



Kursanalys - KTH¹

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
Kvantfältteori	SI2410
Kurspoäng och poäng fördelat på exam-former	När kursen genomfördes
7,5 hp INL1 4,5 hp, TEN1 3 hp	P1 2019
Kursansvarig och övriga lärare	Undervisningstimmar, fördelat på F, Ö, R, L, S
Mattias Blennow	S 18

Antal registrerade studenter 18

Prestationsgrad efter 1:a examenstillfället, i % 89

Examinationsgrad efter 1:a examenstillfället, i % 89

MÅL

Ange övergripande målen för kursen

Efter fullgjord kurs skall studenten kunna:

- använda funktionalintegraler och störningsteori inom kvantfältteori.
- tillämpa renormering och regularisering inom kvantfältteori.
- ha kännedom om gaugeteorier samt kvantelektrodynamik och kvantkromodynamik.
- känna till spontant brutna gaugeteorier såsom BCS-teori och Higgsmodellen.

Ange hur kursen är utformad för att uppfylla målen

Kursen ges i seminarie- och självstudieformat. Studenter läser självständigt in material enligt läsanvisningar som sedan diskuteras i mindre grupper i seminarieform. Kursen examineras kontinuerligt i form av inlämningsuppgifter samt muntligen vid seminarier eller vid en separat muntlig tentamen om kunskapsmålen inte är påvisat uppfyllda vid seminarierna.

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)

¹ Instruktioner till kursanalysformulär sist i dokumentet

² Rektors beslut: <http://www.kth.se/info/kth-handboken/II/12/1.html>

Kursen gavs i stort i samma format som HT18.

Kontakt med studenterna under kursens gång

Studenter i årets kurs-nämnd: Namn E-post (lämnas blank vid webbpublicering)

Resultat av formativ mittkursenkät

Resultat av kursmöten

Kontakt med övriga lärare under kursens gång

Kommentarer

-

Kursenkät; teknologernas synpunkter Obligatorisk del ³

Att komma ihåg:

- 1) Uppmana, mha kursnämnden, till ifyllande av kursenkät i anslutning till / just efter slutexaminationen
- 2) Delge kursnämnden enkäten
- 3) Publicera enkäten under en kortare tid

Period, då enkäten var aktiv 2019-12-12 - 2019-12-24

Frågor, som adderades till standardfrågorna -

Svarsfrekvens 28%

Förändringar sedan förra genomförandet Kursenkäten genomfördes genom KTHs hemsidor via LEQ.

Helhetsintryck Helhetsintrycket från de studenter som svarat på kursenkäten är positivt och kursen verkar varit uppskattad överlag. Viss uppdelning av studenterna finns angående undervisningsformen.

Relevanta webb-länkar -

Kursansvarigs tolkning av enkät

Positiva synpunkter Kursen har uppskattats av de svarande studenterna och läromiljön har varit väldigt positiv.

Negativa synpunkter Viss avsaknad av konkreta exempel. I många fall är dock konkreta exempel svåra att hitta i ett så pass abstrakt ämne.

Var kursen relevant i förhållande till kursmålen? Ja

Syn på förkunskaperna Blandade. Ungefär hälften av de svarande studenterna har sagt att de definitivt haft tillräckliga förkunskaper medan resten sagt sig ha lite för lite.

Syn på undervisningsformen Seminarieformen sågs blandat bland studenterna. Vissa efterlyste föreläsningar medan andra tyckte att seminarieformen gjorde att de lärde sig bättre. Ett blandat upplägg skulle kunna diskuteras.

Syn på kurslitteratur/kursmaterial Inga direkta åsikter om kurslitteraturen mer än att ingen av de rekommenderade är perfekt men att de kan fungera bra tillsammans.

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

Syn på examinationen	Examinationen har sätts som rättvis och öppen i den utsträckning det går att bedöma från enkäten.
Speciellt intressanta kommentarer	-
Synpunkter från övriga lärare efter avslutad kurs	
Vad fungerade bra	-
Vad fungerade mindre bra	-
Resultat av kursnämndsmöte efter examination	
Studenternas sammanfattn.	-
Förslag till förändringar	-
Länk till kursnämndsprot.	-
Kursansvarigs sammanfattande berättelse	
Helhetsintryck	Kursen fungerar bra i dagsläget. De studenter som lämnar in något arbete i kursen slutför också kursen i allmänhet.
Positiva synpunkter	Studenterna verkar uppskatta kursen och att kursen ligger på en sådan nivå att de närmar sig forskningsproblem.
Negativa synpunkter	Kursens utveckling skulle må bra av att undervisas av annan lärare samt att tillskjutas tid för utvärdering av annan möjlig kurslitteratur.
Syn på förkunskaperna	Jag har uppfattat studenternas förkunskaper som goda. Studenterna har varit aktiva under seminarierna och gjort bra ifrån sig på hemtalen.
Syn på undervisningsformen	Seminarieformen leder till en bra studiemiljö där studenterna får möjlighet att diskutera ämnet sinsemellan så väl som med lärare. Ett stort antal studenter gör dock att den effektiva lärartiden per student blir lägre. Det kan diskuteras om kursen skulle må bra av att ha föreläsningar eller en kombination av föreläsningar och seminarier.
Syn på kurslitt/kursmaterial	Bör ses över i mån av tid.
Syn på examinationen	Hemtalen är mycket krävande men i linje med kursmålen. Enbart en student behövde examineras muntligen separat från seminarierna då hen varit borta pga förkylning.
Kursens pedagogiska utveckling II Obligatorisk del ⁴	
Hur förändringarna till denna kursomgång fungerade	-
Förändringar som bör göras inför nästa kursomgång	Eventuell översikt av undervisningsform samt ny kursansvarig och lärare.
Övrigt	
Kommentarer	-

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

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 examinationen 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.

