



Bern University
of Applied Sciences

Bern University of Applied Sciences

Civil Engineering Division
Pestalozzistrasse 20
CH-3401 Burgdorf

+41 34 426 41 74
infobau.ahb@bfh.ch

ahb.bfh.ch
msengineering.ch

[instagram.com/berner_fachhochschule](https://www.instagram.com/berner_fachhochschule)
[youtube.com/user/BernerFachhochschule](https://www.youtube.com/user/BernerFachhochschule)
twitter.com/bfh_hesb
[facebook.com/bernerfachhochschule.ahb](https://www.facebook.com/bernerfachhochschule.ahb)
[linkedin.com/school/berner-fachhochschule-bfh](https://www.linkedin.com/school/berner-fachhochschule-bfh)



Master of Science in Engineering

► Civil Engineering

Partner:

MSE | MASTER OF SCIENCE
IN ENGINEERING

“Civil engineers need to learn again to use their exploding knowledge valiantly and to risk mistakes for the sake of progress, knowing that infrastructure becomes civilisation only when paired with culture.”

Jörg Schlaich (Schlaich Bergemann und Partner)

Content

- 2 Master of Science in Engineering**
 - 2 Study Goals and Competencies
 - 2 Admission Requirements

- 3 Programme Structure**
 - 3 Core Modules
 - 3 Specialisation and Master Thesis
 - 4 Part-time Studies
 - 4 European Credit Transfer System ECTS
 - 4 Title

- 5 Specialisations**
 - 5 Research and Development

- 6 Building Restoration and Building Physics**
- 7 Timber and Composite Construction**
- 8 Transport Infrastructure**
- 10 Geotechnics and Natural Phenomena**
- 11 Supporting Structures**
- 12 Hydraulic Engineering**
- 14 Module Schedule**
- 16 Study Matters**
- 18 After Graduation**

- 20 Administrative Details**
 - 20 Programme Starting Date
 - 20 Programme Duration
 - 20 Study place
 - 20 Programme Language
 - 20 Programme Fees
 - 21 Application Procedure
 - 21 Consultation and Information Events
 - 21 Head of Programme

- 22 Comprehensive Education in Wood and Construction**

Master of Science in Engineering: Enlarge your professional potential

- 2 Today's knowledge and technology driven society requires civil engineers to master new tools and to learn new topics fast. As demanding and unconventional construction projects become more frequent, civil engineers are challenged to employ these new tools optimally to master the challenges from a changing society.

Study Goals and Competencies

As a graduate of the master programme, you possess an encompassing methodological knowledge and comprehend new situations and new problems fast. Thus, you are able to envision and develop new solutions.

During your studies, you advance your competencies and applied experiences while working on applied projects. Through your analytical, conceptual as well as and technical input you contribute considerably to innovative solutions for challenging questions. You are able to recognise relationships and solve problems on your own. Furthermore, you acquire in-depth-knowledge in project management and understand the implications on business management.

Graduates with a MSE degree are individuals with considerable knowledge and outstanding communication skills, who are able comfortable in an international environment.

Admission Requirements

- Bachelor degree in engineering FH or equivalent
- Minimum ECTS grade of “C” or an overall grade of “good”, respectively
- Decision “sur dossier”
- Aptitude test (recommendation by advisors)

Applications are to be addressed to the University of Applied Sciences that the student plans to attend for his/her specialisation.

Programme Structure

The curriculum consists of core modules (theory and context modules), the professional specialisation within the Master Research Unit (MRU), and the master thesis. The programme consists of 90 ECTS credits, whereof the core modules make up one third and the professional specialisation including the master thesis make up two thirds.

Core Modules

The core modules are split in theory and context modules, which are offered by all seven Universities of Applied Sciences in Zurich, Bern, or Lausanne. In consultation with your advisor (teacher of your area of specialisation) you choose the modules according to your needs.

The theory modules encompass technical-methodological modules and theoretical basics. They convey long-term knowledge and enhance the ability to think abstractedly. You are required to visit a minimum of two technical-methodological modules and three modules on theoretical basics.

The context modules augment your knowledge and your abilities in the areas of management, communication, and culture. You are required to visit a minimum of two context modules.

