ETH zürich

Degree programmes

An overview of all subject areas

Hello
and welcome
to ETH Zurich

We are pleased that you are interested in a study programme at ETH Zurich. If you have a flair for figures and a liking for technology, and if you are interested in the natural sciences and the big challenges of the 21st century, then you are heading for the right place. ETH studies are based on well-founded expert knowledge. That, in turn, will provide you with a basis on which you will be able to stay abreast of constant technological and scientific change. In addition, your studies at ETH Zurich will provide you with the skill to reflect on your knowledge in various contexts. It is not least because of this that our graduates are among the most sought-after specialists and executives in industry and research.

Günther Dissertori, Rector

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ETH Zurich – where the future begins

Freedom and personal responsibility, entrepreneurship and cosmopolitanism: Switzerland's values are the cornerstones of ETH Zurich. Here, students find an environment which encourages autonomous thinking, and researchers find a climate that inspires top achievements. In the heart of Europe, and integrated in a worldwide network, ETH Zurich develops solutions to the global challenges of today and tomorrow.

More than

100

patent applications

and more than
150 inventions reported
per year

24 530

students

of whom
4460 are doctoral students, from
more than 120 countries

527

professors
(full-time equivalents, FTEs)

33.3 %

women students

98%

of Master's graduates have a job after a year

301

spin-off firms since 2010

1855

was the year in which the founders of modern Switzerland created this place of innovation and knowledge

22

Nobel Laureates (among them Albert Einstein and Wolfgang Pauli)

6612

scientists

and 3106 technical and administrative staff

ETH budget:

1.9bn

of which CHF 1.3bn basic funding by the Confederation

ETH Hönggerberg

2

Campus

ETH Zentrum

Features of ETH Zurich studies

What is special about studying at ETH in comparison with other universities? How much time do you invest in your studies? When do the examinations take place? How is the study programme structured?

1

subject

Students at ETH Zurich only study one single subject and cannot choose subsidiary subjects (Monodisciplinary studies).

Full-time studies

approx.

30

hours' presence

per week plus approx. 10–15 hours' self-study. The study programme is compact with a clearly structured schedule.

The main teaching language

in all Bachelor's degree programmes is **German**. However, a command of English is indispensable. Depending on the degree programme, lectures will also be held in English from the second or third year of your studies. Most Master's degree programmes are exclusively taught in English.

First-year examinations

The first-year examinations cover the subject matter of the first year of studies (Basisjahr). The subjects are examined individually and subsumed in one or more examination blocks. Students must pass each examination block separately.

Prestudy event

The best starting point for successful Bachelor's studies is attending a prestudy event. This provides information about the future degree programme, the most important contact points and an opportunity to network with other students (see also p. 55).

Examinations

The time between semesters is called lecture-free period at ETH Zurich. Many examinations usually take place towards the end of the lecture-free period. This means that students revise for their examinations between semesters. As a rule, there are about 1–2 weeks' holiday after the examinations and before the beginning of the semester.

Exchange semesters

During Bachelor's studies, a semester in a foreign country is usually possible in the third year of studies. Depending on the degree programme, students can choose from among various universities. A stay abroad is also possible at the level of Master's studies: during a semester, in the course of a research project or while working on the Master's thesis.

1

credit point (credit, ECTS)

corresponds to course work amounting to 25–30 working hours. The credit system of ETH Zurich is aligned with the European Credit Transfer System (ECTS). Credit points are crediting units earned through proof of performance in university education. ETH Zurich only awards credits for course units that students have successfully completed.

Electives

In most degree programmes, there are various electives as from the second half of Bachelor's studies and at the level of Master's studies, in particular. The electives generally serve students to further pursue individual interests and are preferably used to set priorities in a certain direction.

At least

6

credit points

must be earned by students in the Science in Perspective (SiP) course to obtain a Bachelor's degree. The goal of this programme is to enable students to place their specialist knowledge and action into social and economic contexts (see also p. 48).

