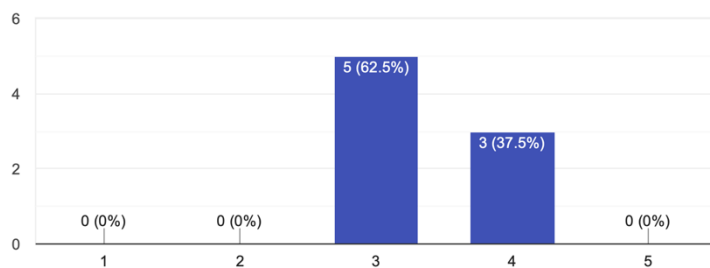
How many per cent of the exercises did you participate in? (Hur stor procentdel av övningarna deltog du i?)

8 responses



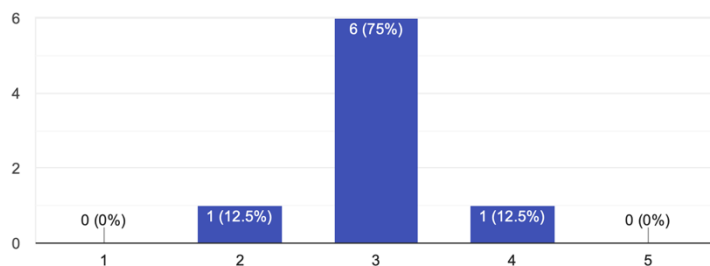
How was difficulty level of the exercises? (Hur var svårighetsnivån på övningarna?)

8 responses



How was the tempo of the exercises? (Hur var takten på övningarna?)

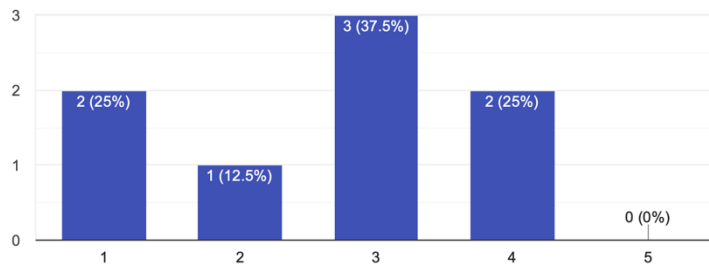
8 responses



LABS (LABORATIONERNA)

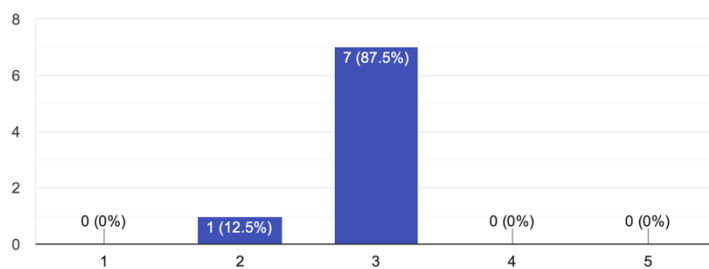
What do you think about the laboratory instructions? (Vad tycker du om laborationsanvisningarna?)

8 responses



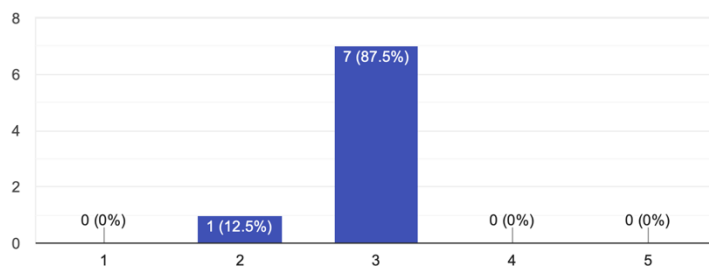
How was the difficulty level of the labs? (Hur var svårighetsnivån på labbarna?)

8 responses



How was the difficulty level of the labs? (Hur var svårighetsnivån på labbarna?)

