

Strategy, Department of Mathematics and Physics

Brief summary

Vision

A sustainable society with a robust economy will require diversification and development towards a more knowledge-based society. A highly educated and adaptable workforce is essential in order to succeed with this transition and to solve future challenges, including the green transition.

Objective

The Department of Mathematics and Physics will offer outstanding research and research-based education in mathematics and physics, thereby providing the workforce of the future with both broad and specialised knowledge and skills in the natural sciences.

Strategy

The Department of Mathematics and Physics will fulfil its objective by creating an environment that explores the unknown through research of the highest international standard and by offering outstanding research-based education in mathematics and physics at all levels.

Introduction

The Department of Mathematics and Physics is one of seven departments at the Faculty of Science and Technology. There are 23 permanent scientific positions at the department: 10 in physics and 13 in mathematics. Three of these are held by women, all in physics. In addition, there are two adjunct professor positions and three permanent part-time positions in connection with the Preliminary Course for Engineers. Including doctoral research fellows and temporary research positions, there are approximately 45 employees at the department. Since 2013, there has been a significant turnover of employees due to retirements. During this period, 17 permanent positions have been filled, and as a group, the department staff is now relatively young.

The primary function of the faculty is research and education in technology and science. Research and education in mathematics and physics are important parts of this activity. In research, the department contributes with basic research in mathematics and physics, and as part of interdisciplinary research projects with other academic communities at the faculty. In education, the department contributes through its own educational programmes and through the mathematics and physics content of the engineering programmes. Throughout, the teaching activity linked to the engineering programmes informs the staffing in physics and mathematics at the department. With the new appointments since 2013, emphasis has also been placed on consolidating coherent and strong research groups in mathematics and physics that constitute an internationally competitive research community.

The green transition is a common theme running through the University of Stavanger's strategy, and *energy, health and welfare*, and *lifelong learning* are focus areas. The strategy at the Faculty of Science and Technology highlights five thematic initiatives that support the *green transition* and an overall emphasis on *outstanding research and education*.

Knowledge and education in mathematics and physics, both in themselves and as foundations for technological development, are crucial in overcoming the challenges posed by *the green transition*. The subjects' essential role as a basis for understanding nature and technology makes mathematics and physics cornerstones of *lifelong learning*, where professional adaptability is key. The academic staff at the department are all active researchers at a high international level in their fields. A relatively high success rate for grant applications to the Research Council of Norway is an expression of the department's commitment to an *outstanding academic community*. This in turn provides the

basis for outstanding research-based education. In teaching and education, the department distinguishes itself with Excellent Teaching Practitioners and award-winning educators.

Overarching strategic ambitions

- The Department of Mathematics and Physics will provide a strong academic environment for excellent research in mathematics and physics at the Faculty of Science and Technology that is attractive to students and researchers nationally and internationally, and contributes to an overall strengthening of the faculty.
- The Department of Mathematics and Physics will continue to be an important contributor to the engineering and technology activities at the Faculty of Science and Technology, by delivering expertise and education in mathematics and physics.
- The Department of Mathematics and Physics will ensure equal treatment, diversity and inclusion, and a working environment that supports gender and ethnic diversity in both research and educational activities.

Strategy in education

From 2023, the Department of Mathematics and Physics will offer the following educational programmes: 5-year integrated master's programme in mathematics and physics, 5-year secondary school teacher programme in science subjects, one-year programme of study in mathematics, and the Preparatory Course for Engineers. Of the total course portfolio of 44 courses, seven are included in the preparatory course and 13 in the faculty's engineering programmes and other science and technology programmes.

The Department of Mathematics and Physics will

- Offer educational programmes on which the students can base their future work life, enabling them to contribute to society.
- Be a prominent and nationally recognised provider of education in mathematics and physics and thus contribute to strengthening the university's and the faculty's portfolio of studies and their ability to recruit committed and talented students.
- Contribute high-quality foundational courses in physics and mathematics to the technological programmes at the faculty.
- Further develop high quality and relevance in the department's study programmes, including the master's programme in mathematics and physics as an important basis for research activity at the department.
- Offer high-quality PhD education in mathematics and physics, and have an average of at least 15 doctoral students and four dissertations per year.
- Work to increase the number of female students in mathematics and physics through targeted initiatives in collaboration with upper secondary schools in the region.