Structure of the Bachelor's degree programmes

Bachelor's studies extend to 180 credit points and take three years as a rule. The maximum time allowed is five years. The first year of studies, called "Basisjahr", conveys the fundamentals of mathematics, the natural sciences relevant to the degree programme (such as physics, chemistry or biology) and the fundamentals of the degree programme itself (i.e. programme-specific subjects). The Bachelor's degree is not regarded as a qualification that enables its holder to embark on professional life. The further academic professional qualification is only reached with the award of a Master's degree.

More information about the structure of the Bachelor's degree programmes
ethz.ch/bsc-prgramme-structure

Degree programmes

Below, all the Bachelor's and Master's degree programmes are listed according to disciplines. At the Master's level, there are consecutive and specialised degree programmes.

Consecutive Master's degree programmes
The consecutive Master's degree programmes constitute the subject-related continuation of the Bachelor's degree programmes. ETH provides at least one consecutive Master's programme for every Bachelor's degree programme. The transition to a consecutive Master's programme in the discipline concerned is not subject to any additional requirements.

Specialised Master's degree programmes
The specialised Master's programmes concentrate on a special topic which is taught in an interdisciplinary way and with an international focus. Admission is subject to the satisfaction of special criteria and a selection process. The number of places is often limited.

Architecture and Civil Engineering

		Bachelor's programmes	Consecutive Master's programmes	Specialised Master's programmes
Architecture	p. 17	●	●	
Civil Engineering	p. 18	●	●	
Geospatial Engineering	p. 19	●		
↳ Geomatic Engineering			○	
↳ Spatial Development and Infrastructure Systems			○	
Environmental Engineering	p. 20	●	○	
Integrated Building Systems				○
Landscape Architecture				● ○

Teaching language: ● German ○ English ● ○ German and English

Engineering Sciences

		Bachelor's programmes	Consecutive Master's programmes	Specialised Master's programmes
Electrical Engineering and Information Technology	p. 23	●	○	
Computer Science	p. 24	●	○	
↳ Cyber Security			○	
Mechanical Engineering	p. 25	●	○	
↳ Process Engineering			○	
Materials Science	p. 26	●	○	
Biomedical Engineering				○
Biotechnology				○
Computational Biology and Bioinformatics				○
Data Science				○
Energy Science and Technology				○
Micro- and Nanosystems				○
Neural Systems and Computation				○
Nuclear Engineering				○
Quantum Engineering				○
Robotics, Systems and Control				○

Natural Sciences and Mathematics

		Bachelor's programmes	Consecutive Master's programmes	Specialised Master's programmes
Biology	p. 29	●	○	
Biochemistry – Chemical Biology	p. 30	●	○	
Chemistry	p. 31	●	○	
Chemical Engineering	p. 32	●		
↳ Chemical and Bioengineering			○	
Interdisciplinary Sciences	p. 33	●	○	
Mathematics	p. 34	●	○	
↳ Applied Mathematics			○	
Pharmaceutical Sciences	p. 35	●	○	
↳ Pharmacy			● ○	
Physics	p. 36	●	○	
Computational Science and Engineering	p. 37	●	○	
High Energy Physics				○
Quantitative Finance				○
Quantum Engineering				○
Statistics				○

Teaching language: ● German ○ English ● ○ German and English

System-oriented Natural Sciences

		Bachelor's programmes	Consecutive Master's programmes	Specialised Master's programmes
Agricultural Sciences	p. 41	●	○	
Earth and Climate Sciences	p. 42	●		
↳ Earth Sciences			○	
Health Sciences and Technology	p. 43	●	○	
Human Medicine	p. 44	●		
Food Science	p. 45	●	○	
Environmental Sciences	p. 46	●	○	
Applied Geophysics				○
Atmospheric and Climate Science				○
Interdisciplinary Brain Sciences				○

Management and Social Sciences

		Bachelor's programmes	Master	Specialised Master's programmes
Management, Technology, and Economics	p. 49		○	○
Public Policy (Professional Officer)	p. 50	●		
Comparative and International Studies				○
Mathematics Education				●
Science Education				●
History and Philosophy of Knowledge				●
Science, Technology and Policy				○

More information about the Master's programmes
ethz.ch/msc-degree-programmes

Teaching language: ● German ○ English ● ○ German and English

Architecture and Civil Engineering

Our society makes great demands on the quality of our living and working spaces and on the transport systems. On the other hand, vital resources such as land, water and air are increasingly being jeopardised. Experts in architecture and civil engineering look for smart solutions in this area of conflicting priorities.

