

Kurssammanställning FYST20 “Spectroscopy and quantum description of matter”

Kursansvarig: Mathieu Gisselbrecht

Övriga lärare: Stacey Sörensen, Jan Knudsen, Lukas Wittenbecher and external researchers from MAXIV: Gunnar Örhwall, Maxim Tchapyguine, Balasubramanian Thiagarajan.

Betyg: 2 st VG, 5 st G, 2 st U (one or two assignments missing)

I - Kursutvärdering - Totalt antal svar: 4 (44 % participation)

A) What do you think about *your* learning outcome from the course ?

- *I got a better understanding of spectroscopy techniques. Could also expand my knowledge on atomic physics.*
- *I have learned quantum mechanical description of matter by using spectroscopic interaction between electromagnetic radiation and matter. We have mainly focused on three different fields which are atomic physics, molecular physics and solid state physics taught by different lecturers. The course consists of many different parts of hand in assignment, group discussion, oral presentation and written project. And I have learned a lot of concepts from each of different fields and homework. It was also good to develop my presentation skills while I was presenting my project in front of students and teachers. From the feedback, I recognize what I need to improve for presentation in the future.*
- *I have learnt a lot about molecular vibrations and atomic spectroscopy. I have finally got the concept of reciprocal lattice and why it is useful.*
- *I thought it gave valuable practical experience from the tour at Max IV, and the opportunity to work under a professor that was working in Max IV*

B) If you were the teacher of the course, which elements would you keep next time what would you do in the same way – and why?

- *Liked the project, gave some freedom to choose something we were interested in. Lectures were great.*
- *I would like to keep group discussions what we did every week. It was really helpful to review what we have learned during the lecture. A visiting MAX IV laboratory was also nice experience to have a look how the beamline works in a real.*
- *Definitely the report writing under a professor, with a chance to check out what their current research is on*
- *I would also rather distribute notes about some topic (or a paper) and prepare a set of questions which are discussed in the lecture. Active learning helps me to think about different concepts and get a grasp on them. I also liked the projects. I appreciated that I got comprehensive comments on my text and I got an opportunity to make improvements. The comments also helped me with writing a project in a course which I have taken in the last period. I also appreciated that we got enough of space for the*

computing project discussion, so we understood the instructions and questions. In the course that I have taken in the last period, no consultations were given on the computing project and it has been very unpleasant experience.

C) If you were the teacher of the course, which elements would you change next time what would you do differently – and why?

- *Maybe more opposition from students in the presentation.*
- *There is nothing to complain about the course.*
- *I would change all the parts where PowerPoint presentations were used as the main tool to teach theory. I do not mind if some results of the research are presented on PowerPoint slides but it should not be used as a way how to teach students. I cannot usually get a theory when it is on slides. There are two problems with slides. First, a lecturer tends to go through them so fast that most of the students cannot catch up. Second, lecturers tend to not explain things on the slides because everything is already "written" on them. In addition, slides are usually congested. Personally, I do not understand why a blackboard is used at Lund University so rarely. All lecturers used a blackboard (physical or virtual on tablet) when I studied in England because there was high pressure from students for high-quality teaching. I could see how the necessity to pay tuition fees motivated students to study hard. Moreover, lecturers felt a high responsibility to teach the lectures professionally.*

D) Would you or wouldn't you recommend this course to another student - and why ?

- *I would recommend it since it doesn't only focus on learning physics but also developing other skills.*
- *I would strongly recommend other students especially studying for material science to take this course. The learning outcomes what I have learned during the course will still be applied in my future studies.*
- *Yes, it's definitely valuable for students who are interested in the research done at Max IV*
- *I would, of course, recommend the course to another student because it is well structured, it motivates analytical and logical thinking and reasoning, and it is taught in a friendly environment. In addition, there are plenty of practical exercises.*

E) Other comments?

- *Thank you so much for giving the nice course. I have really enjoyed studying this subject and it will be really helpful for my future master thesis. I would like to appreciate to all the lecturers and supervisor who gave us help and feedback during the course.*

- *I think that the course was taught professionally. I would just like to point out that my studies at Lund University are sometimes stressful because most of the lecturers use Power Point slides to teach theory.*

II. Lärarlagets kommentarer

The course is offered both as undergraduate and graduate course at NatFak (FYST20/NAFY006). This year, we had 3 Bachelor students, 5 master students, 1 Phd students from the division of atomic physics. The course examination consists of two hand-in exercises (25%), 1 hand-on problem aiming at analyzing the vibrational progression of a molecule from a photoelectron spectrum (25%), a research project (50%) based on scientific articles or book with written report (75 % of the project) and oral presentation (25% of the project).

Based on the student evaluation shown above and the teachers own self-reflection on the course, we conclude the following:

- The goals of the course are met. The course not only focus on knowledge but also on developing skills that are useful for research.
- The use of slide for theory has been criticised, which is on its right for a Bachelor course. However, one can argue that most lectures at advanced level (modern undergraduate/graduate research schools) is based on such a teaching style: provide a summary of a knowledge study and discuss in the course before.

An optimal organization of the schedule has been sought, during the past years. This has led to an increase of the quality in writing the final research project, i.e. promoting more deep learning and less stress for the students due to examinations with other courses. However, the small number of students limit the group dynamics for the discussion. Despite the pandemic, students worked well together.

III. Utvärdering av förändringar sedan förra kursen

The overall structure of the course remains the same. Two improvements were implemented:

- Extra-support was implemented for the CO-project. The effort has been recognized.
- More mentoring of the research project has help students to better understand their research topic, and to engage more in writing the final research project.,

Writing individual feedback seemed to lead to an increase of the student participation to the course evaluation from ~25% to ~45 %.

IV. Förslag till förändringar till nästa kurs

Due to the pandemic, the entire course will be re-discussed. Online teaching will certainly affect the CO-project and the lab at MAXIV. A pre-meeting will be held at the beginning of January 2021 to discuss with the team practical implementations.

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