Kursanalys - KTH[1]

Formulär för kursansvarig.
Kursanalysen utförs under kursens gång.
Nomenklatur: F – föreläsning, Ö – övning, R – räknestuga, L – laboration, S – seminarium)

KURSDATA Obligatorisk del [2]

Kursens namn	Kursnummer
Speciell relativitetsteori	SI2371
Kurspoäng och poäng fördelat på exam-former	**När kursen genomfördes**
Totalt 6 hp, varav 6 hp TEN1	Ht 2013
Kursansvarig och övriga lärare	**Undervisningstimmar, fördelat på F, Ö, R, L, S**
Mattias Blennow (kursansv, föreläsare, examinator)	F: 12x2h
Teresia Månsson (övningar)	S: 9x2h

Antal registrerade studenter	44
Prestationsgrad efter 1:a examenstillfället, i %	77
Examinationsgrad efter 1:a examenstillfället, i %	77

MÅL

Ange övergripande målen för kursen

Efter fullgjord kurs skall en student kunna:

- Använda tensornotation inom relativitetsteori
- Tillämpa begreppen längdkontraktion och tidsdilatation
- Använda Lorentztransformationer
- Lösa enkla kinematiska problem inom relativitetsteori
- Använda och lösa problem inom relativistisk mekanik
- Använda och lösa problem inom relativistisk optik
- Analysera Maxwells ekvationer och använda deras relativistiska invarians
- Förklara relativitetsprincipen

Ange hur kursen är utformad för att uppfylla målen

Kursen ges i form av föreläsningar och övningar. En frivillig inlämningsuppgift utformad som en tentamen lämnas in i två omgångar och kamraträttas. Detta för att studenterna skall bekantas med svårighetsgrad, få räknevana, samt omedelbar feedback och nya infallvinklar genom att få se en annan students lösningar. Varje föreläsning innefattar även konceptuella frågor som ställs via mentometersystem och som studenterna får diskutera sinsemellan för att öka studentaktiviteten under salstimmarna.

Eventuellt deltagande i länkmöte före kursstart

Synpunkter från detta

-

Kursens pedagogiska utveckling I

Beskriv de förändringar som gjorts sedan förra kursomgången. (Berätta även för studenterna vid kursstart)

Konceptuppgifterna gavs tidigare ut i pappersform och har migrerats till det nya mentometersystemet. Den frivilliga inlämningsuppgiften har införts tillsammans med dess utformning. Betygssättningen för tentamen har också ändrats till sin nuvarande form där varje uppgift på tentamen betygssätts.

[1] Instruktioner till kursanalysformulär sist i dokumentet
[2] Rektors beslut: http://www.kth.se/info/kth-handboken/II/12/1.html

Kontakt med studenterna under kursens gång

Studenter i årets kurs-nämnd:	Namn	E-post (lämnas blank vid webbpublicering)
	Ksenia Chechet	chechet@kth.se
	Niclas Hoglund	nhoglu@kth.se

Resultat av formativ mittkursenkät	-
Resultat av kursmöten	Ett kursmöte hölls i mitten av kursen. Studenterna verkade mestadels nöjda med kursen. Ett antal möjliga förbättrningar framfördes av kursnämnden varav de som var genomförbara infördes, huvudsakligen efterfrågades exempellösningar på fler räkneuppgifter.

Kontakt med övriga lärare under kursens gång

Kommentarer

Mattias och Teresia har haft regelbunden kontakt för att stämma av hur kursen fortlöpt.