Distribution of the basic subjects in the first two years of Bachelor's studies

	Mathematics	Physics	Computer Science	Chemistry	Biology	HuLaSoEc[1]	Programme-specific subjects
Architecture	●	●	●			●	●●●
Civil Engineering	●●	●	●	●		●	●●
Geospatial Engineering	●●	●	●●			●	●●
Environmental Engineering	●●	●	●	●	●		●●●

1 HuLaSoEc = subjects from Humanities, Law, Social and Economic Sciences

● 1–10% ●● 11–50% ●●● >50%

Architecture

Architecture is not merely construction: it involves the search for creative solutions in the field of tension between construction, satisfaction of living and working requirements, aesthetic objectives and the preservation of an environment worth living in.

Bachelor's studies (180 credits)
Bachelor's studies provide a shared basis in the training of perceptive and creative skills and in the methodology of architectural design. They convey the fundamentals of the disciplines of science and technology, the humanities and social sciences.

Subject matter
- Fundamentals of creation, design and construction
- Support structure, building technology, ecology, inter alia
- Mathematical thinking, sociology, history of art and architecture, inter alia
- Six-month internship in the field of architecture

Master's studies (120 credits)
Master's studies build on the preceding Bachelor's studies and promote an increasingly autonomous, individual modus operandi and work on major architectural tasks.

Subject matter
- Transdisciplinary design projects
- Core subjects in the fields of history and theory, technology, building research, the preservation of historical monuments, and landscape/urban development
- Specialisation work
- Master's thesis
- Six-month internship in the field of architecture

Careers
Self-employed or executive employee in architectural practices, with planning authorities, banks and insurance companies or in the field of design/art/culture

An Fonteyne,
Professor of Architecture and Design

"Willing to question our current way of living and develop alternatives for inhabiting the planet? Critical, empathetic, adventurous? We look forward to meeting you."

More information
ethz.ch/architecture

Civil Engineering

Residential, office and industrial buildings, bridges, tunnels, road and rail networks play an important role in our daily lives. This infrastructure has to be planned, realised and maintained. This is where civil engineers come in.

Bachelor's studies (180 credits)
In their Bachelor's studies, students acquire the skills to work on civil engineering issues, on the relevant fundamentals of mathematics and natural science, and digital technologies.

Subject matter
- General: mathematics, mechanics, physics, chemistry, geology
- Subject-specific: building processes, geotechnics, structural engineering, transport systems, hydraulic engineering and water management, materials
- Digital: machine learning, digital engineering, scientific computing

Master's studies (120 credits)
In the Master's studies, the knowledge of two of the six subjects on offer is specialised. A great number of electives are available for this purpose.

Specialisation options
- Construction and infrastructure management
- Geotechnical engineering
- Construction
- Transport systems
- Hydraulic engineering and water management
- Materials and mechanics

Careers
Project engineers or project leaders in engineering firms and construction companies, with authorities, energy suppliers and operators of transport systems, as well as in teaching and research

Henri Grossmann,
is studying Civil Engineering and is involved in the AIV
(Academic Engineers' Association)

"Thanks to my involvement in the specialist association, I constantly get to know new people from all sorts of disciplines, which makes my everyday life at ETH extremely varied."

More information
ethz.ch/civil-engineering

Geospatial Engineering

With digital models of our living space, sustainable spatial planning and smart transport concepts, graduates make an essential contribution to the solution of the big social and global challenges.

Bachelor's studies (180 credits)
In their Bachelor's studies, students acquire basic engineering knowledge and practical skills. The focus is on trying out, structuring, understanding and asking critical questions. There is a great deal of leeway to individualise studies by means of elective modules.

