

Basic Physics Laboratory - a space where undergraduate students develop hard and soft skills crucial not only for scientific career

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Abstract. We discuss role of the Basic Physics Laboratory classes in the didactic process at the Faculty of Physics of the Adam Mickiewicz University. We show that these classes allow the improvement of specific hard skills as well as soft competences, that make students competitive in today's job market. The skills taught in the Basic Physics Laboratory are therefore crucial not only for the development of a future scientific career.

Introduction

Classes at the Basic Physics Laboratory are an important part of the didactic process at the Faculty of Physics of the Adam Mickiewicz University. The primary role of these classes is to introduce a student to the experimental aspect of basic physical phenomena. Students from a variety of disciplines take part in these classes, from General Physics and Astronomy to Biophysics, Medical Physics, Computer Technology and Ocular Optics and Optometry. In the educational process for some students, laboratory classes are the first encounter with a simple physical experiment. These classes have a hybrid practical-theoretical-workshop character. On the one hand, the students are required to be familiar with the theory of the physical phenomenon under study, and on the other hand, attention is paid to the efficient performance of the experiment and the execution of the measurements, as well as to the correct statistical analysis of the results obtained and the preparation of the laboratory report. The work on each experiment specified in the timetable has the characteristics of a small scientific project carried out in a small group. The project-based character of these classes provides students with their active intellectual engagement [1].

Observations

Undoubtedly, the classes allow the improvement of specific hard skills already at the stage of preparation for the performance of the experiment, when a critical evaluation of the available didactic materials and content is required. It is not uncommon for teaching materials to be available in English and for some students this is the first encounter and work with a specialized text in the language of science. Hard skills are then developed in the laboratory and computer room, where students perform a statistical analysis of the measurement data and prepare a laboratory report. Let us emphasize, here the application of modern IT tools for data analysis and presentation. The assessment of the hard skills as well as the learning development is based on the established criteria including the level of scientific curiosity, the ability to evaluate the experimental outcome, the level of scientific argumentation presented in the final laboratory report, and progress in the application of IT tools [2, 3].

In the field of soft competences, the classes provide the opportunity to learn to plan project activities. The regularity of the classes develops the ability to learn systematically and to meet commitments on time. During meetings in the laboratory room, students learn time control and work under time pressure. In order to carry out the experiment and prepare the report efficiently, group cooperation is crucial. During the execution of the experiment unpredictable problems may

occur, e.g. technical faults, so the student has the opportunity to be in a situation where he/she has to be creative, flexible and open to a non-standard solution to a problem [4].

Conclusions

The skills taught in the Basic Physics Laboratory are therefore crucial not only for the development of a future scientific career. Graduates who do not undertake doctoral studies and do not follow the research career path acquire competences that make them competitive in today's job market.

References

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