Kursenkät; teknologernas synpunkter Obligatorisk del [3]

Period, då enkäten var aktiv	14-01-17 – 14-02-31
Frågor, som adderades till standardfrågorna	What is your overall impression of the course? How would you rate the overall difficulty of the course? How did you find the lectures? How did you find the exercise classes? Has there been much overlap with other courses? How did you find the test exam? What is your opinion about the course-PM, homepage, and the administration of the course? How did you find the course literature? What activities did you find most useful for learning the course material? How much time did you spend on solving the test exam? How much time did you spend on creating your A4 page aid for the exam? How did the exam correspond to your expectations (both difficulty and content)? What is your impression of the grading system? What is your opinion on the conceptual problems during the lectures?
Svarsfrekvens	75,00%
Förändringar sedan förra genomförandet	Medelalternativ har tagits bort i flervalsfrågorna för att studenterna skall tvingas ta ställning.
Helhetsintryck	Studenterna verkar ha uppskattat kursen och är överlag nöjda. Kursen uppfattas som medelsvår med mycket nytt material.
Relevanta webb-länkar	http://courses.theophys.kth.se/cgi-bin/evaluation/results/evaluation_showresults?command=showresults&evaluationid=151

Kursansvarigs tolkning av enkät

Positiva synpunkter	Det nya kursformatet har varit uppskattat och de förändringar som gjorts sedan tidigare år verkar ha slagit väl ut. Övningstentamen verkar ha uppfyllt sitt syfte och varit till hjälp för de allra flesta studenterna (29/31). Föreläsningarna och föreläsningsformen har varit mycket populära.

[3] Rektors beslut: http://www.kth.se/info/kth-handboken/II/12/1.html

Negativa synpunkter	En hel del studenter har saknat uppgifter av samma karaktär som de som kommer på tentamen. Övningarna har varit något mindre populära, dock fortfarande välbesökta.
Var kursen relevant i förhållande till kursmålen?	Ja.
Syn på förkunskaperna	Förkunskaperna har överlag varit goda vilket återspeglas i examinationsgraden. Det enda område där mer genomgång kan behövas är angående tensorer och hur dessa används.
Syn på undervisningsformen	Undervisningsformen har varit adekvat för de flesta studenterna.
Syn på kurslitt/kursmaterial	Studenterna är nöjda med kursboken. Att kursboken är kompakt har framförts som en fördel. Vissa röster har efterlyst fler extentor för att få fler uppgifter att öva på.
Syn på examinationen	Studenterna har tyckt att examinationen i stort motsvarat deras förväntningar.
Speciellt intressanta kommentarer	*"It took quite a while to figure out and get the things right, but it was a great practise for the exam!"* – Angående övningstentamen *"Very good, the discussion is important because it makes you think and argue about the problem and that is very good for the learning process."* – Angående konceptfrågorna

Synpunkter från övriga lärare efter avslutad kurs

Vad fungerade bra	-
Vad fungerade mindre bra	-

Resultat av kursnämndsmöte efter examination

Studenternas sammanfattn.	Avslutande kursmöte efter kursens slut har hållts. Slutsatsen från detta var att kursen enbart haft vissa problem relaterade till byte av kursansvarig och examinator. Dessa ansågs vara av sådan form att de i stort kommer att lösa sig själva.
Förslag till förändringar	-
Länk till kursnämndsprot.	Se bilaga

Kursansvarigs sammanfattande berättelse

Helhetsintryck	Överlag har kursen flutit på bra. Inga större problem har uppstått och studenterna har gjort bra ifrån sig vid examinationen.
Positiva synpunkter	De införda förändringarna har fungerat som förväntat. Det mesta som införts har även varit populärt hos studenterna.
Negativa synpunkter	Vissa studenter har tyckt att betygssättningen varit något snårig. Detta bör i fortsättningen förklaras tydligare.
Syn på förkunskaperna	Förkunskaperna har varit goda i det mesta förutom möjligtvis angående tensorer.
Syn på undervisningsformen	Undervisningen i form av föreläsningar har fungerat bra, speciellt med den interaktivitet som introducerats i och med konceptfrågorna.
Syn på kurslitt/kursmaterial	Kurslitteraturen är kompakt och relevant. Fler exempel vore att föredra, framför allt i form av extentor.
Syn på examinationen	Examinationen är relevant i förhållande till kursmålen. Alternativ så som större inlämningsuppgifter och/eller muntliga tentamina skulle kunna vara aktuella men ej så länge kursen har samma antal studenter som denna omgång.

