

**INTERACTION**  
**SUSTAINABILITY**  
**INNOVATION**



Faculty of Engineering and Science

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Interaction for sustainable technology and environment

**STRATEGY**  
**2019–2023**



Western Norway  
University of  
Applied Sciences

## Key figures 2019

**3200** students

**275** staff

**26** bachelor's degree programmes

**9** master's degree programmes

**2** PhD programmes

**1** technical college  
for professional divers

**5** campuses

> Førde

> Sogndal

> Bergen

> Stord

> Haugesund

The Faculty of Engineering and Science (FIN) will contribute to the development of innovative technology that takes into account healthy societal development and future generations opportunities and needs.

What we call responsible innovation involves a responsible utilisation of resources that does not go beyond nature's limits. An important prerequisite for realising this is good and close interaction with others. We want good co-operation internally between academic environments, externally with other knowledge institutions and with stakeholders in the business and public sectors – regionally, nationally and internationally. Interaction requires a certain dynamism and ability to collaborate where not everything can or must be planned in advance.

This strategy requires that we always look outwards, that we both contribute to and obtain knowledge from others.

Our goal is to be at the forefront of knowledge with robust, professionally-oriented research, academic development work, relevant education and responsible innovation. A strong regional footprint and sustainability are important elements here. An education at our faculty must promote these values in such a way that students are also trained in critical thinking and reflection, regardless of their level of knowledge and educational pathway.

# Ambition for 2023

The faculty shall contribute to making Western Norway University of Applied Sciences (HVL) a university with a clear professionally and workplace-oriented profile.

Going forward to 2023, we will further develop our bachelor's degree programmes in technology and science with high academic quality and good recruitment and throughput.

We will offer our bachelor's degree students relevant master's degree programmes, in addition to our already recognised doctoral programmes in computer technology and responsible innovation.

The faculty has a good reputation and a large interface with the labour market in the region. We develop and share knowledge in close collaboration with the business community and society around us, especially in our academic profile areas.

### Going forward to 2023 we will:

- > Work for sustainable development through teaching, research, dissemination and innovation
- > Develop our two PhD programmes with a goal of 7 candidates at the faculty defending their theses in 2023
- > Double external funding and increase the scope of R&D
- > Strengthen the academic capacity to offer more relevant continuing education programmes (EVU)
- > Actively contribute to the establishment of a centre for research-driven innovation (SFI).
- > Work to establish a centre for excellence in education (SFU) at the faculty
- > Create student incubators on campuses to strengthen innovation, entrepreneurship and incubation activities
- > Use and further develop good models for student activity and varied forms of learning, and increase the extent of digital learning content
- > Increase the number of exchange students in engineering, especially incoming exchange students
- > Develop the bachelor's degree programmes to become a centre of gravity for sustainable technology and the environment in Western Norway, with a target of 70% throughput
- > Further develop the master's degree programme to meet the increasing need for expertise in society and business in the best possible way, and at the same time ensure that all bachelor's degree candidates are offered a relevant master's degree programme

# Academic profile areas

The academic profile areas show areas we are good at today, and they are a good basis for becoming even better in the years to come. The profile areas are thematic and cross-departmental, and provide a picture of what kind of expertise we have that society around us can benefit from.



## ICT and computer technology

The increased digitalisation of society has been possible due to innovation in computer technology, and all sectors of society and business are increasingly dependent on ICT. Our focus areas include software development and software quality, computational engineering, machine learning, artificial intelligence and simulation technology and communication systems. In interaction with computers, robots, sensors and automation, these areas form the basis for digital solutions and smart systems for the future.

## Fire and safety

Climate change, changes in society and industry, new building methods and new technology bring new risk challenges. At the same time, it means that we can better handle fires and environmental incidents, and it provides new opportunities in risk communication and learning. We contribute to better preparedness and reduction in the number of fires and negative environmental impacts through research, innovation and education.

