

Course analysis: "Physics and Chemistry of surfaces", SK2762, 2023

The course "Physics and Chemistry of surfaces" was taught during period 3 by Maciej Dendzik and Dibya Phuyal. This year there were 8 students: from the master program in Nanotechnology program, through Erasmus and exchange students.

The course ended with a "take home exam" and an oral exam (6 hp). The course also included laboratory work (1.5 hp).

6 students handed in their solutions on time. The take home problems were mainly from research papers, and a few based on the course books.

All students passed with grades from A to B. The average was A/B. The solutions required a lot of work but were solvable with the information given during the course.

Lectures were accompanied by 2 laboratory exercises at the BALTAZAR and Mats Lab, during which the students were able to perform ARPES, LEED and STM measurements on scientifically-relevant samples (Au(111), graphene/SiC and S on Ni(111)). After performing the measurements, students wrote a short report summarizing their observations.

After presenting the students with their final grades, we gathered some feedback about the course. Overall, the impression of the students was very positive. These include statements such as: "the course was hard, but very helpful and approachable". Multiple students expressed their appreciation for a nice learning atmosphere in a smaller room. Students seemed to like black board derivations of some formulas and discussions of different models of electronic structure or orbital diagrams. Also, the lab exercises and possibility to work on "real" scientific data were highly appreciated.

Concerning future improvements to the course, we obtained several individual comments without a clear trend across the whole group. These comments included some technical improvements, such as publishing home exams at the beginning of the course or preparing detailed instructions for the lab exercises, but also comments about the scope of lectures. Some students would be more interested in learning the chemical aspects of surface science, especially modern adsorption models, while others would be more interested in DFT or doing some calculations relevant for the exam. One student commented that the lecture about vibrational spectroscopy was particularly challenging. Finally, while some students enjoyed the scientific focus of the course, others would be more interested in learning more about industry-relevant methods and current problems.

To conclude, the course was successful and appreciated by the students. We, as teachers, also appreciated the students, interested and open to discussions. A good atmosphere to teach in. Due to large interest of students in laboratory work, we might consider organizing a trip to Max IV synchrotron facility for the next year.

Mats Göthelid, course responsible

Maciej Dendzik, lecturer

Dibya Phuyal, lecturer