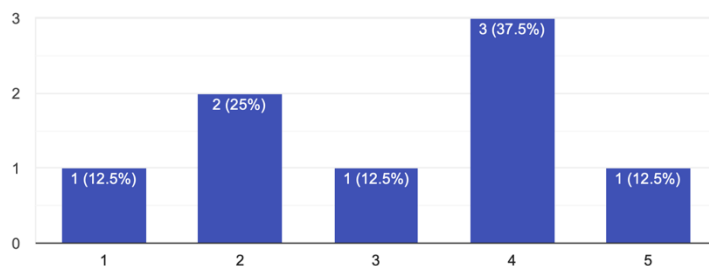
8 responses



OTHER QUESTIONS (ÖVRIGA FRÅGOR)

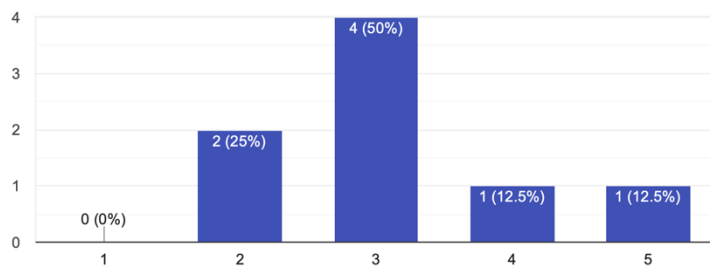
How well have your previous studies prepared for this course? (Hur bra var dina förkunskaper?)

8 responses



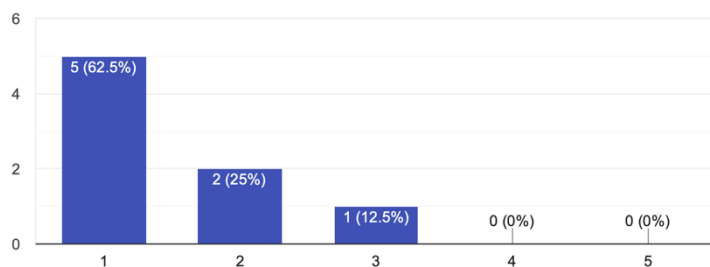
How was the level of mathematics in the course? (Hur var den matematiska nivån i kursen?)

8 responses



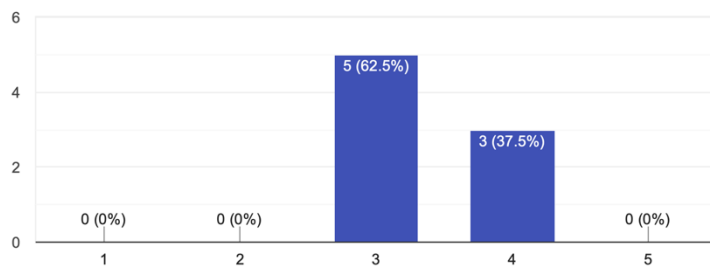
How was the combination with other parallel course(s) in period 2? (Hur gick studierna att kombinera med den parallella kursen i period 2?)

8 responses



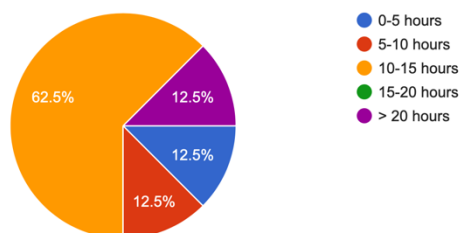
How was the workload in comparison to the number of credits? (Hur var arbetsbördan i förhållande till kurspoängen?)

8 responses



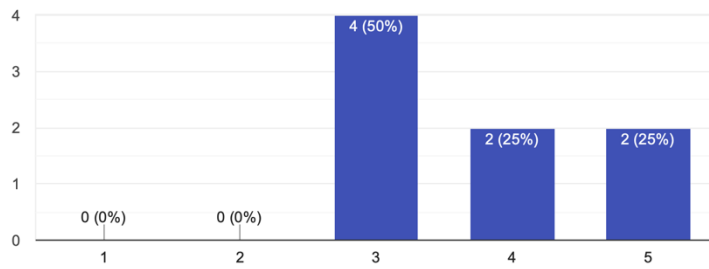
How many hours per week did you study during the course? Include lectures etc. (Hur många timmar per vecka studera...er kursen? Inkludera föreläsningar etc.)

8 responses



What do you think about difficulty of the pre-exams? (Vad tyckte du om svårighet av KSarna?)

8 responses



What do you think about difficulty of the exam? (Vad tyckte du om svårighet av tentan?)

8 responses