## Energy, nature and environment

Transforming energy production and consumption is one of the UN's Sustainable Development Goals. In the years

to come, society must implement major cuts in emissions of greenhouse gases, adapt society to a more extreme climate, manage geohazards and protect biodiversity, ecosystems and agricultural land. We contribute to sustainability by developing renewable energy technology and new knowledge about the interaction between energy transition and the consequences it has for use of resources, nature, society and the environment.

## Sustainable urban and social development

In order to achieve the sustainability goals, it is planned to reduce transport needs and find new energy solutions. We must take natural diversity and ecosystems into consideration if we are to create smart communities that are a good place to live. We contribute with technological development, design, planning, construction and building solutions where BIM and GIS are important tools.

## Innovation and entrepreneurship

The sharing of knowledge with the business community and society within our academic profile areas makes the faculty a driving force for innovation in Western Norway.

Technology plays an important role in most areas of society and is very often

a driver of innovation and transformation. The broad interaction between the academic environment and regional business and industry contributes to renewal in both the private and public sectors. In addition, we can contribute further to innovation in the form of commercialisation and utilisation of technological solutions developed by staff and students.

## Technology in health and care services

The healthcare sector will face major challenges as a result of demographic changes in the years to come. The use of information from sensor networks and robots are examples of the use of new welfare technology in care and welfare services. In this context, where the goal is to improve the quality of life for users, we contribute to increased use of technology in taking of samples and analysis, among other things. We also

participate in the development of new technology for cancer treatment - in close collaboration with the healthcare services.

## Ocean technology

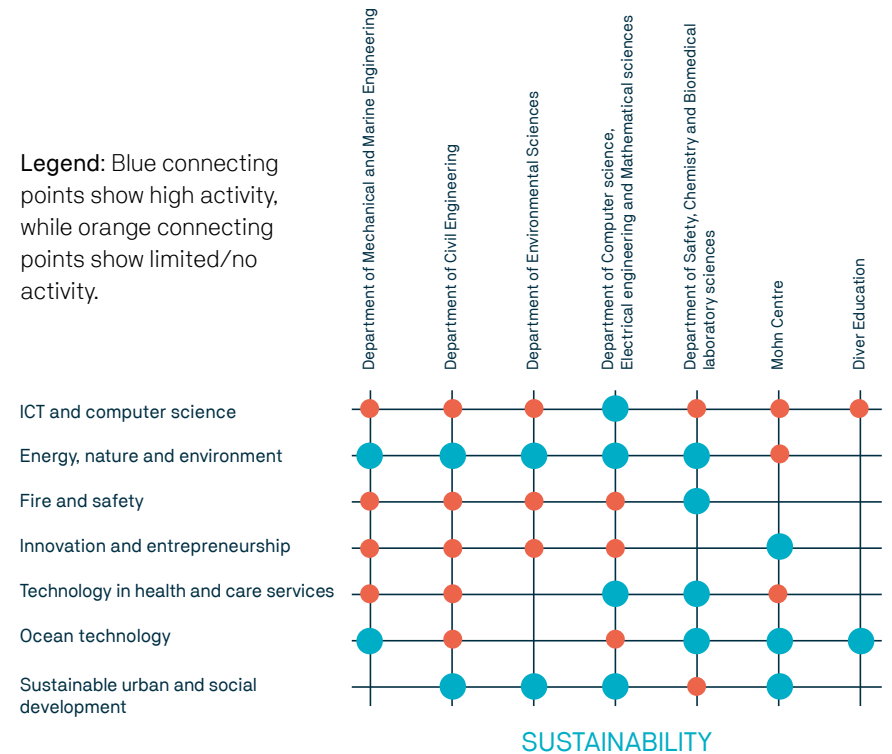
Regjeringa har som mål å femdoble The Government's goal is to quintuple extraction of resources from the sea before 2050, which places great demands on sustainable development. Among other things, we work with technology for offshore operations, marine construction technology and hydrodynamics for ships, floating structures, underwater vessels, anchoring systems, aquaculture and environmentally friendly closed aquaculture facilities. Our work also includes control systems, monitoring, navigation and communication systems and sensors, as well as enabling technologies such as advanced materials and nanotechnology, ICT and biotechnology.