Kursens pedagogiska utveckling II Obligatorisk del [4]

Hur förändringarna till denna kursomgång fungerade	Förändringarna har fungerat bra. Vissa konceptfrågor kan behöva finjusteras. Framför allt de som studenterna haft extra lätt eller svårt för, vilket leder till bristande eller vilseledande diskussion mellan studenterna.

[4] Rektors beslut: http://www.kth.se/info/kth-handboken/II/12/1.html

Förändringar som bör göras inför nästa kursomgång	Betygssättningen av tentamen bör uppdateras enligt följande: • Varje uppgift på tentamen betygssätts. Varje uppgift motsvarar en separat del av kursen. • För att uppnå ett visst betyg krävs 4 uppgifter med minst det betyget, dessutom får inget betyg vara mer än två steg sämre. Bonussystemet från övningstentamen uppdateras samtidigt enligt följande: • Studenterna får separata betyg på varje uppgift som motsvarar en upgift på tentamen (och därmed även kursdel). • Två av de sex uppgiftsbetygen får tillgodoräknas för att ersätta betyg på motsvarande tentamensuppgift. Detta görs så fördelaktigt för studenten som möjligt. För godkänt betyg krävs även att ett godkänt betyg (E eller högre) erhållits på varje kursdel vid antingen tentamen eller övningstentamen. Detta för att säkerställa att studenter uppnår godkänd status på alla kursmål.

Övrigt

Kommentarer

-

Instruktioner till kursanalysformulär

1) Kursanalysformuläret fylls i interaktivt; fälten expanderar automatiskt.
2) Fyll i fälten inom en månad efter kursens slut. (Viktigt krav från KTH!)
   Skicka sedan till studierektor (som vidarebefordrar till prefekt och programansvarig).
3) Försök att ge så kompletta uppgifter som möjligt.
   Tänk på att kursanalysen är ett hjälpmedel inte bara för teknologerna, utan även för Dig som lärare.
4) Med ”prestationsgrad” avses antalet presterade poäng hittills på kursen (inlämningsuppgifter, projektuppgifter, laborationer etc.) dividerat med antalet möjliga poäng för de registrerade studenterna. Med ”examinationsgrad” avses antalet studenter av de registrerade, som klarat samtliga kurskrav. Kurssekreteraren hjälper gärna till här.
5) Kontakten med studenterna:

- Etablera kursnämnd under kursens första vecka (minst två studerande, gärna genusbalanserad).
- Lämplig bonus till kursnämndsdeltagarna är fri kurslitteratur.
- Om kursnämnd ej kan etableras, skall sektionens studienämndsordförande (SNO) kontaktas genast (se www.ths.kth.se/utbildning/utbildningsradet.html för kontaktuppgifter).
- Kursnämnden skall sammanträda under kursens gång, exempelvis i halvtid. Har mittkursutvärdering genomförts, skall den diskuteras då.
- Kursnämnden skall även ha ett möte efter det att studenterna har besvarat kursutvärderingen och kursnämndens studenter fått tillgång till resultaten. Undantaget är kurser i period fyra, där mötet bör ske direkt efter examinatioinen är avslutad för att analysen skall vara klar innan sommaren.
- Under det avslutande kursnämndsmötet bör studenterna föra protokoll. Detta protokoll skall kursansvarig få senast en vecka efter mötet.
- Det är kursansvarigs ansvar att kalla till kursnämndsmöten.

Slutligen, tänk på:

- det är viktigt att kursanalysen tydligt *visar utvecklingen av kursens kvalitet* från ett läsår till nästa.
- möjligheten att lägga ut kursanalysen på kurshemsidan.
- spara kursanalysen till förberedelsearbetet inför nästa kursomgång.

Special Relativity – SI2371 Fall 2013 – Final evaluation

Attending: Mattias Blennow (emb@kth.se), Ksenia Chechet (chechet@kth.se), Niclas Hoglund (nhoglu@kth.se)

Overall impression

A large majority of the students were either positive or very positive with the course overall.