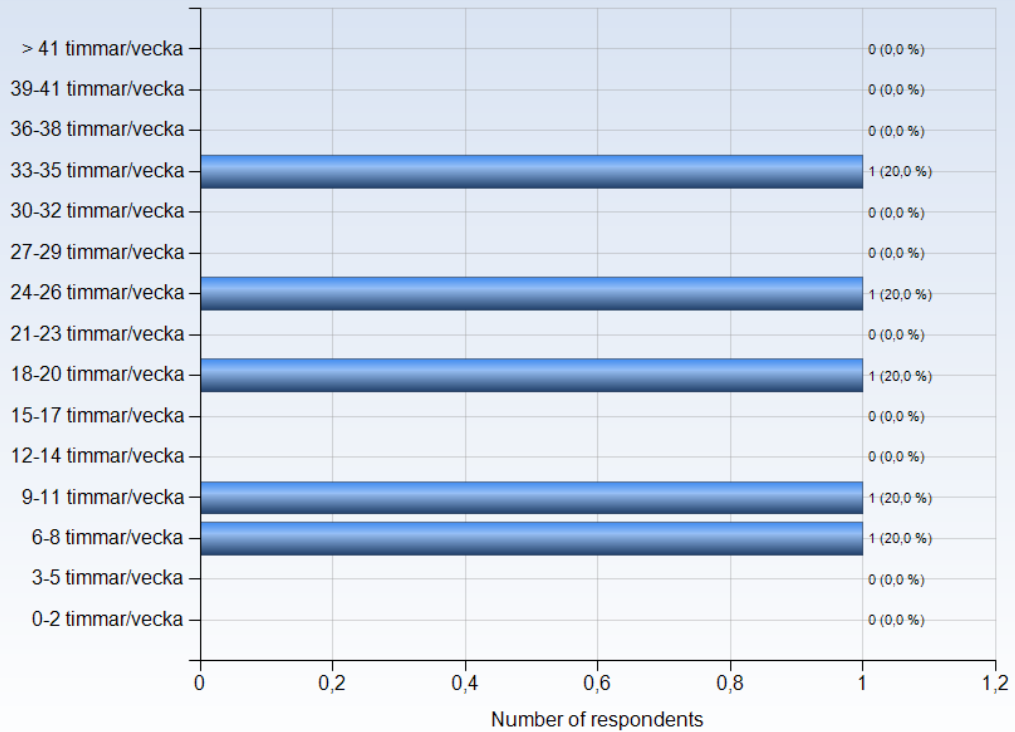


SI2410 - 2019-12-11

Antal respondenter: 18
Antal svar: 5
Svarsfrekvens: 27,78 %

ESTIMATED WORKLOAD

On average, how many hours/week did you work with the course (including scheduled hours)?



Comments

Comments (I worked: 6-8 timmar/vecka)

I would have wanted to, and probably would have needed to, spend more time on the class. It was a stressful period and the course was not well suited for learning things "briefly", but would have required more time, something that I am sad I wasn't able to put aside.

Comments (I worked: 9-11 timmar/vecka)

A lot of new information that need time to be process

Comments (I worked: 24-26 timmar/vecka)

I think the workload is very reasonable, especially considering the difficulty of the subject!

Comments (I worked: 33-35 timmar/vecka)

The homeworks were very demanding! Spent a lot of time on the first seminar but they were more relaxed than anticipated.



LEARNING EXPERIENCE

The polar diagrams below show the average response to the LEQ statements for different groups of respondents (only valid responses are included). The scale that is used in the diagrams is defined by:

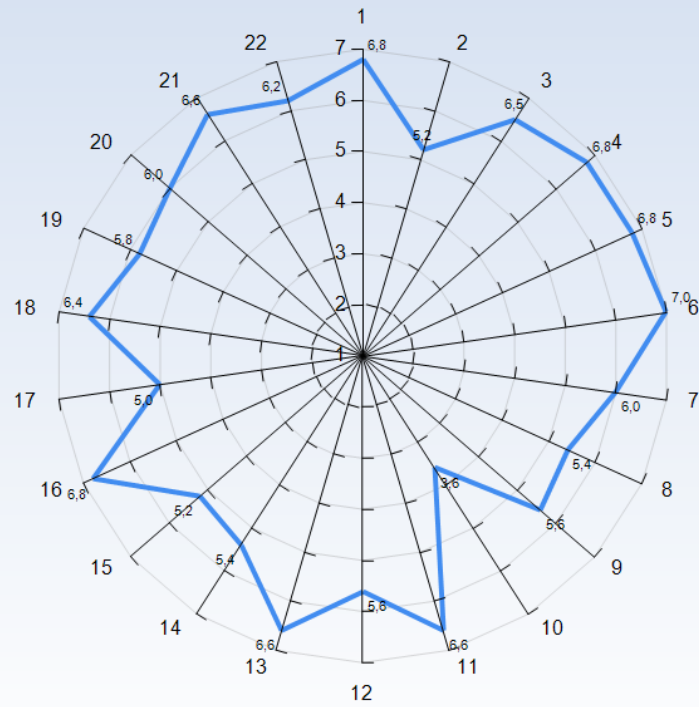
1 = No, I strongly disagree with the statement

4 = I am neutral to the statement

7 = Yes, I strongly agree with the statement

Note! A group has to include at least 3 respondents in order to appear in a diagram.