Subject matter
- General: mathematics, physics, computer science, machine learning, inter alia
- Subject-specific: cartography, GIS, geodesy, transport, spatial planning, inter alia
- Extended: ecology, economics, law, project management, inter alia

Master's studies (120 credits)
The Bachelor's degree provides access to the Master's programmes in "Geomatics" or "Spatial Development and Infrastructure Systems".

Specialisation options
Master's programme in Geomatics
- Engineering geodesy and photogrammetry
- Space geodesy and navigation
- GIS and cartography
- Planning

Master's programme in Spatial Development and Infrastructure Systems
- Spatial Planning and Landscape Development
- Transport Systems and Behaviour
- Network Infrastructures

Careers
Geomatics and engineering firms; authorities; transport, telecommunications and energy supply companies; IT industry and much more

Mike Halbheer,
is studying Geospatial Engineering

"I'm studying Geospatial Engineering because this covers a wide range of fascinating topics and because the culture in the programme is very much like that of a family."

More information
ethz.ch/geospatial-engineering

Environmental Engineering

Environmental Engineering mediates between the unavoidable use of important resources such as water, land and air, etc., on the one hand, and the preservation of valuable natural systems, on the other hand.

Bachelor's studies (180 credits)
During their Bachelor's studies, students acquire the foundations of engineering, natural and social sciences, which are required for them to understand environmental systems and their sustainable management. The degree programme leads to integrative, interlinked and system-oriented thinking.

Subject matter
- General: analysis, computer science, chemistry, physics, inter alia
- Subject-specific: earth observation, hydraulics, hydrology, air pollution control, ecological systems analysis, urban water management, water balance, inter alia
- Practical work in the laboratory and the field
- Extended: social science and digital subjects

Master's studies (120 credits)
In the Master's programme, the knowledge acquired in one of the five disciplines is extended and complemented by a one-year laboratory practical.

Specialisation options
- Urban water management
- Environmental technologies
- Resource management
- Water management
- River engineering and hydraulics

Careers
Project staff in engineering firms or public administration. Environment officers in the private sector or in public enterprises, development cooperation, research

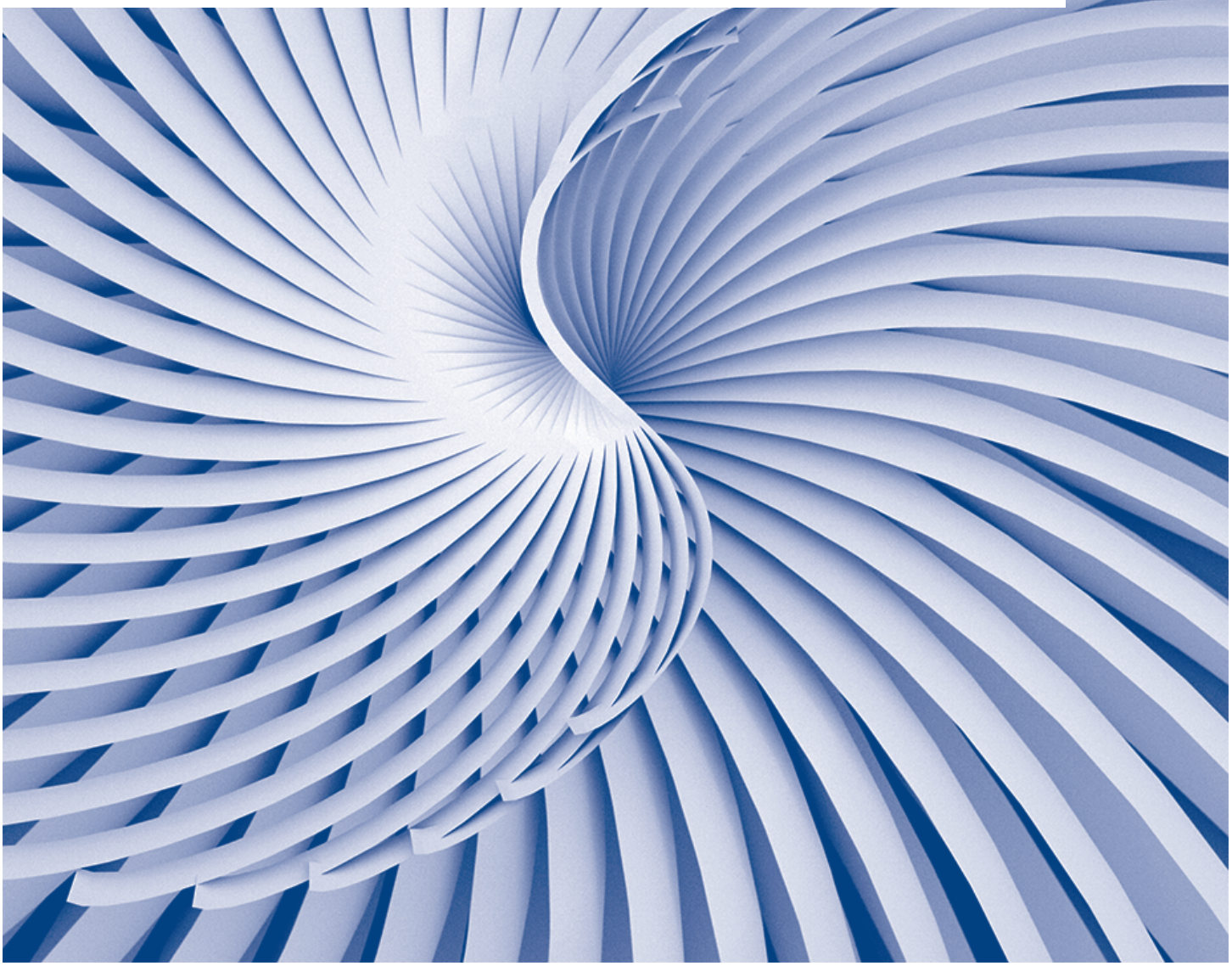
Flavia Hänsli,
is studying Environmental Engineering