Difficulty

The course was deemed to be difficult by most students, mostly based on the tensor calculus. More emphasis should be placed on tensors, and how they work.

Lectures

No problems here. Both lectures and conceptual questions were popular among students.

Exercise classes

There were several complaints regarding the teacher's linguistic abilities, and more structured classes were wanted. Teresia will not be teaching the exercise classes next year, due to her stay at KTH being over.

Overlap with other courses

The overlap with other courses was low, and what little overlap existed was only helpful.

Test exam

The test exam was found to be well made and educational. As noted below, the direct correlation between exam problems and test exam problems was not crystal clear to most.

Administration

No issues here. Migrating to KTH Social would require a lot of work. The handwritten and scanned lecture notes are meant to act as a (not so rough) draft of what is included in the lectures, and will most likely not be TeXed or so.

Course literature

Rindler's book was liked by most students. There are talks of translating a Swedish piece on tensors and such into English, if free time can be found to do so.

Exam content/difficulty

Quite a mixed reaction, some found the exam to be too difficult, while some found it fair and balanced. The content seemed to reflect the course well, even if many did not see the immediate correlation to the problems in the test exam.

Grading system

Most people liked the grading system, while others found it confusing or unfair. Some found that the ease of passing made them less motivated to study for the exam. There will be changes made for next year, raising the bar for a passing grade a bit (ensuring that students actually have knowledge about all parts of the course).

Other remarks

The lack of older exams was a problem for some students, but this will resolve itself for next year's students.

KUNGL TEKNISKA HÖGSKOLAN

Teoretisk fysiks kursutväderingar

Teoretisk Fysiks kursutvärderingar

Aktuella utvärderingar
Administrera
Hjälpsida

Alternativ:
Lägg upp ny
Till min startsida
Logga ut

Resultat av: Special Relativity, SI2371, ht 2013

Status: Avslutad
Publicerad under: 2014-01-17 - 2014-01-31
Antal svar: 31
Procent av kursdeltagarna som svarat: 75%
Kontaktperson: Mattias Blennow

What is your overall impression of the course?

31 svarande

Very positive	13	41%
Postive	17	54%
Negative	1	3%
Very negative	0	0%

- The course is well-structured and the notes taken during the classes are enough to prepare for the exam. (Very positive)
- The course was different from other courses. It felt like the examiner tried hard to make the courwe good. (Very positive)
- Good course, very good teacher, sadly not a very good TA, Theresia while charming isn't that great a teacher. (Very positive)
- This is a useful course with new methods for teaching which fit the course. (Very positive)

Resultat av: Special Relativity, SI2371, ht 2013 - Kursutv... http://courses.theophys.kth.se/cgi-bin/evaluation/evaluation

- Very interesting, but not so easy to get. (Postive)
- If it wasn't for the teaching assistant who sets an all new low after every exercise session, I would have given a "Positive". The way to compute the grade is extremely difficult to understand and doesn't seem as fair as the usual system of points. The average of each exercise in the examination is most of the time way over the grade we finally get. (Negative)

How would you rate the overall difficulty of the course?

31 svarande

Very high	3	9%
High	23	74%
Low	5	16%
Very low	0	0%

- It is very hard to understand all the different parts of the course, and there is a lot of material. (Very high)
- It is a difficult and somewhat unintuitive subject. (Very high)
- I didn't attend all the classes but my impression was that the difficulty of the exam did not really meet my expectations from the exercises. The exam was mor difficult. (High)
- Some concepts are more difficult, such as tensors. Sadly, I never learned/understood those parts of the course. (High)
- The tensor part is the most difficult one. It was a good idea to suggest some papers concerning this part, although i did not read them. (High)
- I found the course more difficult than what my first impression of the course was. (High)
- I think the current level of difficulty is good. (High)
- Somewhat high relative to the majority of courses, but it is an appropriate level. (High)
- I would say between low and high. Indeed this course can easily be passed but when it comes to having the best grade, I think it can get very difficult (Low)

How did you find the lectures?

