Course Analysis SH2203 – 2014

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Statistics for the Course Evaluation

Number of students: 25 **Number of Evaluations**: 18

Comment: The number of students this year was roughly twice as many as any other year. This had a number of consequences for the course, one of which was that the final student seminar day had to be divided into two full days, each day with half of the class. The students fill in their evaluation forms during the last lecture, and ideally the seminar day should be before that so that full feedback can be given. This year, only half of the class had had their seminar day before the last lecture, the extra day had to be scheduled afterwards. Consequently, half of the student evaluations could comment on the seminar day which serves as the final examination task in the course.

Focus points of the 2014 course (taken from last year's course evaluation)

"I would like to review the home assignments and while they are very good they at least need to be modernized (the field is developing rapidly and it would be good to reflect that in the home assignments). New data from the LHC could be used. Another thing to look into is to update the course literature. Need a better explanation of the Higgs mechanism. Finally, the course home page can really be improved, although some improvements happened already this year."

Comment: None of this really happened, since I was on parental leave from June 2013 to January 14, 2014. Therefore, I had zero time to do course development before the course started this year. Some "in-time" improvements were done, addressing for example the Higgs mechanism explanation where an additional lecture was devoted to that topic. The home assignments remain the main area to improve for 2015 however.

Course updates during this year's course

The most important improvement this year was that I continued to re-shuffle the material to make the lectures follow a clear path, culminating in the discussion of the Higgs boson, electroweak unification and finally beyond the standard model physics. I devoted more of the initial two lectures to developing important concepts, for example what invariant mass is, that are needed for the rest of the course and which I had felt the students hadn't grasped before. To make room for this, I removed some of the tangential material like discussion of experiments in astro-particle physics and a significant portion of the neutrino physics experiments discussion. These topics are, partially at least, covered by other courses. This has led to SH2203 being more clearly focused on particle physics phenomenology and the experiments at CERN's Large Hadron Collider.

This year, I was also taking dedicated notes evaluating each lecture and home assignment after each such occasion. I will not bring up all the points in this course review, but for next year I intend to use the notes to tweak the course content and work on making the explanations that I thought were a bit weak this year clearer.

The increase in the number of students really made it tough on me as a teacher. The workload is heavy for this course even in a normal year, but with twice as many students it was beyond reasonable this year. For the home assignments, each student hands in on average 10 pages each time. Multiplied with 25 students, it meant I had 250 pages of calculations to go through, which took a full work week. There were three such sets of home assignments. As mentioned before, the student seminar day now also had to be made into two full days, which required extra scheduling and advising. The students also suffered from the increased number in the class, as there were not enough seats available in the lecture room for everyone. This can be noticed in the course evaluation feedback this year, where there were several complaints about the locale (this has never happened before). I do not expect those complaints to surface again if the number of students in the class goes back to normal next year, so it can have been an aberration. I do however agree with the comments that it could have been useful to have a larger blackboard, so perhaps it would be better to have a real classroom for the course in the future instead of using our group room. This would increase the cost of the course though I assume, and require that the course gets added to the central KTH course planning. I am not sure that it is needed.

Finally I have updated (with *a lot* of help from Åsa) the course tasks reported to Ladok for next year, so that it really reflects what is done in the course (the previous tasks must have been very historical and included real experimental tasks for example).

The course evaluation form

The same form as last year was retained. The idea is to keep the questions as open as possible to get broad feedback. One new question was added, inquiring why there was such an increase in the number of students (i.e. asking for the reason for taking the course). The course evaluation form can be found in the attachment.

Summarizing the main points of the feedback

The students were very positive in their feedback; everyone crossed either “a) Very positive” or “b) Quite positive” in the overall impression (10 a) and 8 b) answers). About half of the students use the reading assignments that are given for each lecture to come prepared. I should try for next year to use even less of the material from the book in the lectures, and assume that everyone come prepared (the ones that didn’t read usually quoted that the lectures anyways were self-contained). The home assignments (HA) rate very highly with the students as a learning aid, and I hear the same sentiments from my master students that have taken the course one or two years ago (so the lessons stick). It will be a challenge for next year to try to re-work the assignments so that they require less of my time to correct, while maintaining their open-ended nature that makes them good as a learning tool. A few students commented that the HA’s should count for more of the grade, reducing the importance of the final student presentation. I am reluctant to do that however, as the HA’s and the seminars are testing different skills (and the presentation is also clearly individual). The attitude towards the student seminars is also very positive, everyone likes them and the opportunity they give to delve deeper into some topic. There was one good comment that the suggested topics for the presentations should be even more targeted towards experiments, as it is hard to cover any theory in the 15-20 minutes the students are given (it coincides with my own impression of the student talks). I will take that into account for next year and re-consider some of the topics and replace them with

new ones (a lot of the suggested topics were new for this year too, another consequence of the exceptional number of students).

Focus points for future years

The things I would like to improve for next year are:

- Finish a review of alternative literature to the course book. At least I would like to study Quarks & Leptons by Halzen and Martin in detail, it is a much more advanced book but it gives better insight into some of the topics where I find the current explanations to be a bit shaky.
- Try to review all the home assignments. Contemplate if there is any way to reduce the work load it takes to correct the home assignments (having an assistant do that could be an expensive alternative). Right now, the course is appreciated by the students and they learn a lot, so I am also very reluctant to do anything that worsens that. They need to be returned to the students much quicker than what was possible this year, and ideally even more feedback should be given than now afterwards.
- Update all the lecture material taking into account my notes from this year. Typically, one or two things can be done better each lecture.
- Try to think of a way to incorporate more real experimental devices into the course. Use a spark chamber for example? As I recently became more involved in various outreach projects, I will see what I can learn from that and use it for the course.
- One student found some inconsistencies in the course PM, this needs to be fixed for next year.
- If the same number of students are expected (remember to check during the sub-atomic course in the fall) then another room should be booked for next year.

Attachment 1 – Evaluation Form

Course evaluation

SH2203 Experimental Particle Physics (2014)

Have you done most of your studies at KTH or are you a visitor?

(a) KTH

(b) Visitor

What is your overall impression of the course?

(a) Very positive

(b) Quite positive

(c) Neutral

(d) Quite negative

(e) Very negative

Comment:

Has there been much overlap with other courses?

(a) Far too much

(b) Some overlap, but it was useful to review the topics again

(c) Some overlap, which was mostly unnecessary

(d) No overlap

Comment:

How challenging has this course been compared to other courses you have recently taken at KTH?

(a) Much more challenging

(b) More challenging

(c) About the same

(d) Less challenging

Comment:

What are your thoughts on the reading assignments? How many did you read, and did you find it useful to read before the lectures?

Comment:

What did you think about the amount of material presented during each lecture?

(a) Too much!

(b) About right

(c) Too little

Comment:

What did you think about the home assignments (difficulty and schedule)?

Comment:

What did you think about the home assignments (as a learning aid)?

Comment:

Is it a good idea to have student presentations?

Comment:

What are your thoughts on the report you had to write before the seminar, and the task of being "opponent" for one of you fellow students? Did you find it useful?

Comment:

I am interested in knowing your motivations for taking this course (especially this year since there are many of you). Can you please give a short explanation for why you chose to take this course?

Comment:

Any other comments / suggestions for improvement?