Actions

- Work actively to recruit good students regionally and nationally through:
 - Participation in public events.
 - Visits to upper secondary schools.
 - Use of student-ambassadors.
 - Increased visibility both digitally and in the media.
 - Further developing student exchange agreements.
- Implement outstanding teaching initiatives, including:
 - Offering relevant courses and seminars that focus on teaching expertise with the aim of qualifying for titles such as 'Excellent Teaching Practitioner'.
 - Facilitating the use of diverse forms of teaching and evaluation.
 - Introducing digital tools and programming in teaching, where relevant.

- Being in regular dialogue with upper secondary schools in connection with curricula and didactic expertise.
- Ensuring didactic supervisory expertise through new appointments.
- Ensure the necessary staffing so that regular teaching can be carried out without having to use temporary substitutes, and equally distribute the most extensive teaching tasks across all employees over time.
- Promote practices that strengthen quality, diversity and inclusion in connection with lectures and supervision.
- Work for the co-location of all employees at the department by realising the 5th floor extension, E-block, KE house.

Strategy in research

The Department of Mathematics and Physics has six research groups working within the fields of mathematics and physics:

- Algebraic geometry
- Real and complex analysis
- Mathematical physics
- Mathematical statistics
- Materials physics
- Theoretical subatomic physics and cosmology

Active research collaboration takes place with international research organisations such as CERN, LISA, LIGO-VIRGO, ESRF and ISS. The department is a member of relevant national networks and the academic staff actively participate in national and international professional research communities.

In addition to basic research, the materials physics and mathematical statistics groups have significant activity in applied science. The topics include medical statistics, econometrics and materials physics aimed at carbon and hydrogen storage and battery technology. This is largely conducted in collaboration with other academic communities at the faculty and externally, including Stavanger University Hospital and the national research institutes IFE and SINTEF.

The specific research topics are largely related to individual researchers' academic backgrounds and activity. Focus on the six areas has been created through the academic appointments at the department over the past ten years. The Department of Mathematics and Physics now consists of a relatively young faculty, and major changes in research activity and expansion into other areas must be seen in connection with future opportunities for new appointments.

The Department of Mathematics and Physics will

- Conduct research to high international standards that is published in highly ranked international journals and that creates visibility and recognition nationally and internationally.
- Strengthen and consolidate the existing academic groups.
- Conduct research that supports the strategic goals of the Faculty and the University of Stavanger, and contributes foundational skills and knowledge which stimulate and support the research activities at the other departments at the faculty.
- Continue to attract trendsetting international conferences to the department and increase the number of international and national workshops.
- Ensure a research community that supports cultural, ethnic and gender diversity.

Actions

- Ensure a good balance between the time spent on research and on teaching tasks. Normal teaching balance is one course per semester. Ensure the establishment of a research sabbatical scheme.
- Stimulate more academic collaboration within the department and with the other departments at the Faculty of Science and Technology.
- Support and stimulate the writing of applications for external funding (Research Council of Norway, EU, ERC) from national and especially European sources by providing additional resources to applicants.
- Continue to build a strong academic community for Norwegian Centre of Excellence applications.
- Ensure and further develop a well-equipped research laboratory for materials physics.

Strategy for the working environment

The Department of Mathematics and Physics will

- Ensure a safe and supportive working environment that nurtures open dialogue and communication.
- Encourage active participation in strategic decision-making processes.
- Nurture a culture of positive and constructive collaboration that creates a collective of satisfied employees.
- Ensure a working environment that supports cultural, ethnic and gender diversity.

Actions

- Establish support functions for qualification to professor positions.
- Hold regular information meetings for the entire department.
- Organise social gatherings at the department.
- Celebrate and communicate outstanding achievements.
- Ensure that diversity is safeguarded in all employment processes.
- Work for the realisation of the 5th floor extension, E-block, KE house.

Strategy on communication and public relations

The Department of Mathematics and Physics will:

- Be a prominent and nationally recognised provider of outstanding research-based education in mathematics and physics.
- Be a prominent and internationally recognised research institute within the six focus areas.
- Through research communication, be an active and nationally familiar voice for the important role that mathematics, physics and science play in meeting global challenges now and in the future.
- Proactively engage in the public debate, and provide factual and objective information to the discussions.

Actions

- Offer a communication skills course.
- Continue to attract conferences and workshops to the department.
- Produce popular science content that can be disseminated through a wide variety of media.
- Increase the number of visits to and from upper secondary schools.