Resultat av: Special Relativity, SI2371, ht 2013 - Kursutv... http://courses.theophys.kth.se/cgi-bin/evaluation/evaluation

31 svarande

Very good	20	64%
Good	7	22%
Poor	2	6%
Very poor	0	0%
Did not participate enough to have an opinion	2	6%

- Mattias is a very competent lecturer. I do think that some more examples would be good. (Very good)
- Much better than the average. The lectures played out like they were well rehearsed. Clear writing on the black board. (Very good)
- Very good with the clickers and conceptual problems. Easy to stay focused. (Very good)
- Amazingly good lectures! Mattias is always well-prepared and explains the material in a good way! (Very good)
- Highly interesting teacher, clear explanations. I enjoyed the clickers: it is also a good way to get acquainted to you neighbours ^^ (Very good)
- Mattias is a very good teacher! (Very good)
- The lectures were mostly easy to follow and entertaining. (Very good)
- Mattias is a great lecturer. Organized, relaxed and pedagogical. (Very good)
- Some things are to be clarified in terms of indexes and exponents of the vectors (Good)
- But a bit too fast. (Good)
- Maybe not clear enough sometimes. (Good)
- Most key concepts were brought up and explained clearly. The uploaded lecture notes are sloppily written and poorly scanned, however, making it very frustrating to attempt to use them. (Good)

How did you find the exercise classes?

31 svarande

Very good	0	0%
Good	3	9%
Poor	17	54%
Very poor	6	19%
Did not participate	5	16%

- Very relevant and truly putting into practice the theory of the course, but more details about the steps followed would be welcome (which has been nevertheless well balanced by the very clear answers to the questions) (Good)
- Exercises were solved correctly and with decent speed. Some motivations were difficult to follow or simply lacking. The uploaded notes were a great help. (Good)
- They got better and better as the course progressed. Sometimes there was some languague problems like when the lectures talked about eigentime, but the exercises used "proper time". Minor isssues, but they complicated things a bit. (Good)
- The intention was good but it was sometimes hard to follow the reasoning and that made it difficult to understand the solutions. A quick note on how to think about the problem before the solution would help the understanding of the solution. (Poor)
- Not structured enough, it was sometimes hard to know what we were doing. (Poor)
- -: The teacher seemed to be quite unprepared in the beginning. And she seemed quite uncomfortable lecturing in English. So the result was not very good. +: When asked questions the teacher gave good helpful answers, the notes uploaded from the exercises were good and as the course moved on the teacher definitely made an effort to improve. (Poor)
- The correction of exercise was too slow, the teacher should write more details even if it is so clear for her that it seems unnecessary. At least for the first sessions. Generally, develop more the answers which are not always clear. (Poor)
- The exercise teacher seemed uncomfortable teaching in English. (Poor)
- Theresia isn't as good as Mattias, but the exercise classes were still... ok I guess. (Poor)
- The english was not the best. (Poor)
- I did not have time to prepare for the exercise classes, and I found them very hard to follow since the TA was pretty unstructured (for example, she did not always formulate the exercises clearly and sometimes failed to refer to the course concepts which she used). I did not

attend many exercise classes. (Poor)
- I participated 1½ exercise class and felt that it was a waste of time to take part. The exercises seemed to be poorly prepared and the class very poorly structured, which made it impossible(at least for me) to learn anything. (Very poor)
- In the end there were nobody anymore and I understand why. (Very poor)
- There was no structure to the exercise classes. It was not clear what problem that was being solved, what the question was and the answer. (Very poor)
- The teacher's English was a bit off, and I found the language barrier too high. (Did not participate)

Has there been much overlap with other courses?