Average response to LEQ statements - all respondents



— Medelvärde



KTH Learning Experience Questionnaire v3.1.4

Meaningfulness - emotional level

Stimulating tasks

1. I worked with interesting issues (a)

Exploration and own experience

2. I explored parts of the subject on my own (a)

3. I was able to learn by trying out my own ideas (b)

Challenge

4. The course was challenging in a stimulating way (c)

Belonging

5. I felt togetherness with others on the course (d)

6. The atmosphere on the course was open and inclusive (d)

Comprehensibility - cognitive level

Clear goals and organization

7. The intended learning outcomes helped me to understand what I was expected to achieve (e)

8. The course was organized in a way that supported my learning (e)

Understanding of subject matter

9. I understood what the teachers were talking about (f)

10. I was able to learn from concrete examples that I could relate to (g)

11. Understanding of key concepts had high priority (h)



Constructive alignment

- 12. The course activities helped me to achieve the intended learning outcomes efficiently (i)
- 13. I understood what I was expected to learn in order to obtain a certain grade (i)

Feedback and security

- 14. I received regular feedback that helped me to see my progress (j)
- 15. I could practice and receive feedback without being graded (j)
- 16. The assessment on the course was fair and honest (k)

Manageability - instrumental level

Sufficient background knowledge

- 17. My background knowledge was sufficient to follow the course (f)

Time to reflect

- 18. I regularly spent time to reflect on what I learned (l)

Variation and participation

- 19. The course activities enabled me to learn in different ways (m)
- 20. I had opportunities to influence the course activities (m)

Collaboration

- 21. I was able to learn by collaborating and discussing with others (n)

Support

- 22. I was able to get support if I needed it (c)



Learning factors from the literature that LEQ intends to examine

We tend to learn most effectively (in ways that make a sustained, substantial, and positive influence on the way we think, reflect, act or feel) when:

- a) We are trying to answer questions, solve problems or acquire skills that we find interesting, exciting or important
- b) We are able to speculate, test ideas (intellectually or practically) and learn from experience, even before we know much about the subject
- c) We are able to do so in a challenging and at the same time supportive environment
- d) We feel that we are part of a community and believe that other people have confidence in our ability to learn
- e) We understand the meaning of the intended learning outcomes, how the environment is organized, and what is expected of us
- f) We have adequate prior knowledge to deal with the current learning situation
- g) We are able to learn inductively by moving from concrete examples and experiences to general principles, rather than the reverse
- h) We are challenged to develop a true understanding of key concepts and gradually create a coherent whole from the content
- i) We believe that the work we are expected to do will help us to achieve the intended learning outcomes
- j) We are able to try, fail, and receive feedback before, and separate from, each summative assessment of our efforts
- k) We believe that our work will be considered in an honest and fair way
- l) We have sufficient time for learning and devote the time needed to do so



m) We believe that we have control over our own learning, and not that we are being manipulated

n) We are able to collaborate with other learners struggling with the same problems

Literature

Bain, K. (2004). *What the Best College Teachers Do*, Chapter 5, pp. 98-134. Cambridge: Harvard University Press.

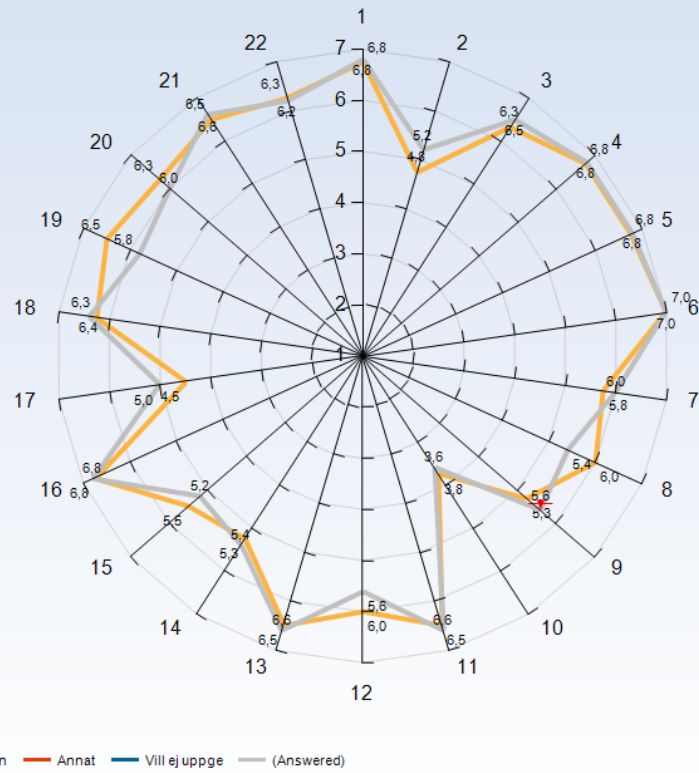
Biggs J. & Tang, C. (2011). *Teaching for Quality Learning at University*, Chapter 6, pp. 95-110. Maidenhead: McGraw Hill.

Elmgren, M. & Henriksson, A-S. (2014). *Academic Teaching*, Chapter 3, pp. 57-72. Lund: Studentlitteratur.

