



Bern University  
of Applied Sciences



# Master of Science in Precision Engineering

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UNIVERSITÄT  
BERN

Exclusive Joint Master of BFH  
and the University of Bern

# MSc in Precision Engineering: exclusive, practice-based, international

Would you like to actively shape the products of the future in the field of precision engineering? Are you interested in an international and practice-oriented master's degree with the option of pursuing a doctorate? This degree programme lets you dive into the fascinating world of precision mechanics and optics and carry out innovative research at the cutting edge of industry.

## **Main areas of study**

Precision engineering is a key technology for functioning innovations and thus the gateway to future markets. It calls for innovative materials and digital production and manufacturing concepts. The main areas of study are primarily aligned to the needs of local industry. In the master's programme, special attention is devoted to the two specialisations "Ultraprecision Engineering" and "Optical Engineering": students gain application-based, foundational knowledge that enables them to plan and design safe, sustainable and globally marketable products for a circular industry. For this, modern methods such as human-robot collaboration and artificial intelligence are combined and integrated into production planning.

## **Programme content**

In the first semester, you acquire in-depth expertise in the fundamentals of ultraprecision engineering, precision optics, physics and structural mechanics, materials and analytics, modelling and simulations, as well as control and automation. Whether you choose "Optical Engineering" or "Ultraprecision Engineering" as a specialisation, you gain the necessary knowledge to develop successful and sustainable products in the field of precision engineering as a Master of Science in Precision Engineering.

# Career prospects

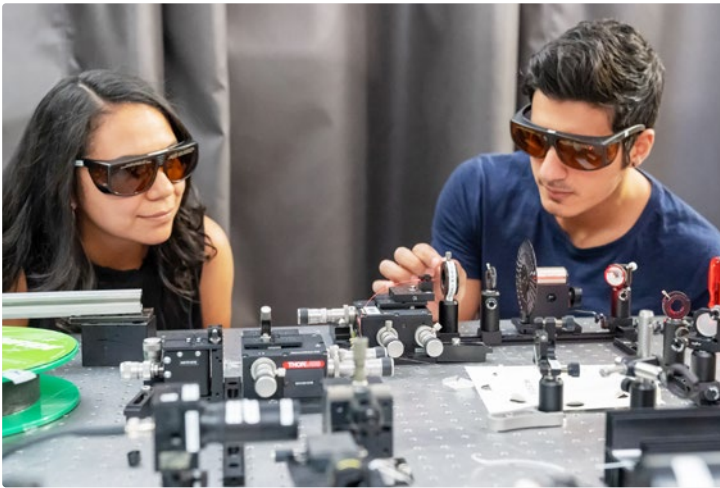
Would you rather focus on innovative research or on putting your know-how to practical use? With the Master of Science in Precision Engineering, the choice is yours!

## Professional profile and career prospects

There is a great need for skilled workers, both in research and industry, i.e. in manufacturing and production. With the Master of Science in Precision Engineering, you are ideally equipped for this and able to develop safe, sustainable and globally competitive products. This includes modern methods such as artificial intelligence or collaborative robotics, which deal with human-machine cooperation. Whether you work in the watch industry or become self-employed with the launch of a spin-off company, once you have graduated you will find the doors on the job market wide open for you.

## Occupational fields

- Medical technology
- Watch industry
- Micro and nanotechnology
- Electronics/robotics



Students working in the lab

# Specialisations and practical relevance

In the second semester, you choose one of the two specialisations and acquire the relevant specialist knowledge working hands-on in the Creative Engineering Lab.