31 svarande

Far too much overlap	2	6%
Some overlap - mostly unnecessary	1	3%
Some overlap - but useful as repetition	18	58%
No overlap	10	32%

- Basically the only overlap is the decay part which was slightly talked about in modern physics but without 4-vectors. (Some overlap - but useful as repetition)
- The tensor part has partial overlap with SI1140 Fysikens matematiska metoder, but I think that part was very useful to repeat. Also, there is nothing about upper and lower indices in that course. The basics of the course (e.g. inertial frames, Lorentz transformation) was seen in SH1012 Modern fysik, but that was also a useful repetition. (Some overlap - but useful as repetition)
- Mostly just the Lorentz transformation and basic consequences like time dilation. The equivalence of mass and energy as well as electromagnetic field transformations appear in other courses, but are not explained thoroughly. (Some overlap - but useful as repetition)
- Other courses usually do as if we knew special

relativity, now it's done, at least a little ! (No overlap)
- I haven't done many physics courses. (No overlap)

How did you find the test exam?

31 svarande

Very difficult	1	3%
Difficult	24	77%
Easy	6	19%
Very easy	0	0%
Did not try to solve it	0	0%

- It was very good to have to think a lot and run everywhere to find some answers, as it helped a lot for the exam at the end. (Very difficult)
- Not as hard as the exam but it is difficult to compare since the amount of time is very different. (Difficult)
- When the course is over those problems should not be difficult, but when you do them they are just right as challenging problems that fit the schedule. (Difficult)
- It took quite a while to figure out and get the things right, but it was a great practise for the exam! (Difficult)
- Good exercise to prepare the exam. (Difficult)
- Difficult but enough time to complete them. (Difficult)
- some of the problems were difficult and others were easy. (Difficult)
- One problem in each part was particularly difficult, while the others were okay. (Difficult)
- The first three problems on the test exam were pretty easy. The last three problems were harder in my opinion. Some of the exercises had an unnecessary amount of algebra (maybe it would have been easier if I had used Maple or Mathematica, I don't know). (Difficult)
- There were 2 questions which together took about 3/4 of the time I used. One learned much, but it took time. (Difficult)
- Some parts were easy, some were more involved. Overall, the level is good. (Easy)
- Half of the problems were really trivial, but 1 or 2 were a bit difficult. (Easy)

What is your opinion about the course-PM, homepage, and the administration of the course?

31 svarande

Very good	18	58%
Good	12	38%
Poor	1	3%
Very poor	0	0%

- Even though I generally like having an active Social page as homepage there was nothing wrong with the current one. Clear and well-structured information! (Very good)
- No comments ! (Very good)
- Very clear and well organized (Very good)
- No problems, continue not using kth social! (Very good)
- information was good, however the lecture notes were not so good. (Very good)
- I found everything I needed (except old exams) on the homepage or in the course PM. I especially like the progress reports sent by email regarding the test exam etc. (Very good)
- Only problem I noticed was that a lecture and an exercise class changed time slots in the course PM, but not on KTH's schedule system, which is what most people rely on. (Very good)
- Sometimes a bit more complicated than it needs to be. (Good)
- The information is clear. However, I missed old exams or more test exams to study before the exam. (Good)
- The course pm was good, but the classes where never in the location the schedule said. (Good)

How did you find the course literature?

30 svarande

Very good	10	33%
Good	16	53%
Bad	4	13%
Very bad	0	0%

- There are of course many resources to find out more about this subject online, but if one only has to book it can be a bit to short in its explanations. For me it was hard to understand a subject just from the book when I had missed a lecture. (?)
- Not to much reading, and that is very good. Don't change to an american book that explain the same thing in 500 pages instead of 150! (Very good)
- I liked Rindler's book. The size was good too. (Very good)
- I wish other physics courses used books like this one. Clear, concise and very insightful! (Very good)
- I like short books as you can reread paragraphs and chapters if you need to. However, I find the later half of the book very difficult to read. From the EM chapter and forward. (Good)
- It was rather difficult to grasp sometimes, I would wish for more 'illustrations' actually (space time diagrams or so), but it was handy that it was so neat. (Good)
- I have understood a lot of things thanks to crossing different literature I found on the web and around (Good)
- Good excercises, didn't get the book. (Good)
- Never bought it myself, borrowed a friend's when needed and it seemed good. (Good)
- Somewhat compressed text. (Good)
- Lacking an alternative between good and bad, it was recent! (Bad)