## Matrix organisation from 1 August 2019

From 1 August 2019, the Department of Computer Science and Mathematical Sciences and the Department of Electrical Engineering will be merged into the Department of Computer Science, Electrical Engineering and Mathematical Sciences. From the same time, the Department of Biological and Chemical Engineering and the Department of Fire Safety and HSE will be merged into the Department of Safety, Chemistry and Biomedical Laboratory Sciences.

**Legend:** Blue connecting points show high activity, while orange connecting points show limited/no activity.



# Core tasks

## We will educate

FIN will continue to work to strengthen our programmes of study at all levels in the period 2019–2023.

We will continue to work closely with industry and other external actors in the implementation of existing education programmes and the establishment of new ones. The faculty shall collaborate strategically with clusters and networks in Western Norway on both the development and revision of study programmes.

Our programmes must be workplace-oriented, research-based and innovative. Students are the faculty's most important resource, and we must facilitate diversity in the study body and ensure that each individual succeeds in their studies. In our programmes, we have a special focus on student-active learning with several pilots of different forms of teaching. The students' voice must always be clear in councils and committees.

We will work purposefully to utilise digital forms of teaching and assessment where this contributes to improved quality in education programmes or to make the academic environment more robust. In this way, we will be better equipped to provide programmes for student classes that are assembled from multiple campuses, and to meet the growing need for continuing education (EVU) in the business community. In addition, we co-operate with a large international network, which strengthens both research and education programmes, and contributes to increased student mobility.

### Going forward to 2023 we will:

- > Further develop and utilise good models for student-active, varied forms of learning, and increase the scope of digital learning content
- > Further develop the bachelor's degree programmes to become a centre of gravity for sustainable technology and the environment in Western Norway, with a target throughput of 70%
- > Further develop the master's degree programme in line with the growing need for expertise in society and business, while ensuring that all our bachelor's degree candidates are offered a relevant master's degree programme.



- > Increase the number of exchange students, especially incoming exchange students.
- > Fill our places with well-qualified applicants

## We will research

FIN will increase internal research expertise in the period 2019-2023.

We will apply for funding for more externally funded projects, increase the number of academic publications and strengthen the research-based aspect of all our programmes. We will work purposefully to increase expertise through qualification scholarships and research grants for top positions and positions which entail doctoral competence or equivalent. This will strengthen the academic foundation of our programmes, so that we achieve a good balance between professional experience and theoretical in-depth knowledge in our academic staff.

We will work towards obtaining more externally funded research projects from the Research Council of Norway, the EU and other sources, in close co-operation with the region around us. Internal research resources should be used to a greater extent as an incentive for, or as part of, externally funded projects that will increase the R&D volume at the faculty.

High quality, relevance and throughput for doctoral candidates at the faculty is a prioritised task during the period. Knowledge from our research and development work will be published scientifically and through open publication channels. The goal is that the proportion of staff members who actively participate in research communication will increase every year, and that even more of our students participate in research projects and R&D work.

We will emphasise research leadership to stimulate more external collaboration, and we will have research groups that tie our research activities together. Our research groups will encourage new research projects, skills development and applications for external funding.



### Going forward to 2023 we will:

- > Strengthen the culture of research through research groups and research leadership
- > Increase expertise to 70 per cent academic staff formally qualified for employment at associate professor/professor level, where at least 20 per cent have top-level expertise
- > Double income from externally funded research projects and strengthen investment in R&D at the faculty
- > Increase the number of publications and the proportion of staff who publish scientifically
- > Have at least three industry PhDs and public sector PhDs at any given time
- > Have good recruitment and completion of our doctoral programmes

## We will create

FIN will continue to play a key role in social development and innovation in Western Norway in the period 2019-2023.