## Specialisation in Optical Engineering

- Established principles of optical sensor and measurement technology
- Identification and use of suitable optical components for product development
- Development of unavailable components
- Simulation of optical systems using relevant software
- Planning of complex optical sensor technology in consideration of modern manufacturing processes
- Collaboration with related disciplines to realise real-time data acquisition and data evaluation

## Specialisation in Ultraprecision Engineering

- Strengthening and creating new types of value chains based on digital industry platforms
- Applying methods to boost productivity through digital transformation with the aim of realising shorter innovation cycles and lowering production costs
- Integration of zero-waste manufacturing, de- and remanufacturing, smart recycling, reuse of raw materials, repair and overhaul of products into modern manufacturing processes and environments

## Practical focus

You study at the newly created “School of Biomedical and Precision Engineering” in Bern, which plays a significant role in strengthening Bern as a business location in the field of medical and precision engineering. You benefit from a renowned network comprising representatives from the university, the university of applied sciences, industry and institutions in the field of medical and precision engineering.

At its core is the Creative Engineering Lab, a beacon of engineering training. Lecture hall and laboratory in one: this is where both the tuition and the direct implementation of the acquired knowledge take place in the form of industry-focused project work.

From the idea to the prototype, every step of the process can be implemented in the Creative Engineering Lab.

## The Master's degree programme in Precision Engineering at a glance

<b>Focus</b>	Ultraprecision engineering, precision optics, physics and structural mechanics, materials and analytics, modelling and simulations, control & automation
<b>Profile</b>	<ul style="list-style-type: none"><li>– Project planning</li><li>– Industry 4.0, circular industry</li><li>– Sustainability</li><li>– Product and process simulation</li><li>– Sensors and actuators</li><li>– Functional model via 3D printing</li><li>– Quality control</li><li>– Prototype</li></ul>
<b>Specialisations</b>	<ul style="list-style-type: none"><li>– Optical Engineering</li><li>– Ultraprecision Engineering</li></ul>
<b>Development pathways / professional profiles</b>	Technical specialist and manager in typical professional fields: <ul style="list-style-type: none"><li>– Electrical/metal/mechanical engineering</li><li>– Natural sciences</li><li>– Optical technologies</li><li>– Production, manufacturing</li><li>– Technology, fields of technology</li><li>– Medical technology</li></ul>
<b>Mode of study</b>	Full-time, 4 semesters Part-time study possible
<b>Study language</b>	English
<b>Mobility</b>	Semester abroad (optional)
<b>Study location</b>	Bern (master's thesis in Bern, Biel, Burgdorf or at partner lab)
<b>Professional qualification</b>	Yes
<b>Costs</b>	Approximately CHF 800.– / semester One-time fees: enrolment fee (CHF 100.–), exam fees (CHF 300.–)
<b>Start date</b>	Week 38
<b>Admission</b>	Bachelor's degree in a related field of study. Minimum grade 4.5 or grade D on the ECTS grading scale
<b>Registration</b>	April 30 or August 31 for late entries
<b>Title / degree</b>	Master of Science in Precision Engineering

# Admission

Admission to the master's programme is open to applicants with a Bachelor's degree from a Swiss university in the following fields of study or subject areas with a minimum grade of 4.5 or grade D on the ECTS grading scale:

- Automotive Engineering
- Chemistry
- Chemical Engineering
- Electrical Engineering
- Energy and Environmental Technology
- Mechanical Engineering
- Materials Science
- Medical Technology
- Microtechnology
- Photonics
- Physics
- System Technology





Project work  
in the laboratory

### Why you should choose this degree programme

- Switzerland's only degree programme from a university of applied sciences in conjunction with a university
- Option of pursuing a doctorate
- Innovative teaching methods guarantee a world-class study programme that attracts the best students and lecturers.
- Option of part-time study by concentrating in-person learning onto three days
- Close connections to leading medical, optical and precision institutions and industry on a national and international level
- Lecture hall and laboratory in one: in our Creative Engineering Lab, you pass through all the steps from the idea to the product

### Information event and personal advice

Visit one of our information events or get personal advice about the degree programme and your specific plans.

Arrange an appointment for a personal advisory meeting

Beat Neuenschwander, Head of Degree Programme  
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Register for an  
information event  
now

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