"After university? Good question! Fortunately, there are many options: I'm interested in river engineering and hydraulics in an engineering firm or in work in an aid organisation."

More information
ethz.ch/environmental-engineering

Engineering Sciences

Whether in transport, communication, industry or medicine – our high-tech society requires efficient products and production processes, without which our present-day standard of living would be inconceivable. Engineers are responsible for their development.



Distribution of the basic subjects in the first two years of Bachelor's studies

	Mathematics	Physics	Computer Science	Chemistry	Biology	HuLaSoEc[1]	Programme-specific subjects
Electrical Engineering and Information Technology	●●	●●	●●			●	●●
Computer Science	●●		Part of the programme-specific subjects			●	●●●
Mechanical Engineering	●●	●	●	●		●	●●●
Materials Science	●●	●●	●	●●		●	●●

1 HuLaSoEc = subjects from Humanities, Law, Social and Economic Sciences

● 1–10% ●● 11–50% ●●● >50%

Electrical Engineering and Information Technology

Each “smart” device contains the work of electrical engineers who deal with electrical and electronic systems ranging from tiny semiconductor components to giant power stations.

Bachelor’s studies (180 credits)
The first two years of Bachelor’s studies provide students with a sound basis of fundamentals and practical competencies. In the third year, students choose a specialisation, which they complement with electives. They complete the programme with a Bachelor’s thesis.

Subject matter
- General: mathematics, physics, computer science
- Subject-specific: digital technology, semiconductor technology, networks and circuits, electromagnetic fields and waves, semiconductor components, signals and systems theory

Master’s studies (120 credits)
Students compile their subjects from among the specialisation options. At least one semester paper, an (optional) internship in industry and a six-month Master’s thesis complete the engineering course.

Specialisation options
- Computers and networks
- Electronics and photonics
- Energy and power electronics
- Communication
- Systems and control
- Signal processing and machine learning

Careers
Very varied! Project engineer, project leader or start-up founder in the electrical industry or in medical technology, in the energy sector, with software providers, in research and teaching

Yvan Bosshard,
is studying Electrical Engineering and Information Technology

“My tip for starting your studies: lectures are the best place to learn something. Learning and understanding, though, also means doing things yourself, for example in a project or in the exercise series.”