Kember, K. & McNaught, C. (2007). *Enhancing University Teaching: Lessons from Research into Award-Winning Teachers*, Chapter 5, pp. 31-40. Abingdon: Routledge.

Ramsden, P. (2003). *Learning to Teach in Higher Education*, Chapter 6, pp. 84-105. New York: RoutledgeFalmer.

Average response to LEQ statements - per gender

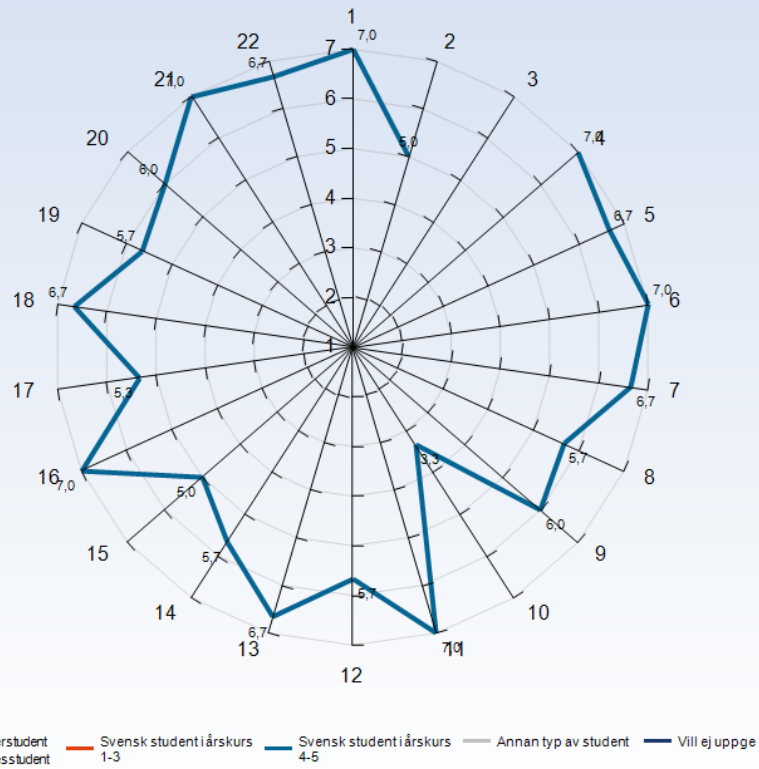


Comments

Comments (I am: Kvinna)

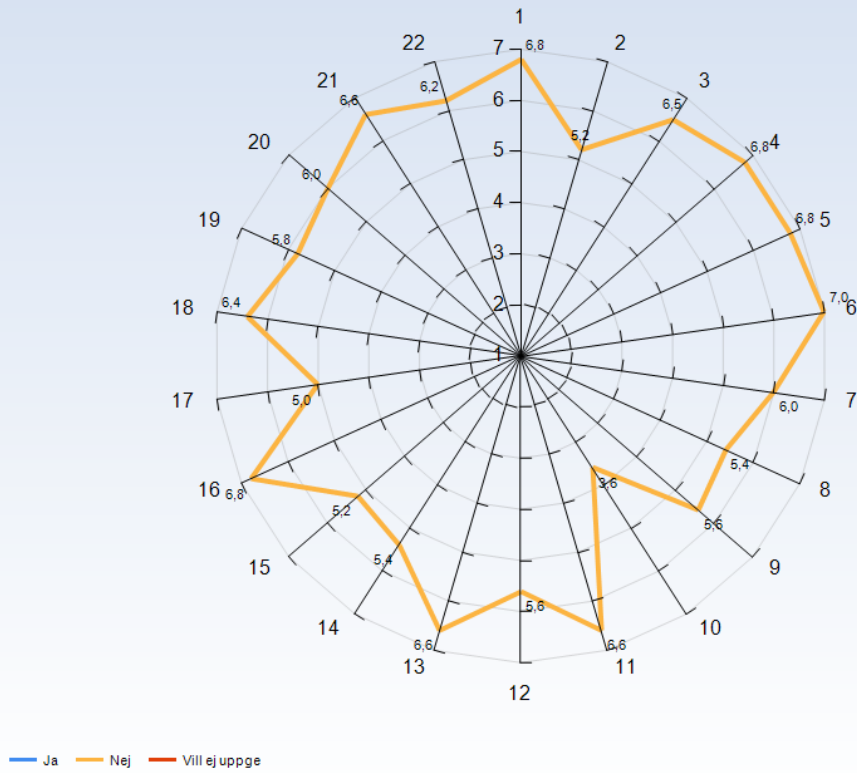
I wish we were many more!

Average response to LEQ statements - per type of student



Comments

Average response to LEQ statements - per disability



Comments



GENERAL QUESTIONS

What was the best aspect of the course?

What was the best aspect of the course? (I worked: 6-8 timmar/vecka)

The basic setup with home assignments and seminars felt like it was more focused on us to "learn" than to just examine us to give us a grade in the end. I like how the main focus wasn't on any exam, but rather on problem solving with problems tackling a lot of different aspects that requires some thought.

What was the best aspect of the course? (I worked: 9-11 timmar/vecka)

The fact that we had to read the book before the lessons. That means that we had more time to process new information.

What was the best aspect of the course? (I worked: 18-20 timmar/vecka)

The seminars were a lot of fun. Learning by explaining or listening to another student's explanation was great and being able to ask and receive an answer from Mattias once the group got stuck on a topic was great.