Specialisation and Master Thesis

The specialisation takes place within the Master Research Unit “Civil Engineering and Building Technologies”. You assemble the topics of your specialisation individually and choose from one or a combination of the following topics: “Building Restoration and Building Physics”, “Timber and Composite Construction”, “Transport Infrastructure”, “Geotechnics and Natural Phenomena”, “Supporting Structures” and “Hydraulic Engineering”. The specialisation consists of supplementary courses and projects as well as of the master thesis. When studying full-time, the specialisation takes up two days per week.

BFH also offers supplementary specialist events in the form of seminars (in German only). Possible seminar topics are specialist civil engineering, integral bridges, probabilistic safety concepts, risk assessment, laboratory methods and others.

Further details: bfh.ch/ahb/mse-seminare

Specialisations

- 4 In the third semester you will concentrate exclusively on your specialisation through your work on your master thesis. In this concluding work you show that you are capable of managing a complex project and that you can present your solution scientifically.

Part-time Study

The modules allow a customised education, which facilitates part-time studying in combination with a position in industry or with employment at the research unit of the BFH. With changing work loads, the curriculum can be adapted. When studying part-time, the specialisation takes up one day per week.

80 %

of the students profit from the modular system and combine their education with employment in private industry or the research unit of the BFH.

European Credit Transfer System ECTS

The BFH uses the European Credit Transfer System (ECTS) in accordance with the Bologna Treaty. According to ECTS, one credit corresponds to approximately 30 hours of work. When studying full-time, approximately 30 credits per semester are possible. Some activities may be conducted outside regular semester periods. For part-time students, the workload will be reduced accordingly. For the successful completion of the master programme, 90 credits are required.

Title

Successful completion of the program leads to the internationally recognised title “Master of Science BFH in Engineering with specialisation in Civil Engineering and Building Technology”.

You assemble the topics for your specialisation individually from one or a combination of the following six areas: “Building Restoration and Building Physics”, “Timber and Composite Construction”, “Transport Infrastructure”, “Geotechnics and Natural Phenomena”, “Supporting Structures” and “Hydraulic Engineering”. The specialisation is practical-oriented, but, at the same time, built on the newest findings in research.

Research and Development

The curriculum is oriented towards a project-oriented education by involving students in attractive research and industry projects. Through collaboration with industry, a fluent transition from studying to career can be guaranteed.

The inclusion of all students in research teams creates the unique character of this Master of Science programme. More than 100 motivated employees in research and development offer an ideal prerequisite for a future-oriented technical and science-based education.

The inclusion into research teams creates the unique character of this Master of Science programme.

The research activities of the BFH are geared towards industry and focus on solving everyday problems fast and innovatively. Researchers at the BFH also provide services to industry and society in the areas of materials, products, planning, expert opinions, and consultations.

Building Restoration and Building Physics

- 6 The sustainable use of energy is a central theme in the field of construction. Also, the expectations on the living comfort are increasing. Here, alongside the need for light and thermal comfort, the need for quietness with its related challenges in sound proofing, all play a role. The specialisation “Building Restoration and Building Physics” focuses on such aspects, which have a direct relation to the construction structure, the construction technology, and the execution of projects.

Curriculum

During your studies, you will work on project-related tasks which require consideration of the broad spectrum of building physics related aspects. You analyse construction materials, construction components, as well as damages and you develop applied solutions while building your knowledge in materials science, the development and the use of construction components, quality assurance, and the preservation of construction structures.

Building Restoration

A large part of future construction activity will be conducted on existing structures. When doing this, one has to take into account the increased expectations of the users and the increased expectations regarding the room climate and energy efficiency. As a specialist for building restoration, you will create project-specific descriptions of a construction's status. Thereby, you recognise the architecturally, constructive, and historic qualities of an object and you create innovative applied solutions.

Building Physics

The future challenges in the field of building physics require specialists who can adapt to the changing demands of society and who can develop new solutions. As a specialist, you are concerned with the physical characteristics of construction materials, construction components, and structures. Building physics traditionally is concerned with heat and mass transfer, fire and acoustic protection, and the ecology of buildings, all of which are closely connected to the construction of a given structure.

Specialists in the field of building restoration and building physics are concerned with physical characteristics of construction materials, construction components, and structures and develop innovative, applied solutions.

