

Advanced physical and polymer chemistry laboratory practical

Course code: KMEN006S

Valid from 2020/2021

The aim this course is to study different physical chemical phenomena in complex systems. The practice is 5h/week. Students are not allowed leave the laboratory for longer than 15 min without the permission of the instructor. Students shall permanently leave the lab only after handing in a completed lab note or (after returning the used equipment and receiving the signatures of both the technician and the instructor) 30 minutes before the end of the practice. The allotted measurements and required parameters are listed in the separate descriptions of the practices.

Students carry out experiments either alone or in pairs. Each student performs different experiment every week, which is assigned by the instructor a week ahead. Students must write a handwritten reports about their own work, starting with a preparation in advance, at home. The measured results and their evaluation should also be included. The description of the experiments is available online (see the URL above). The first step of the preparation is that the student downloads the appropriate instructions of the experiment from the Internet. The necessary information, e.g. URL addresses, passwords, etc., will be given by the instructor at the first laboratory class. After the student got familiar with the tasks and their theoretical background by reading the downloaded material, she/he should prepare a handwritten one-page summary of the experiment on 4-paged A4 size sheets. The summary must include a required header (name, title of the experiment, date – see below), the main statements concerning the theoretical background, and formulas used in the evaluation of data. Students working in pairs should prepare separate reports.

| Date | Title of the experiment | Name, group |
|--|-------------------------|-------------|
| Summary of the experiments, with the most important equations and theoretical background (no specific values, e.g., concentration, volumes should be included here!). (maximum!! 1 A/4 page) | | |

In case of working in pairs, both students will have the exact same experimental data, but their evaluation should be done separately. The evaluation means performing calculations using the experimental data, preparation of graphs etc. – following the guidelines of the given experiment, typically detailed at the end of the downloaded documents. Students are allowed to do the calculations by a scientific calculator. The graphs can be produced on graph/grid/millimeter-paper. Computer programs (such as Excel) can also be used, as well for calculations, creating tables and graphs. In this case, the tables and graphs should be given to the instructor in both printed and electronic form (i.e., in files). The instructor might ask the student for the reproduction of them on site. If it is proven, that the student is unable to do the evaluation on his/her own, or the used files were produced by others, the mark of that experiment is failed (1). Moreover, the instructor may force the same procedure for the student's earlier reports produced by computers, and in case of failure in the reevaluation, the marks of those reports can be lowered.

Requirements

The laboratory class starts with a short, 10–15 minutes long test, in order to check the students' knowledge concerning the particular experiment. **Possible** test questions are given in the description of the experiments, but other questions beyond these, related to the description and the theoretical background of the experiment can also be asked by the instructor. The instructor will check and mark the tests promptly. If its mark is failed (1), the student is not allowed to perform the experiment, because she/he is unprepared, and her/his final mark will also be failed (1). After successful tests, the students can start their experiment.

All experimental data should be recorded directly into the report, in ink. The note books are checked and signed by the instructor, when the experiments are finished. The technician should also sign the report to prove that all the equipment, instruments and tools, were returned in proper, unharmed state and order. The evaluation of the data should be finished until the beginning of the next class. It is required to hand in the report at the beginning of the next class the latest. Delay in doing so, will result in a reduction of the mark by one, each week afterwards. The instructor will check and mark the reports within the soonest possible period of time. The given marks depend on the quality of the students work, the precision of the performed experiment, and the rightness of the evaluation. The instructor has a right to give back the report for reevaluation during the first two active weeks if it contains fundamental errors. It is requested to give the details of the calculations by substituting the values and the units into the used formulas (especially when software e.g., Excel is used for evaluation). If a calculation must be repeated several times, in order to fill in a table of data, the detailed calculations should be given as an example only for one row (column), independently whether the table is printed or handwritten. These examples should be given even if you do the calculations by computer.

The instructor shows the marked reports to the students and she/he explains the weak and the strong points of the reports to the students. There will be no experiment assigned for the first and the last week of the semester and obviously for the week of the University Holidays and for the days of National Holidays. The course is accepted if a student finishes at least 80% of the assigned experiments with better marks than failed (1). It means 10 successful reports in a semester with 12 active weeks. If there are less than 10 active weeks in a semester, the minimum number of accepted reports must be 7. Students who were absent from the laboratory class, must show an official certificate (e.g. medical certificate, etc.) at the beginning of the following class, that her/his absence was justified. **The grade of the missed experiment will be failed (1) without excuse!** The instructor can propose another time, twice in a semester, to perform the missed experiment. The last week is reserved for repetition of one missed or failed experiment. The repetition of a failed experiment will not cancel the previous mark, its mark will be added to the other marks and will be taken into account at the calculation of the final mark independently. The mark of the missed experiment will be failed (1) if the student refuses to make the experiment in the offered time or on the last week, independently from the justification of the absence.

Final mark

The final mark of the class will be calculated from the average marks of the test and the reports. **The weight of the marks of the reports will be two-third while that of the test will be only one third.** The mark will be excellent (5), good (4), acceptable (3), passed (2) or failed (1) if this weighted average is in the range of 4.51–5.00, 3.76–4.50, 3.00–3.75, 2.00–2.99 and below 2.00, accordingly. Students, who did not miss or fail experiments, can apply for a possibility to perform an additional experiment on the last week to improve his/her mark. The only condition is, that the calculated averages of his/her previous marks allows to improve the weighted average to the next range, by adding an excellent (5) to the marks of the reports and another to the marks of the tests. The students must take part in a short training on safety precautions at the laboratory on the first week. Every student signs the appropriate form, stating that they are aware of the risks, and accept and follow the rules which are in force in the laboratory. Nobody can attend the classes without it! Students who deliberately or severely violate safety rules or use no protective equipment despite warning, will be sent away from the practice and their practice count as failed (1) labs.

Thematic

The description of the experiments performed during the semester can be downloaded from:

<http://www2.sci.u-szeged.hu/physchem/msphyschemlab.html>

During the laboratory practice each student (or student pairs) perform different experiments. The experiment performed on a given occasion will be announced at least one week prior.