Semester: Autumn 2019
Course: Kvantmekanik och kemisk bindning II, 1KB502
Registered students: 91
Course evaluation answering frequency: 46/88 (52%)
Date: 2019-12-20

Examination results

Number of students examined: 66
Fail: 30 (45%)
Pass: 36 (55%)
Pass with Distinction: 13 (20%)

Brief summary of student viewpoints and suggestions

When asked what was especially good about the course many students felt that the teachers were very committed, engaged, and involved in the teaching. Students valued the laboratories, which added to the learning experience. On average, students felt there were good opportunities to be active in the various parts of the course. There were mixed opinions about the course textbook, Physical Chemistry (Atkins, de Paula); some found it helpful and others not at all. There were also mixed viewpoints on the course goals; some felt the course goals were clear from the start, and others not. Despite this, students largely felt that they achieved the course goals. Students asked for more course structure from the spectroscopy lecture and materials and also for scheduling of labs and presentations. On average the students overall impression of the course was neutral (neither satisfied nor dissatisfied).

"Strengths" according to students

- The teachers in the course were committed and engaged.
- Many students felt that the course was of the right level of difficulty and a majority of students left the course with new knowledge on the subject.
- The LIF laboratory, computer labs and exercises were effective learning methods in the course.
- The chemical bonding part of the course was clear and well-structured.

"Weaknesses" according to students

- The Quantum Mechanics portion of the course needed more structure.
- There were a lot of assignments and material to cover in a five week course.

- Rewarding feedback from the instructors was not provided during the course.

Comments from course director/teachers on the implementation and outcome of the course

This is my first year as course director and lecturer. For me (taught spectroscopy), the students gave a lot of detailed feedback about how the course could be improved and what worked/did not work for them. Many of these comments were helpful for me as a new instructor and I plan to implement changes (vide infra) in order to address the areas in which students sought improvement. Additionally, it could be more engaging for students and the instructor to use some of the lecture hours for inquiry based learning exercises. Some of the course lecture content can be converted to exercises (similar to the computer labs in the chemical bonding part of the course), which would increase the relevance of lectured material to the application of spectroscopic concepts. Such exercises would also provide an opportunity for teacher-to-student feedback, which was one of the weaker points of the course. From the free comments section, students wanted more structure and clarity from the spectroscopy lectures. Students were satisfied with the structure of the chemical bonding lectures. Even though the students called for significant improvement in the spectroscopy lectures to help them better understand the material, the final exam results did not necessarily reflect that students understood spectroscopy less than chemical bonding. Of the students who failed the exam: 15 failed the chemical bonding part (and passed the spectroscopy part), 2 failed the spectroscopy part (and passed the chemical bonding part) and 13 failed both parts of the exam.

The chemical bonding part of the course is well established and planned out and students in general enjoy this very much.

The course content defined in the syllabus is a lot to tackle in a five-week course. There are 4 lectures on chemical bonding and 7 lectures on spectroscopy. As the course has been taught in years past (and in this year) one spectroscopic method has to be discussed per lecture to satisfy the syllabus learning outcomes. At such a pace it is not possible to go very deeply into the theory and some practical applications/examples of the spectroscopic method. At this pace it is difficult for many of the students to make a meaningful connection with the spectroscopic methods, which leads to a lot of confusion about, e.g. how to differentiate between spectroscopies. It would be good to reassess which spectroscopies are of the highest relevance for K and Q groups and have not been taught in other courses. In this way it will be possible to cut down on superfluous material. Furthermore, the students have a significant workload in

their other courses, which generates a lot of stress with respect to handling the workload in the spectroscopy course.

In class conversations with the students revealed that many of them either found the textbook (Atkins) to be not useful, or did not use the textbook for the course. Much clearer and more concise texts about spectroscopy exist (e.g. Fundamentals of Molecular Spectroscopy by Banwell and McCash). I suggest using a different textbook for the course.

Students who showed up regularly to lecture and lektion were in general engaged and a very fun group of students and the instructors enjoyed working with them.

Proposed changes/comments/measures

- Regarding the amount of material/topics covered in the course - Meet with K and Q program responsible to reassess which spectroscopic topics are the most relevant to the course. For example content encountered in other courses could be removed from 1KB502.
- Regarding the distribution of course credits - a more representative distribution of credits in the course with respect to work performed in the course would be 1 credit for chemical bonding (lab/assignments), 1 credit for spectroscopy (lab/project/assignments), and 3 credits for the final exam.
- To increase degree of structure of the spectroscopy/Quantum mechanics part of the course - i) have assignments, problem sets, additional practice problems and practice exam(s) uploaded to the student portal at the start of course. ii) Provide more lecture materials (notes and summaries, and figures) that students can use during a lecture to supplement their own notes. iii) Replace some of the lecture hours with a spectroscopy activities, for example a "computer lab", which increase active student participation and put new spectroscopy knowledge immediately to use.
- Regarding feedback - Provide an opportunity for teacher-to-student feedback from each of the parts of the course half-way during the course.

Names of those who wrote the course report, ie course director/another appointed person at the Department

Starla D. Glover