More information
ethz.ch/electrical-engineering-and-information-technology

Computer Science

Computer science is at once a basic science and an engineering discipline. Algorithms for artificial intelligence are as much of an issue as questions about information security for protection against unauthorised access.

Bachelor's studies (180 credits)
Bachelor's studies convey the fundamental concepts of computer science, as well as basics from mathematics and natural science. From the third year of the course onwards, students can specialise in specific areas of computer science.

Subject matter
- General: linear algebra, discrete mathematics, analysis, probability and statistics, numerical methods, inter alia
- Subject-specific: programming (sequential, parallel, systems), algorithms and data structures, theoretical computer science, databases and data modelling, computer networks, formal methods

Master's studies (120 credits)
In their Master's studies, students deepen their knowledge in a selected discipline. Besides the Master's programme in "Computer Science", they can also opt for the Master's programme in "Cyber Security".

Specialisation options
- Data management systems
- Machine intelligence
- Secure and reliable systems
- Visual and interactive computing
- Theoretical computer science

Careers
Software engineers, security experts and data scientists, IT architects, consultants, entrepreneurs, activities in the field of research and teaching

Livia Capol,
is studying Computer Science

"I'm studying Computer Science because it combines the analysis of problems with the creative development of solutions. These can be used in a wide variety of applications."

More information
ethz.ch/computer-science

Mechanical Engineering

If you associate machine-building with engines and turbines, you are only partially right. Today, mechanical engineers also develop medical microrobots, CO_2-neutral fuel or product designs.

Bachelor's studies (180 credits)
In Bachelor's studies, students acquire foundations and methods in mathematics, natural science and engineering. In the third year, they can opt for a focus project or a focus specialisation, for instance in the field of Mechatronics and Robotics; or Energy, Flows and Processes; or Design, Mechanics and Materials.

Subject matter
- Compulsory subjects: analysis, physics, mechanics, thermodynamics, control systems, computer science, technical drawing and CAD, innovation project, laboratory internships, inter alia
- Focus project or focus specialisation

Master's studies (90 credits)
An individual timetable guarantees a specialised education in "Mechanical Engineering" or "Process Engineering".

Subject matter
- Core subjects
- Multidisciplinary subjects
- Student project
- Industrial internship
- Master's thesis

Careers
Product developers, project leaders, scientific staff members, programmers, managers, quality engineers or start-up founders

Michèle Strzelecki,
is studying Mechanical Engineering and is involved in LIMES
(Ladies in Mechanical and Electrical Studies)

"It's important to me to encourage other women to study engineering and if necessary to dispel their fear of the male domain."

More information
ethz.ch/mechanical-engineering

Materials Science

Materials science combines natural and engineering sciences: thanks to an interdisciplinary way of thinking, answers can be found to socially relevant questions about the development of new technologies or improved industrial processes.

Bachelor's studies (180 credits)
Bachelor's studies provide students with a comprehensive understanding of relations between the structure, properties, characterisation, processing and application of materials. The theoretical basics are applied in projects and laboratory practicals from the first year of the course onwards.

Subject matter
- Fundamentals of mathematics and natural science
- Material-specific specialist lectures such as Material Synthesis, Thermodynamics, Material Selection, inter alia
- Projects and laboratory practicals from the first semester onwards

Master's studies (120 credits)
At the Master's level, students are able to extend their knowledge of materials science according to their personal interests.