What was the best aspect of the course? (I worked: 24-26 timmar/vecka)

The course setup; it's such an interesting topic, and I really liked that we had seminars instead of lectures. The amount of material we covered was also perfect. It was totally awesome to have a real research question as homework (thinking about homework problem 2.1), it's pretty much the first time during the entire education where it was impossible to find answers by googling. That homework really showed me that I am able to come up with creative solutions to unanswered problems by reading and thinking about them myself.

What was the best aspect of the course? (I worked: 33-35 timmar/vecka)

Learning QFT and to discuss it with others!

What would you suggest to improve?

What would you suggest to improve? (I worked: 6-8 timmar/vecka)

Having lectures, not many but some, would not only have been instructive but also fun. It would have been fun to receive some information through the course on how this links to current research and what the problems with the different models are, in a more structured way such as a lecture.

What would you suggest to improve? (I worked: 9-11 timmar/vecka)

More advices, comments, demonstration ... from the teacher

What would you suggest to improve? (I worked: 24-26 timmar/vecka)

There was not a lot of time to ask the teacher questions during seminars. Questions which were not related to the seminar questions were hard to get answered, and I feel like many times all students in a seminar group had actually misunderstood something and then later realised this when doing problems or talking to the teacher. Maybe the course should have had one or two exercise classes or just problem-solving sessions to enable some more teacher-student interaction. Maybe supply students with some recommended problems also to make us a bit more prepared for the homework.

Also, I didn't like that the course continued into period 2, because it didn't say so in the course plan. This screwed up my course planning slightly. It's fine to have the course over P1 and P2, but then it should say so, with some indication of the workload (e.g. 6 credits P1, 1.5 credits P2) in the course plan!

What would you suggest to improve? (I worked: 33-35 timmar/vecka)

Include lectures, less seminars and have more homeworks but not as time consuming. I learned from the seminars but I learn better by doing homeworks. Lectures would be a very nice complement to the seminars.

Also, the second homework extended into the following period which was very stressful. As with many other courses at KTH I perceive the workload to exceed the number of credits.

What advice would you like to give to future participants?

What advice would you like to give to future participants? (I worked: 6-8 timmar/vecka)

Spend more time on the course than I did, purely because it is interesting. (And take the prerequisites).

What advice would you like to give to future participants? (I worked: 24-26 timmar/vecka)

Don't be afraid of the math, spend a lot of time reading and verifying things you don't understand in the book, and everything will become clear eventually. Make sure to study the group theory carefully. I found it worthwhile to revise the chapter on Dirac fields after having read group theory properly. Also, I bought the book by Schwartz to complement Peskin, which was a lot of help. Neither book is perfect, I found it very useful to have both.

What advice would you like to give to future participants? (I worked: 33-35 timmar/vecka)

Collaborate and discuss with your classmates and ask the teachers if you do not understand the concepts. Start EARLY with the homework and search the internet. The Peskin Schröder book was very useful for key concepts and the seminars but contained few (if any?) examples. Read the course evaluations and follow their advice!



Is there anything else you would like to add?

Is there anything else you would like to add? (I worked: 24-26 timmar/vecka)

I found it hard to balance how much information I gave to other students on the homework problems. Especially when I had found the solution to problems and talked to students who hadn't, I felt some social pressure to give them hints or parts of the solution. Doing so would not be fair because I would basically give away my hard work for free, and since there is no real other examination, this would reflect unfairly in the grades. I know that other students in the same situation felt the same way. Also, some students even seemed to actively try and get solutions from students they weren't working together with, but this was less of a problem because people are not as keen to give away solutions as they are to give hints. I do feel like people tend to give a way a bit too much information "to be nice", though.

This problem is not limited to this course but occurs in the other courses where homework is the primary form of examination as well. Some courses have an oral exam at the end to check that the student indeed is at the level they appear to be in the homework, and I think this is a good idea. It's too easy to get high grades on the seminars in this course for them to work in this sense, though. More broadly, on the master programme's side, maybe you should think about introducing some kind of honour codex (like the computer science courses at KTH have) where it's made clear what kind of information exchange between students is allowed and not (e.g. distinguishing the trade of information with a student's "informal working group", where there is actually a lively discussion, from giving away information (in the form of hints or solutions) to other students where there is only a one-way transfer of information). If there were official guidelines like this I think it would be easier as a student to not give away information because one feels one should be nice.

Is there anything else you would like to add? (I worked: 33-35 timmar/vecka)

Overall an interesting course! I would have chosen it again.