Timber and Composite Construction

In building construction as well as in engineering construction and bridge construction, there are currently two developments visible: On the one hand, more builders consider building with wood. On the other hand, combinations of a variety of high-performing materials are brought together in addition to the classical steel and concrete composite construction.

Curriculum

During your studies, you will learn the principles of timber and composite construction based on the theoretical basics and based on applied research projects. You will learn as to how to develop well-performing solutions and you will understand its modes of action. You will advance your understanding of material properties and how to use them appropriately.

Timber Construction

The increased requirements for energy-efficient and sustainable construction as well as the knowledge that wood is the only sustainable material for construction has increased the demand for constructions made with wood by private and governmental builders. As a specialist in timber construction, you use your skills when drafting and calculating demanding wood constructions. You are in a formidable position to show your talent in engineering companies, in particular in timber construction engineering companies.

Composite Construction

As a specialist in composite construction you offer builders high performance and filigree constructions for buildings and bridges. You draft buildings with short construction durations and flexible floor plans. Your contribution is in the calculation of the required cross sections and you specify connection systems according to the latest laws and regulations, determining to a large degree the economic benefits of building with composite constructions.

Specialists for timber and composite construction create constructions appropriate to the used material and for exceptional design tasks.

Transport Infrastructure

8 The design and the quality of our infrastructure are of considerable importance to our economy. Interdisciplinary infrastructure projects are concerned with a wide range of specialisations, such as geology, geo-technology, hydraulic engineering and road engineering. The subject specialisation “Transport Infrastructure” focuses in particular on road infrastructure. Additionally, selected issues in the field of railway and airport construction will be addressed. In this context, particular attention will be directed to the increasing strategic importance of the optimal design of new and existing road and traffic infrastructures.

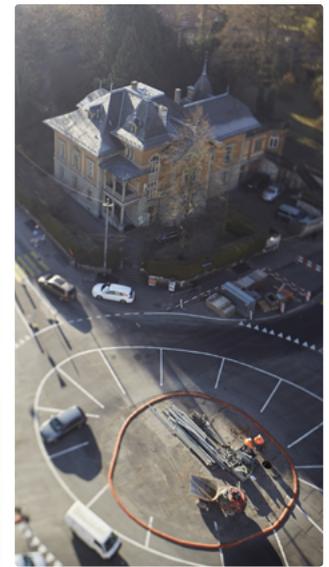
Curriculum

To master this demanding task, the knowledge gained from the basic bachelor degree in road construction/traffic will be strengthened and expanded. The knowledge acquired is applied to the in-depth analysis and exploration of case studies from practice so that the potential for optimisation – whether for example in designing or determining the size of traffic and structural facilities – can be made clearly tangible and useable. This curriculum offers close connections to research, industry and authorities nationally and internationally, and is academically challenging as well as practice-oriented.

Road & Traffic Infrastructure

As a specialist in the field of traffic infrastructure, you are prepared for a career in road and traffic engineering. With your knowledge, you will become involved in the planning, drafting, construction, use, maintenance, and preservation of traffic facilities. Thanks to your competence as an engineer, you are capable of working in interdisciplinary teams to plan and achieve a safe, efficient and sustainable road and traffic infrastructure.

Specialists in the field of transport infrastructure use their knowledge to enhance road and traffic infrastructure in terms of efficiency, performance, safety and quality.



Top left: Novel braid cover, KTI research project (Geotechnics and Natural Phenomena)
Top right: Modification “Eigerplatz”, Berne (Transport Infrastructure)
Bottom: Service contract to check supporting structure, Centre Pompidou, Metz. (Timber and Composite Construction)

Geotechnics and Natural Phenomena

Supporting Structures

10 Large projects, such as the alpine rail transversal, new traffic patterns in cities and agglomerations, large shopping centers or high-rise buildings, or structures for protection against avalanches or stones, cannot be realised without fundamental insights from geotechnicians. The properties of the construction site, the water, the ground water as well as their construction related interpretation offer large amounts of uncertainties in respect to planning. Geotechnicians thus occupy important key positions when planning and constructing edifices.

