

Self-evaluation KJM3310/4310 - V2022

This was the second year that the new version of the Physical Chemistry III course had taken place, the first in presence after the first online version due to COVID restrictions in 2021. The number of students attending the class was in line with past years. These are my considerations, after having accumulated some experience over two years:

The level of the contents, according to the textbook “Molecular Driving Forces” by Dill&Blomberg, appears appropriate. In particular the level of mathematics is not particularly demanding, so that the chemical-physical concepts can be smoothly introduced and reasoned upon. Nonetheless, I noticed significant polarization in the results of the exam. Prominently, students with adequate mathematical background follow the course without problems. Unlike past years, this now includes students coming from the standard chemistry bachelor at UiO. On the contrary, students that come from other curricula (especially from other Universities in Norway), may not have a sufficiently solid background. It is thus important to check carefully what are the true competences of students coming from other curricula, and eventually advise them to reinforce their bases, if needed.

After this first cycle of lectures in person, I confirm the feeling that the quantity of notions and contents (very practically, the number of book chapters) is excessive compared to the time at disposal for the students. In practice, the current curriculum requires the introduction of a new topics every week. The feeling is a rush through the book that leaves little time for going deeper and reason on basic concepts. I believe that it would be more engaging for the students if the course had a different, slower pace. This implies the necessity of sacrificing some of the contents. For that, already this year I have tried to prune some content, to focus more on the fundamentals. My impression is that it already worked better than the first year. For next year, I will try to sharpen the content even further.

Thanks to being again in full presence, this year I could implement for the first time a set of exercises / experiences. The aim is to combine more traditional exercises with computational/numerical simulations where students can explore in more depth the theoretical models studied in the curriculum. I am relatively satisfied with the computational experiences that were setup in this year, but I am aware that there is significant space for improvement. I plan to build on the experience of last year to propose more intellectually stimulating tasks in the next edition of the course. I thank Audun S. Hansen for precious help setting up these experiences. Nonetheless, this course would immensely profit from a teaching assistant (PhD student) that could help with the organization and supervision of the experiences.

There remains a level of overlap between Phys. Chem I and Phys. Chem. III. I am personally convinced that the traditional approach to thermodynamics as it is currently implemented in PC-I is a relic of the past that a modern university curriculum should dismiss. Like during last year, also this time I collected some frustration in the students who felt they had to wait until PC-III until they could truly understand things so basic as what truly is entropy, where does the Maxwell Boltzmann distribution come from etc. In other words, how the microscopic nature of matter in at the basis of macroscopic thermodynamics. I would welcome a serious debate about the organization of the three PC courses, and a major reorganization of their contents to fit the knowledge and needs of XXI century chemistry students.