What activities did you find most useful for learning the course material? (Check all you consider relevant)

31 svarande

(på denna fråga var det möjligt att välja flera svarsalternativ)

Attending lectures	23	74%
Attending exercise classes	4	12%
Solving the test exam	29	93%

Solving problems in the course litterature	10	32%
Self-study using the course litterature	18	58%
Self-study using other resources (please comment)	9	29%
Other (please comment)	2	6%

- The course SI2372 was of great help to understand the material in this course. There are also very good lectures online from Stanford with Leonard Susskin who explains things in a different way, more analytical mechanics. I think the lectures at KTH are just as good as the ones at stanford but to get two different explanations of the same thing is even better.
- More examples of how the exam could look like would have been welcome.
- I've read the book quite a lot and tried to understand as much as possible. Unfortunately I did not do as many problems as I would wish to have.
- Wikipedia on SR.
- The excersize compendium and David Tongs lecture notes.
- As I've said before, Mattias is a very good teacher and I felt I learnt alot during his lectures.
- the problems from Mickelson were good
- Watched Open Course Ware (OCW) lectures from Stanford.
- Other: making the A4 sheet for the exam was also a useful learning experince :)
- Test exam was very good training.
- Wikipedia usually had useful material as long as one checked which metric the article used.

How much time did you spend on solving the test exam? (both parts, in total)

31 svarande

None	0	0%
0-3 hours	0	0%
3-6 hours	6	19%
6-10 hours	12	38%
10-15 hours	6	19%
> 15 hours	7	22%

- I did it together with a friend and we discussed it alot. (10-15 hours)
- Which is reasonable for something that gives a lot of bonus, and also the time is not wasted as you learn a lot. (> 15 hours)
- Easily above 30 as well. (> 15 hours)

How much time did you spend on creating your A4 page aid for the exam?

30 svarande

< 30 mins	7	23%
30 mins - 1 hour	5	16%
1-3 hours	11	36%
3-10 hours	5	16%
> 10 hours	2	6%

- Used an aid page another student had made. (< 30 mins)
- There was a aid page doen in LaTeX by one of the students circulating before the exam. I took that one and added a few things. (< 30 mins)
- I started dying my own and then someone else had made one so I took that. Though I think it would be better to have one sheet for everyone. People will spend less time trying to write down stuff and more time learning (even though you might learn something when writing). (1-3 hours)
- Done while re-reading the course before the exam. (1-3 hours)
- I used one someone else had written but spent >1hr adding things I felt were missing. (1-3 hours)
- Wrote it as I was studying problems. (1-3 hours)
- Since there were no earlier exams to use it was hard to know how to focus. (1-3 hours)
- Closer to 3 than to 10. I did not know about the A4 page before I started to study for the exam about 2 weeks earlier. Had I known about it earlier, I had probably added stuff to it throughout the course. Was it

mentioned at the first lecture? (3-10 hours)
- The course contains way to much from diffefrent areas to make your own formulas. Change to no help om the (> 10 hours)

How did the exam correspond to your expectations (both difficulty and content)?

31 svarande

Very well	4	12%
Well	19	61%
Poorly	7	22%
Very poorly	0	0%
I did not take the exam yet	1	3%