Curriculum

While studying, you will learn to analyse geotechnical tasks using actual research projects through the collection, evaluation, and assessment of basic facts. You will learn the instrument of drafting geotechnics using natural science principles, you will be able to compare them, and you will be able to employ them using examples. To realise projects later, you will learn different assessment tools.

Geotechnics

As a geotechnician you work at the interface of the earth sciences and construction technologies. Here, the construction material is made available from nature and is the construction site. Few opportunities exist to influence its composition so that your tools are, depending on the situation, limited and require appropriate measures.

Natural Phenomena

As a specialist for natural phenomena you focus on structures for the protection from natural events, such as slope instabilities, avalanches, or rock falls. The objective of your work is to recognise and to defuse danger. You achieve that not only through the development of protective structures which take up the acting forces, but also through concepts and models to reduce the effects and consequences. This approach simplifies the necessary constructive measures and increases its effectiveness.

Geotechnicians develop structures for use and for protection, thereby minimising possible problems.

Structural engineering is a creative discipline. Design ideas are realised with static and technically rigorous constructions. Modern buildings are built to ever increasing heights and wider spans, forms become freer. New requirements in the fields of energy, house technology and building management need to be addressed and incorporated already during the structure planning phase. The impressive buildings being created also increase the demands on the engineers who plan and execute them. And, in addition to the core competencies of the structural engineers, their understanding of interdisciplinary teamwork with the planning partners is of growing importance.

Study contents

During your studies, you will acquire thorough knowledge in the field of structures, regardless of the building materials involved. Based on project-related tasks, you will be dealing with structures of buildings, infrastructure facilities and other structural installations. The focus will be on cutting-edge methods for modelling, simulation and data management as well as on interdisciplinary questions and non-material-specific topics. The project tasks will give you the opportunity to familiarise yourself with innovative building materials such as ultra-high performance fibre concrete and textile-reinforced concrete.

Structural engineer

As an expert or specialist in structures you will be able to evaluate and plan structures, to chose suitable materials and accurately implement them in constructions – holistically, from the design all the way to supervising the construction. The aim is to find the best technical, economic and aesthetic solution. In order to achieve this, there needs to be close coordination with senior figures in related areas who can influence the structural design to a considerable degree. Emphasis will be placed on the optimisation of the structures in terms of structural safety, serviceability, durability, economic viability and ecology.

Structural engineers evaluate and plan structures for buildings and other constructions.

Hydraulic Engineering

12 Hydraulic Engineering is a challenging and multi-faceted specialist field. Climate change is increasing the need for sustainable solutions in this field and makes it more difficult to predict events and their impact. This is the case for river engineering, which is confronted with various, sometimes conflicting demands. Heavily built-up urban areas and rural agricultural areas have differing interests in how land should be used. Moreover, it is a legal requirement that rivers be revitalised to ensure high-quality habitats and more space and migrating opportunities for aquatic communities. Bedload should, on the one hand, be kept for retention basins and, on the other hand, be transported further for the purpose of revitalisation. In addition, there are the efforts to extract more energy from hydropower. Another area of conflict in hydraulic engineering is lakes. They are gaining more public attention as drinking water reservoirs and heat exchangers with their harbours and shoreline protection.

Curriculum

During the degree programme, you will produce concepts for flood control and power plants, including hazard and risk analyses. You will deepen your knowledge of dimensioning protective structures, use various simulation programs and work with hydraulic models.

Hydraulic Engineering

As a hydraulic engineer, you will be in demand as a risk-conscious specialist who is able to both deploy specific knowledge in planning and construction projects acceptable to a majority and contribute to a sustainable solution.

Hydraulic Engineers develop solutions to protect society from flooding and, at the same time, use the valuable raw material that is water efficiently and sustainably.