SPECIFIC QUESTIONS

RESPONSE DATA

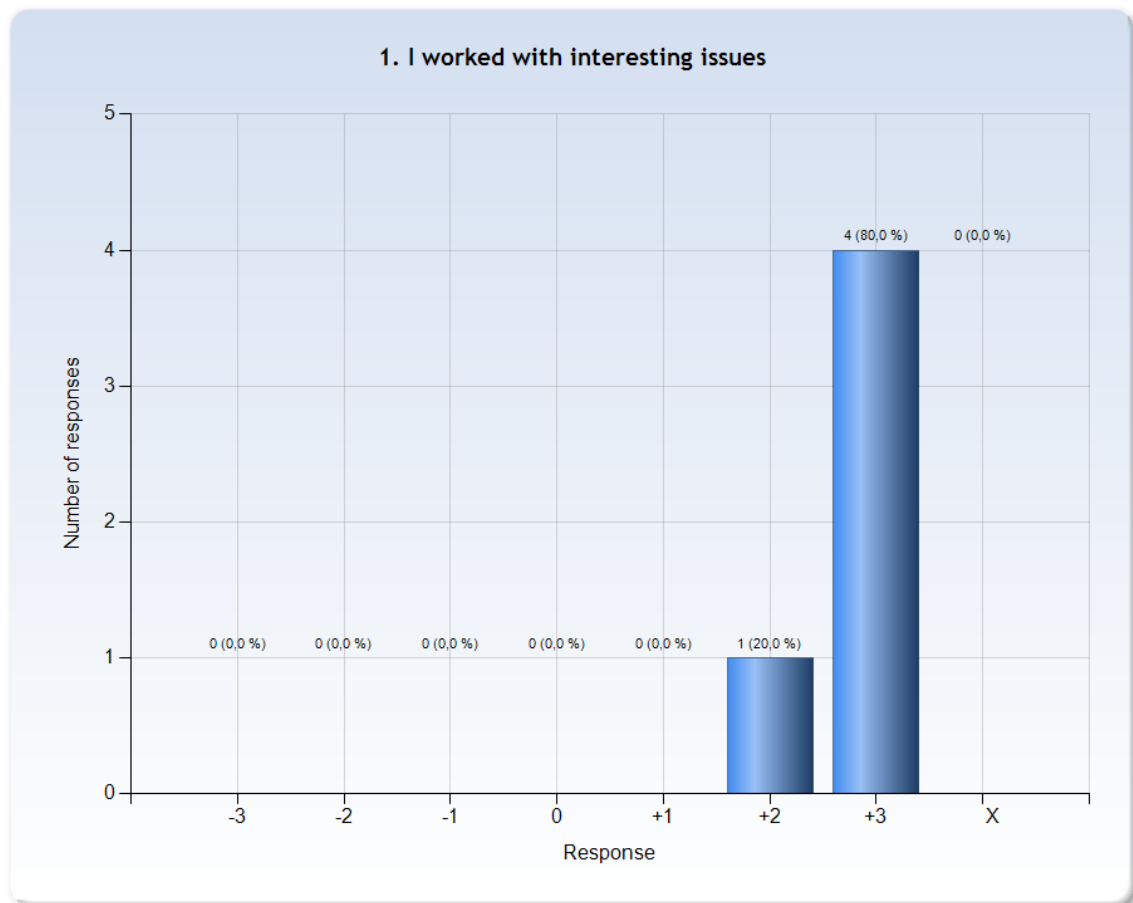
The diagrams below show the detailed response to the LEQ statements. The response scale is defined by:

-3 = No, I strongly disagree with the statement

0 = I am neutral to the statement

+3 = Yes, I strongly agree with the statement

X = I decline to take a position on the statement

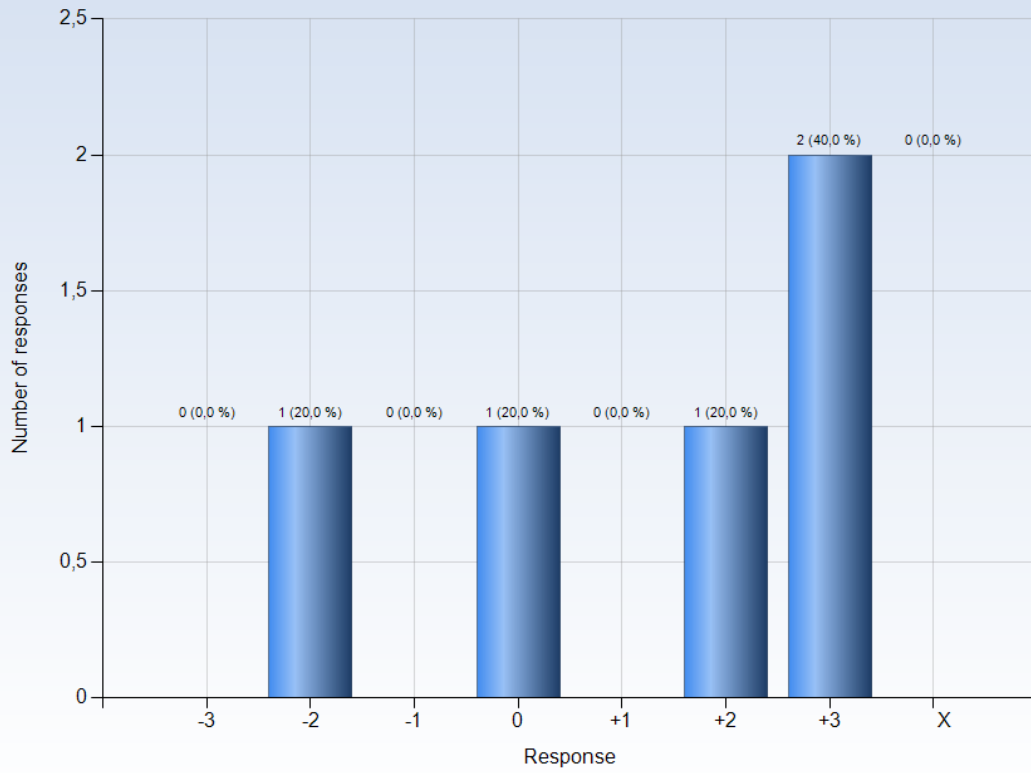


Comments

Comments (My response was: +3)

Very interesting.