- The exam was slightly more difficult than the test exam. However, it was quite reasonable. But if you had been more prepared from seeing more test exam problems at the same level it would have helped. (Well)
- The questions were such that they tested if you had understood what had been covered in the course, which is not always the case. (Well)
- I thought there would be more "calculate"-type of questions and less "show that"/"derive". Even though I do understand that "show that"/"derive" questions show our understanding of the material more than just 'calculate'. (Well)
- I feared it would be more difficult. There was problems on each part of the course so I was happy with it, even though I am not sure of my result. (Well)
- It was the test exam with minor variations. (Well)
- The question about the plane wave and maxwell's equation felt odd, but I could have been because I didnt study that part of the course very much. (Well)
- The exam was more or less as expected. However, with no old exams, its hard to know what to expect. I found some of the problems difficult, mainly because I hadn't had time to practice those parts of the course a lot (e.g. continuum mechanics). (Well)
- I would have been glad to see the exam from the previous year though. (Well)
- The difficulty was higher, the exercises should include more exercises like the ones in the exam. (Poorly)

What is your impression of the grading system?

31 svarande

Very good	6	19%
Good	19	61%
Bad	3	9%
Very bad	3	9%

- Seems fair. (Very good)
- It's a good idea but I'm not sure it's better than to just have points instead. (Good)
- Let's see the result of the exam ^^ (Good)
- Decent (Good)
- The grades I gave on the test exam seemed to correspond decently well with the ones Mattias gave, seemed ok. (Good)
- The grading system is unlike any other course I have taken at KTH (not necessarily a bad thing). I like the bonus grades from the test exam. The system is pretty unforgiving (since if you don't know how to solve one of the problems on the exam and didn't solve the test exam, you cannot get a higher grade than E, even if you nail all the other problems), but maybe that's the intention. (Good)
- It kind of works as a way of making sure that all parts of the course have been understood equally well, but this is partially ruined by the fact that two problems can completely be disregarded if the test exam has gone well. It feels like the system can range from being very forgiving to completely merciless, despite only small differences in average performance on the exam. (Good)
- It is nice with a new one, but the result of a single question can change the result a bit much. (Good)
- The "two steps above lowest"-bit can be a bit harsh. (Bad)
- It is the worse and the most unfair system to grade. One personne that has a very good understanding of the course and somebody who has quite none can have the same mark. (Very bad)
- See top comment. (Very bad)

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What is your opinion on the conceptual problems during the lectures? (Posed using clickers)

31 svarande

Very good	19	61%
Good	7	22%
Bad	3	9%
Very bad	0	0%
Did not participate	2	6%

- Very good, the discussion is important because it makes you think and argue about the problem and that is very good for the learning process. (Very good)
- Helps to get concentrated, to make some links with previous knowledge, and to get some concrete examples, so very useful. (Very good)
- Nice getting to think abit and have some kind of activity during the lecture. (Very good)
- I like them! Interactivity on the lectures is always welcome! The clickers are great. (Very good)
- Excellent thing to do! (Very good)
- Nice, but sometimes there was perhaps too little time to discuss properly. (Very good)
- Change so the answer is not always (Good)
- more such problems would deepen the understanding, but it must be done so that the problems doesn't take too much time from the lecture. (Good)
- It takes a lot of time and most of the questions were really trivial. It's probably most useful for students who don't prepare for lectures and only have a very basic understanding of the subject. (Bad)

Please enter any further comments and opinions about the course:

- Thank you for an inspiring course!
- It was a good course. What I think is lacking is a more thorough explanation of tensors, tensor equations. To really take it slow and explain everything when they appear in the EM part and onwards.
- I would suggest to really insist more on the indices positions, why they are up or down and what is the difference. Also I like very much having the whole formula, without any approximation, meaning more precisely to have the formula with all the 'c' even if we don't bother about them as c=1. It was a very interesting course, and I have learnt a lot, thank you
- Much more difficult than i thought.
- Completelly lacking relevant assignments. Only test good.
- Mattias is good.
- no further comments
- Good job Mattias!
- It was amazing how fast Mattias corrected the exam. Also it is great getting the result by email.
- It would have been nice to have a list of recommended exercises beyond those solved during exercise classes. Answers to selected questions would also have been a great help.
- Most of the problems are things I think will be sorted out. It is also a problem that it is the first time the course is given in this format. Some earlier exams would have helped a lot. I did not do well on this course, but it is my own fault.

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