Top: Construction of a flood retention basin, Rohrbach (Hydraulic Engineering)

Bottom: Sound insulation measurements on windows, Biel/Bienne (Building Physics)

Module Schedule

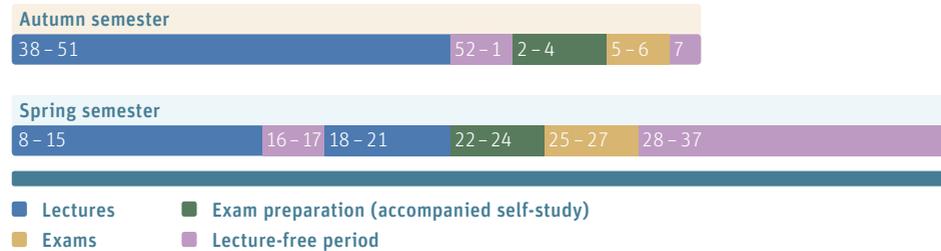
14 Full-time study plan

Semester	Credits																													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	TSM / FTP / CM 3 Credits			TSM / FTP / CM 3 Credits			TSM / FTP / CM 3 Credits			TSM / FTP / CM 3 Credits			TSM / FTP / CM 3 Credits			TSM / FTP / CM 3 Credits			Project module 9 Credits									Specialisation 3 Credits		
2	TSM / FTP / CM 3 Credits			TSM / FTP / CM 3 Credits			TSM / FTP / CM 3 Credits			TSM / FTP / CM 3 Credits			Project module 9 Credits			Specialisation 3 Credits									Specialisation 3 Credits			Specialisation 3 Credits		
3	Master Thesis 30 Credits																													

Part-time study plan

Semester	Credits														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	TSM / FTP / CM 3 Credits			TSM / FTP / CM 3 Credits			TSM / FTP / CM 3 Credits			TSM / FTP / CM 3 Credits			TSM / FTP / CM 3 Credits		
2	TSM / FTP / CM 3 Credits			Project module 9 Credits									Specialisation 3 Credits		
3	TSM / FTP / CM 3 Credits			TSM / FTP / CM 3 Credits			TSM / FTP / CM 3 Credits			TSM / FTP / CM 3 Credits			Specialisation 3 Credits		
4	Project module 9 Credits									Specialisation 3 Credits			Specialisation 3 Credits		
5	Master Thesis 15 Credits														
6	Master Thesis 15 Credits														

16 Annual schedule in calendar weeks



Certificate of Global Competence

With BFH's supplementary "Certificate of Global Competence", you as a student have the opportunity to acquire specific intercultural and trans-cultural skills during the course of your studies and to earn a qualification for them. You can find more information at bfh.ch/international.

Infrastructure

- The university has an open-access library with reading rooms. The library documents are linked to NEBIS, the network of libraries and information centers in Switzerland.
- Students are allowed to use the facilities of the technology park, laboratories, and workshops. They may use the facilities during or outside the study times.
- Students have access to an intranet, as well as direct access to WLAN. Each student is allocated a personal e-mail address.
- Parking spaces are available for a fee. Windscreen stickers are available from the campus secretariat. Why not try public transportation instead?
- In Biel we operate the biggest research centre for the Swiss wood industry; in Burgdorf we run a laboratory for geotechnics together with the Institute for Geology at the University of Bern. Most Export reports are certified according to ISO / IEC 17025 by the Swiss Accreditation Service (SAS). The tests are internationally recognised.

Accommodation and Catering

The university refectories offer inexpensive meals (breakfast, lunch, dinner and snacks) from Monday to Friday. We help our students find inexpensive accommodation near the campus. For more information, go to our website at bfh.ch/en/studies/study-at-bfh.

Leisure: Sport and Culture

The BFH offers a broad range of leisure activities, with training in numerous types of sport and various culture-related courses. The choices are varied and attractive, ranging from badminton or power yoga to drawing or singing in a choir. "The Games", our traditional sports day, takes place every year in early summer at the Federal Institute for Sports in Magglingen. You can find more information at the website University sport.

