

Summary of the Educational Evaluation of the Freestanding Courses in Physics at Uppsala University, October 2021

1. Background

1.1 Evaluated education

The evaluated education is the freestanding in Physics at The Department of Physics and Astronomy, Uppsala University (UU). Responsible for the courses and author of the self-evaluation is Dr. Lisa Freyhult, director of studies.

1.2 The evaluation panel's composition

- Dr. Linn Areskoug, Senior Lecturer, The Department of Education, Uppsala University, convenor of the Evaluation Panel,
- Prof. Dr., Jochen Weller, Dean of Studies, Faculty of Physics, Ludwig-Maximilians-Universität, Munich,
- Privatdozent Dr. Martin Kerscher, Head of Exams Office, Faculty of Physics, Ludwig-Maximilians-Universität, Munich,
- Anna Ivleva, Faculty of Physics, Ludwig-Maximilians-Universität, Munich, student representative.

1.3 Implementation

The method is benchmarking. The evaluation started in January 2020, but was delayed due to restructuring of the evaluation panel and Covid-19 pandemic. In February 2021, the present evaluation panel started the work that is at hand. Material for the evaluation is primarily the self-evaluation and various documents referred to in the self-evaluation. No visits between the UU and LMU were possible, and all meetings and communication were on zoom or email. Meetings occurred throughout spring and early fall 2021. To compensate for the benchmarking method, the evaluation panel has incorporated supplementary information in the evaluation (chapter 3) on how some aspects are organized at LMU, when possible.

2. The evaluation

2.1 Strengths

2.1.1 Content, teaching methods, and assessments

The study of Physics is a great way to be prepared to deal with changes in working life. Exposing students of other programs to the way physicists solve problems, will prepare these students, although on a more limited scope, to these situations. The focus on student centred and active learning is well established.

2.1.2 Teachers' expertise

The self-evaluation describes an organized structure concerning pedagogy. Overall, the conditions for teachers to teach on research that they are experts in as well as develop pedagogically, seems to be satisfactory in the freestanding courses.

2.1.3 Students' influence and study environment

The infrastructure for student representation is laudable since students can actively take part in shaping the courses and the process is transparent. It is positive that the students have access to spaces for studying and socializing at campus since it also increases the sense of belonging as well as helps the student to get acquainted with the informal and social aspects of research life.

2.2 Areas of improvement

2.2.1 The selection of courses

Freestanding courses often “live” on the personal commitment of the teacher. It seems worthwhile to have some flexibility in changing the courses, allowing new additions and phasing out old ones.

2.2.2 Teaching

Install class-room teaching assistants for the courses and prepare introductory material for the course, for example in the form of video explanations of core concepts to extend the student centred and active learning. Video explanations that were created during the Covid-19 pandemic’s online teaching could be a resource in post-pandemic teaching. A structure for how pedagogical engagement at the department is organized could be clarified to highlight individual teachers’ careers.

2.2.3 Gender perspective and equal opportunities

The strategy for involving women as teachers in the introductory courses in favour of the new students meeting women who teach is presented. The freestanding courses gather a wide range of students from different paths in life. Implications for learning in relation any chosen strategy taking the student cohort into account, should be discussed.

3. Recommendations

3.1 The selection of courses

- a) The question of the preservation or termination of courses is that such a discussion should consider disciplinary and interdisciplinary perspectives, as well as societal benefits.
- b) Project courses can be very interesting for exchange students, proving an organisational framework for lab-courses, project work, and a BSc or MSc thesis project.
- c) Individual courses could be used as spearheads for social engagement in topics relating to Physics, for example sustainability and climate change.
- d) Courses to attract a wide range of students could deal with Physics in popular culture such as Science fiction movies, the image of the Physicist in popular culture, or socio-cultural research perspectives on Physics.

3.2 Teaching

- a) All teaching material created at UU, should take the guidelines for accessible teaching into account.
- b) A clear organization on how to benefit from engaging in pedagogical development career-wise could be of interest to individual teachers.
- c) Courses geared towards social engagement could explore a wider range of pedagogies, for example course design to promote oral and written debate skills, thus integrating urgent topics of today’s society that calls for the expertise of physicists as well as creating opportunities to practice communication skills.

3.3 Gender perspective and equal opportunities

- a) Costs and gains should be addressed from a local and individual perspective as well as from a societal and structural perspective. Disciplinary traditions and historical norms in Physics relating to representation, stereotyping, and power hierarchies related to science as well as the society is important to highlight in this issue.
- b) Pedagogical methods profiting from this diversity puts special demands on the teachers, and a reflection on privilege and marginalisation within the student cohort should be discussed continuously. Researchers in gender perspectives and STEM disciplines should be invited to present their research at professional development events for teaching.