2. I explored parts of the subject on my own

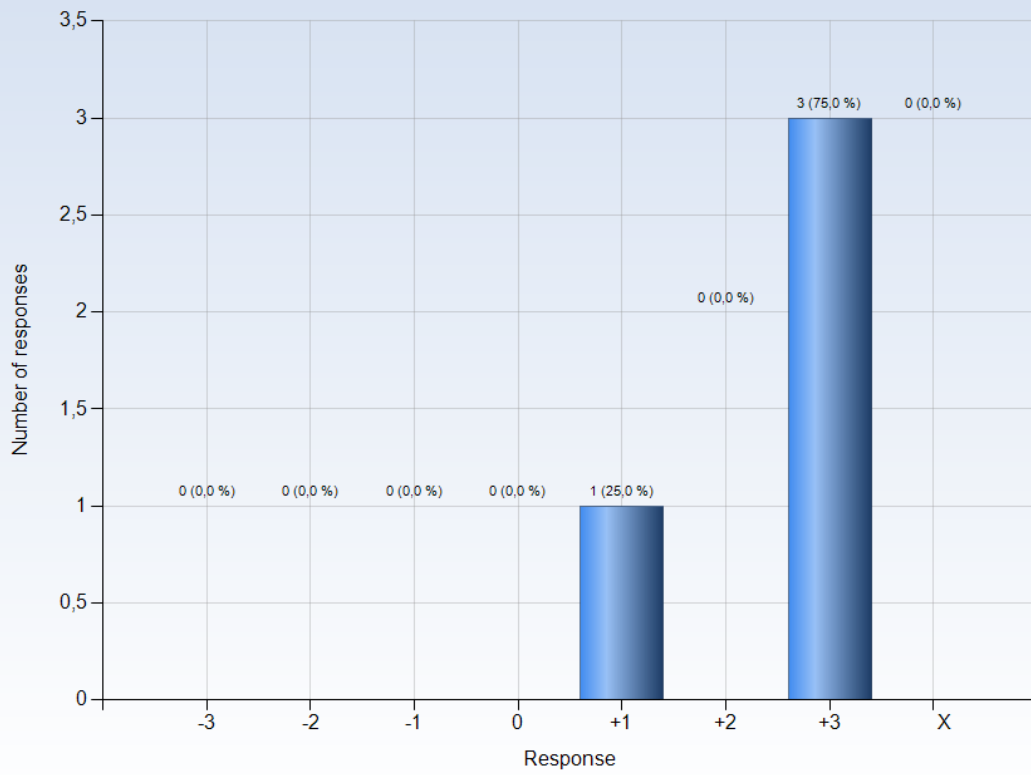


Comments

Comments (My response was: +3)

Yes, due to the seminar form.

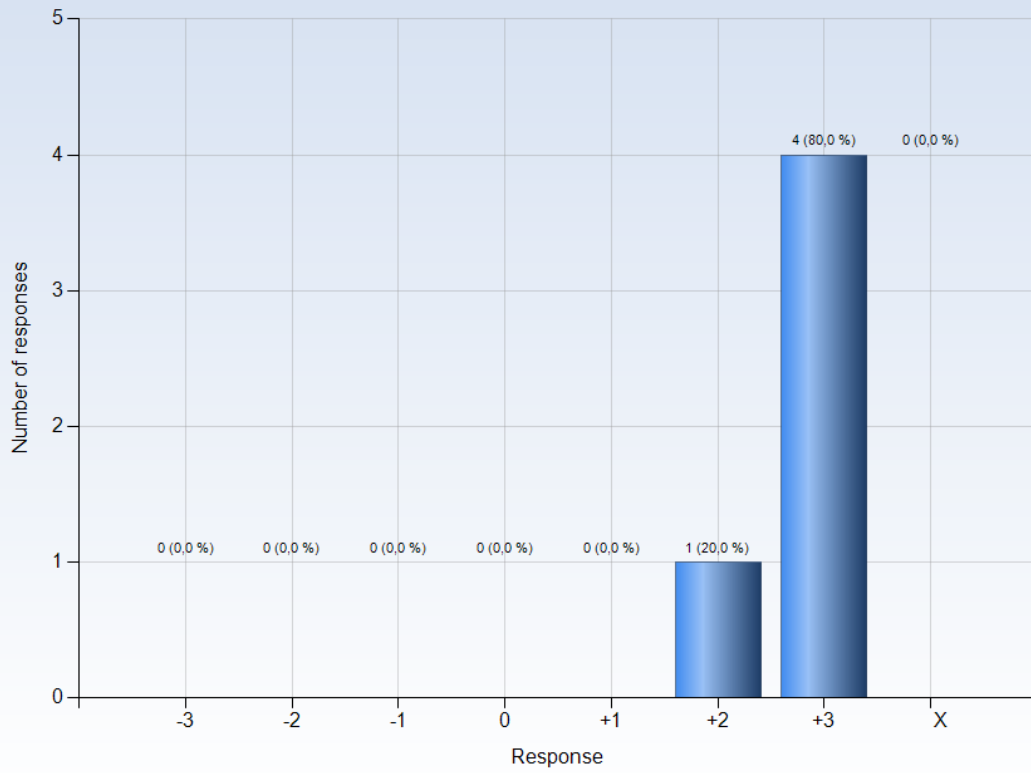
3. I was able to learn by trying out my own ideas