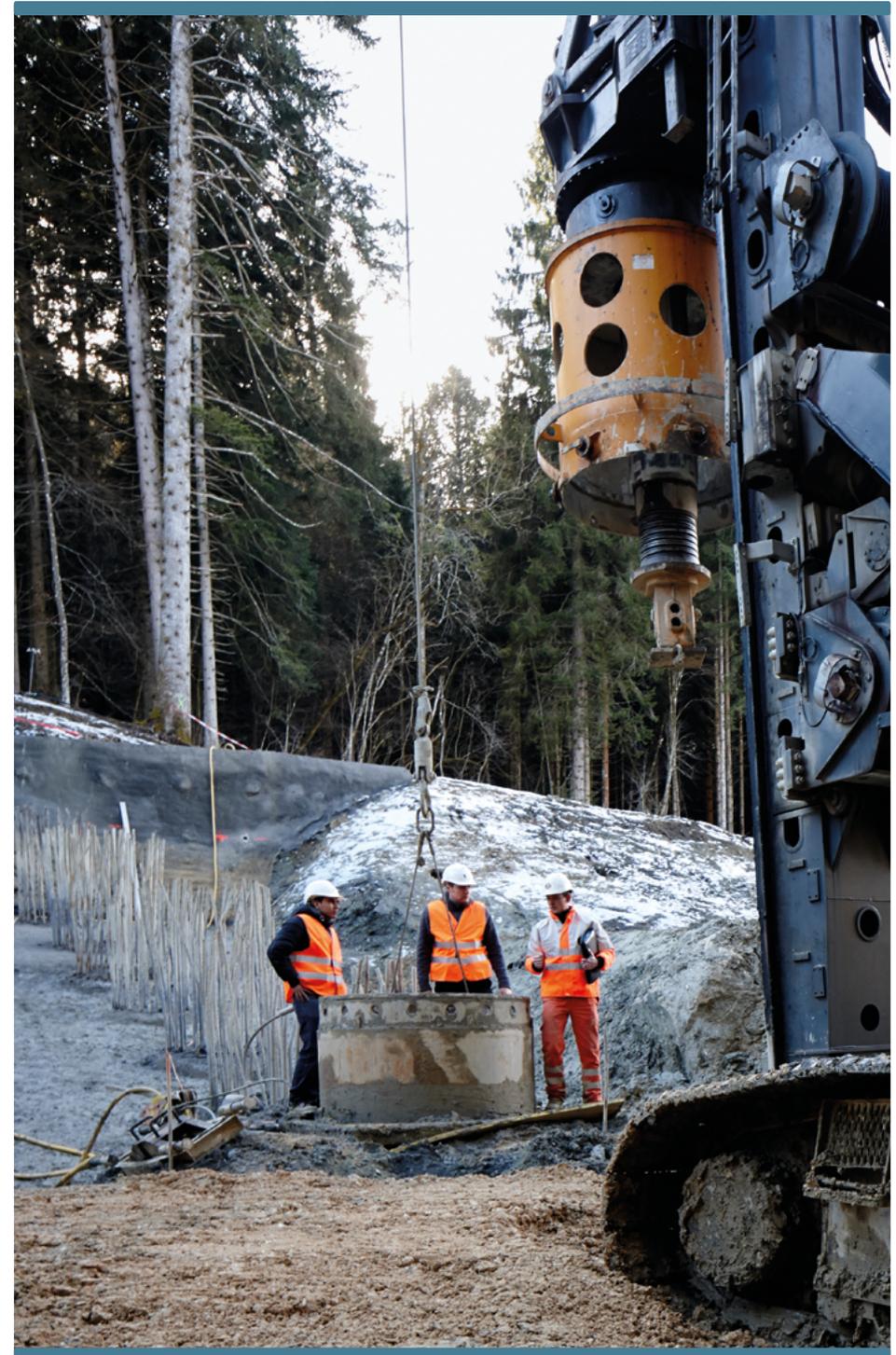
After Graduation

18 Doctoral Degree

Holding a master of science degree with excellent results, you may, in collaboration with a university, write a doctoral thesis at the BFH. The candidates are admitted by the university. They can thus take advantage of our practice-oriented infrastructure and laboratories, while obtaining specific, in-depth knowledge. We can help you find the appropriate university and research topics.

Continuing Education

The range of continuing education offered by the BFH in the disciplines of architecture, wood and civil engineering supports life-long learning and helps to keep you professionally up-to-date. The university lets you acquire the latest innovative and professionally relevant subject matter through dialogue with professionals from teaching and research, as well as with experts with practical experience. We offer further education courses (MAS and CAS), specialist conferences and courses. What we offer is oriented on the needs of your professional career, your individual situation, and your company's needs. Additional information can be found at continuing education on ahb.bfh.ch/wb, where the full range of what we offer is presented.