We will strengthen the close interaction between educational programmes and regional business and industry. This is how we will highlight the innovation work in private and public enterprises in Western Norway. We will strengthen the focus on student entrepreneurship at the faculty by further developing the interaction between education and idea development alongside the educational pathway. A key goal is for students at the various campuses to have a good and equal offer for the facilitation and follow-up of student-driven innovation projects.

Increasingly stringent demands are being placed on the quality of the educational programmes offered by higher education institutions. At the same time, established learning activities are being challenged by the possibilities of digital learning tools, and there is a demand for more student-active forms of learning. Based on this, we will develop a strategic focus on innovation projects linked to educational programmes in our own operations.

### Going forward to 2023 we will:

- > Strengthen the regional innovation systems in Western Norway through collaboration with regional business and industry and public enterprises
- > Develop more research-based innovation projects based on the academic profile areas.

## We will communicate

FIN will to a greater extent communicate knowledge and innovations that are relevant to the population.

All staff at the faculty have a responsibility to communicate up-to-date knowledge and expertise to the outside world. The faculty will endeavour to have a culture where participation in public discourse is encouraged, both by management and colleagues.

TekstboksIf the media contacts us, we will make ourselves available. When there is a debate within one of our fields of study, we will contribute – especially if the debate lacks important nuances or facts. Academic engagement is manifested through staff and the academic community contributing to setting the agenda, and this often has a positive effect on our reputation. When publishing research articles and organising conferences, we must consider whether there are elements in this that can be sold to the media. We will also use internal expertise for counselling and assessment.

### Going forward to 2023 we will:

- > Increase participation in both social media and traditional media
- > Work to increase community involvement among students and staff, which will help to make internal expertise more sought-after externally
- > Establish an internal culture that accepts and encourages participation in public life
- > Organise and participate in dissemination activities that HVL initiates or participates in

# Faculty in 2019

Today, the faculty has a broad technological and scientific academic profile. In addition, we have the Mohn Centre for Innovation and Regional Development with its strong interdisciplinary profile, and the tertiary vocational education programme for divers.



The balance between professional and work experience and theoretical depth of knowledge at the faculty is very good. Many of our staff also have broad experience from business and industry. We have a high level of scientific expertise, with approximately 65 per cent of academic staff in positions that entail doctoral competence or equivalent, of which 15 per cent have professorial qualifications. In addition, we collaborate with a large international network of academics, which strengthens both the research and the programmes.

One advantage of our programmes is that they are closely linked to the business community. In 2019, we have 26 bachelor's degree programmes, four own master's degree programmes and several other master's degree programmes in collaboration with various institutions. For several years in a row, the Student Barometer has voted software development, which is a joint degree with UiB, as one of the best master's degree programmes in Norway. The faculty also has excellent continuing education programmes.


The faculty currently has an established doctoral programme in computer technology, and a new doctoral programme in responsible innovation and regional development is being established in collaboration with two other faculties at HVL.

We make key contributions to innovation through knowledge sharing with industry and society within the faculty's profile area. Staff at the faculty publish their research at conferences and in recognised journals to an increasing extent every year, and we increasingly receive funding for externally funded research projects from the Research Council. The faculty contributes to increased flow and sharing of knowledge between R&D institutions, business and society, and to the innovation system becoming even more coordinated and harmonised. The faculty also has very well-equipped laboratories, which are a resource for education, R&D and external collaboration.

**Collaboration:** Continuous work to strengthen and utilise the complementarity between engineering and science means that we collectively perform our tasks better than we are capable of individually. Professional proximity through collaboration with the community and business clusters in Western Norway is therefore particularly important.







## About the strategic plan

This strategic plan is based on Western Norway University of Applied Sciences' values and strategy, and goes into depth on how the Faculty of Engineering and Science will contribute to realising its ambitions in this respect. Two central guidelines in HVL's strategic plan are the university's ambition and the professional and workplace-oriented profile.