Comments

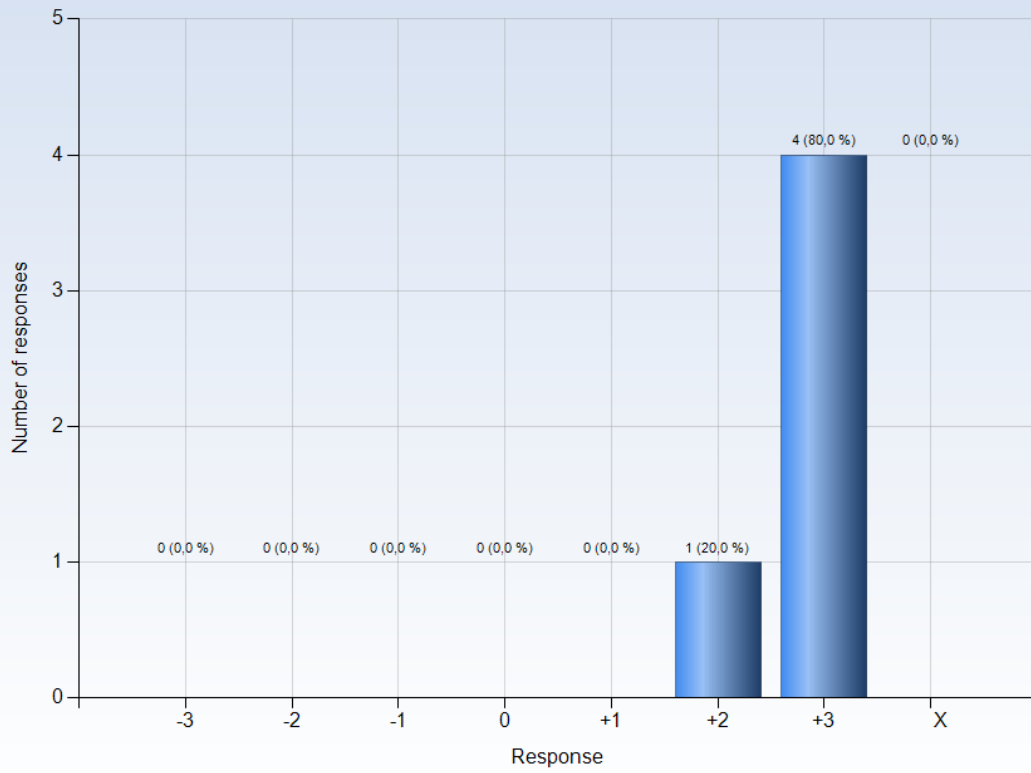
Comments (My response was: +3)
Especially in the second homework

4. The course was challenging in a stimulating way



Comments

5. I felt togetherness with others on the course

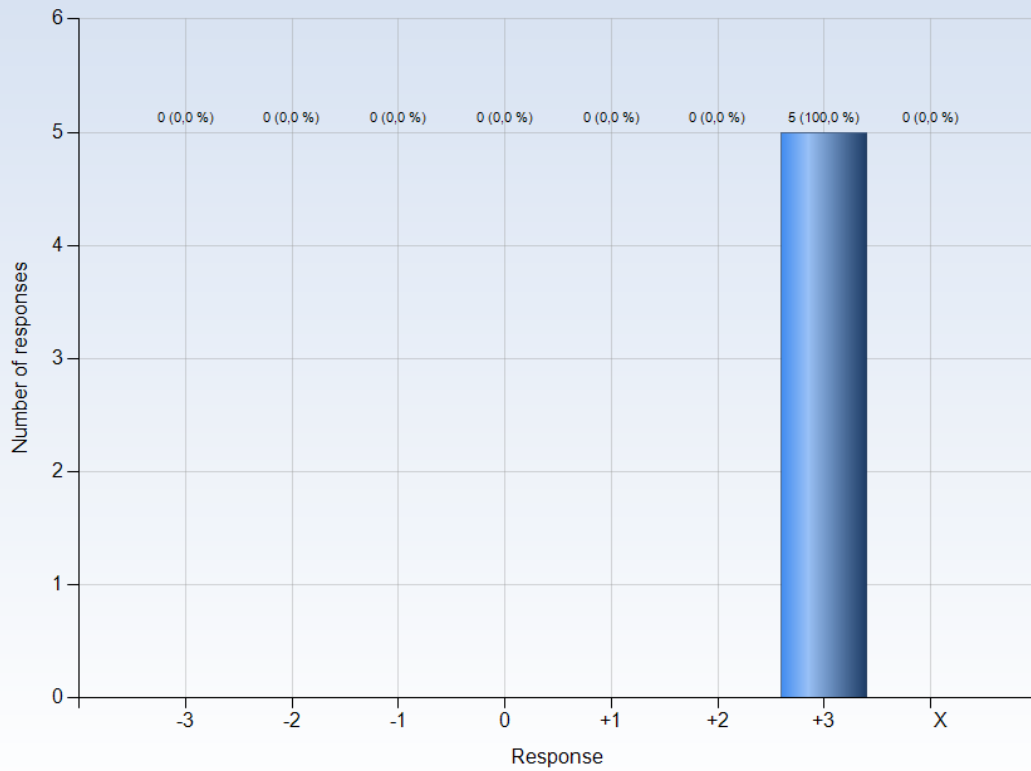


Comments

Comments (My response was: +3)

Yes, mainly because of the seminar form.

6. The atmosphere on the course was open and inclusive



Comments

Comments (My response was: +3)

Actually a wonderful atmosphere during the seminars. I always felt like I knew the least, but I always felt like I had no problems admitting to that.