Administrative Details

20 Programme Starting Date

Autumn: calendar week 38

Spring: calendar week 8

Programme Duration

Full-time: 3 semesters

Part-time: 4 to 6 semesters

Study place

For the central modules: Zurich, Bern, or Lausanne; for the specialisation: Biel (Building Restoration and Building Physics; Timber and Composite Construction) or Burgdorf (Transport Infrastructure; Geotechnics and Natural Phenomena; Supporting Structures, Hydraulic Engineering).

Programme Language

German, some modules are available in English and French. Upon agreement by one's advisor, projects and master theses can be written in English or French.

Programme Fees

- Tuition (CHF 950.- for international students)*	CHF 750.-
- Enrolment fee	CHF 100.-**
- Materials fee	CHF 50.-
- Examination fee	CHF 80.-
- Fee for social, cultural, and sports activities	CHF 24.-
- Voluntary BUAS student association membership	CHF 15.-

*all persons of foreign citizenship who at the time of obtaining their university entrance qualification were domiciled under civil law neither in Switzerland nor the Principality of Liechtenstein. This rule applies as of the 2018/19 autumn semester.

**in case the application for enrolment is granted, the application fee is taken into account as part of the enrolment fee. If the application is refused, there will be no refund of the application fee.

Application Procedure

Applications are to be submitted online at bfh.ch/application. All documents that are not written in German, French, or English, require an official translation. After receipt of all documents and the registration fee, an interdisciplinary admission commission decides on the application. The applicant can review the status of their application online at all times.

Consultation and Information Events

A printed program guide does not always answer all questions. For this reason, several information events at which the programs are presented are conducted every year. Additionally, advisory meetings to assess one's prerequisites are possible. The information events and the advisory meetings are free of charge and non-binding. Additional information can be found on our website: bfh.ahb/en.

Head of Programme

Dr.-Ing. habil. Dirk Proske, Professor of Risk Management
dirk.proske@bfh.ch

Comprehensive Education in Wood and Construction

22 The Bern University of Applied Sciences Architecture, Wood and Civil Engineering offers the following degree courses

Bachelor

- of Arts in Architecture
- of Science in Civil Engineering
- of Science in Wood Engineering

Master

- of Arts in Architecture (coop. with the University of Applied Sciences of Western Switzerland)
- of Science in Wood Technology (coop. with the University of Applied Sciences of Rosenheim, Germany)
- of Science in Engineering (coop. with Switzerland's Universities of Applied Sciences)

Master of Advanced Studies

- MAS Timber Construction
- MAS Preservation of Historical Buildings, Restoration and Conversion
- MAS in Sustainable Construction
- MAS Real Estate Management
- MAS Infrastructure and Transportation

Certificates of Advanced Studies (CAS)

The affiliated Higher Technical School of Wood Biel offers the following courses

- Technical Specialist Diploma HS Wood Technics with diploma in Timber Construction, Woodworking Industry, or Lumber Industry
- Postgraduate course HS in management
- Timber construction foreman with diploma
- Timber construction foreman with federal professional certificate
- Wood specialist with federal professional certificate
- Master Craftsman in timber construction, specialist with federal diploma

The Department Architecture, Wood and Civil Engineering is part of Bern University of Applied Sciences BFH and is one of the leading universities in the wood and construction sector. As a nationally and internationally accredited school, we equip future architects, civil-, timber or wood technology engineers for a successful career.

The range of services offered by Research and Development covers

- Application-oriented research and development in all areas of study
- Contract services
- Accredited testing: Most expert reports are certified according to ISO/IEC 17025 by the Swiss Accreditation Service (SAS). The tests are internationally recognised.
- Knowledge and technology transfer

Legal note:

The present document is a general information document. In case of doubt, legal regulations and the study regulations are authoritative. Errors and omissions excepted.

Pictures:

Cover, Pages 9, 13, 19: Alexander Jaquemet; Page 9 Centre Pompidou-Metz, 2010, © Shigeru Ban Architects Europe et Jean de Gastiners Architects, avec Philip Gumuchdjan pour la conception du projet lauréat due concours / Metz Métropole / Centre Pompidou-Metz / Photo Philippe Giesselbrecht; Page 13: Franziska Frutiger

Edition January 2020