Subject matter
- Wide range of core and elective subjects
- 2–3 research projects
- Industrial internship (from 2023)

Careers
Project engineers, project leaders or start-up founders in product or process development, in quality management, in research or in technical sales

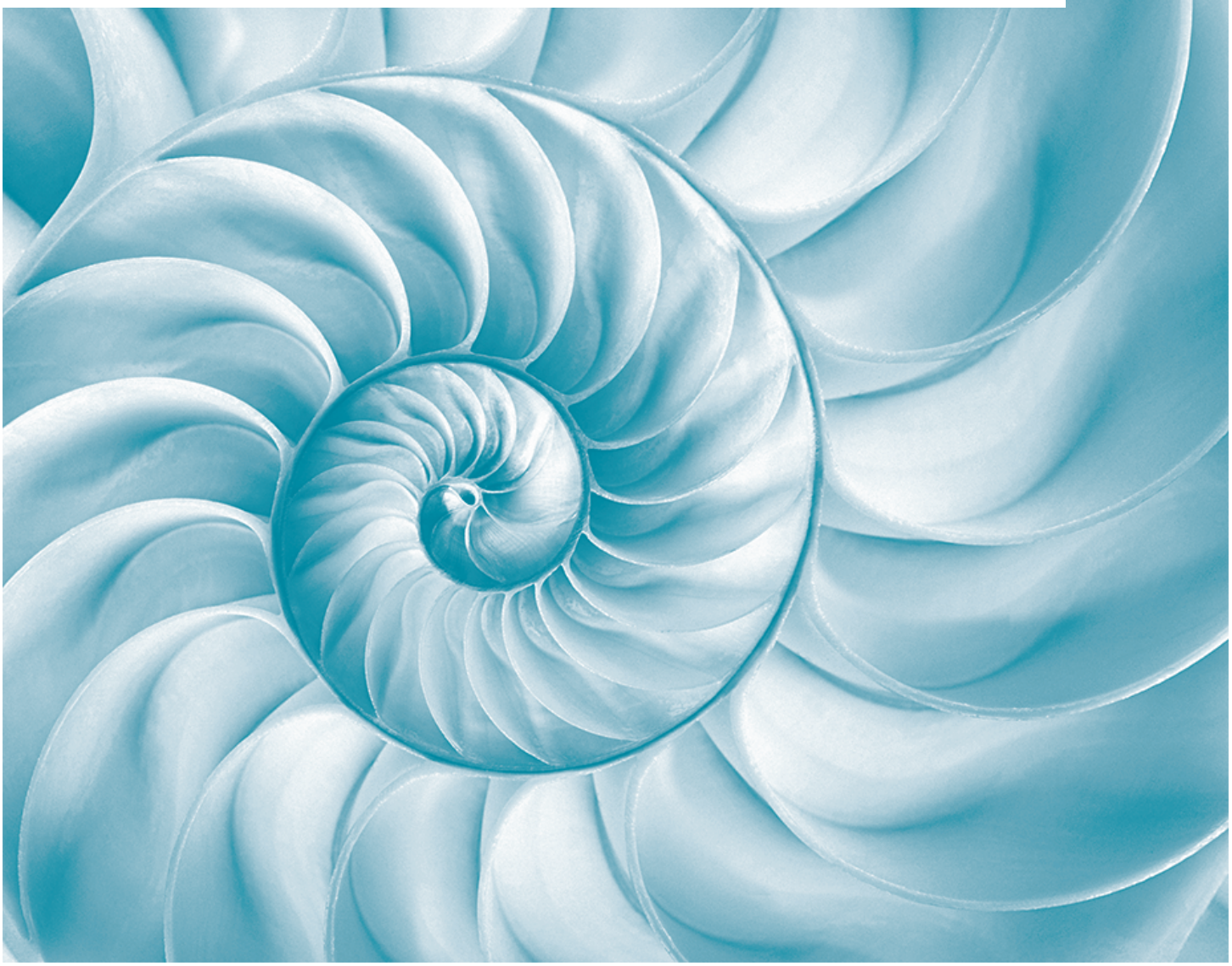
Markus Niederberger,
Professor of Multifunctional Materials

"Do you like chemistry, physics and mathematics? If you do, study materials science and develop the materials of the future with us."

More information
ethz.ch/materials-science

Natural Sciences and Mathematics

Natural sciences and mathematics have strong ties to basic research. They search for the laws that govern our cosmos, our earth and our lives. However, they are also the source of many-faceted applications for technology, medicine and the economy.



Distribution of the basic subjects in the first two years of Bachelor's studies

	Mathematics	Physics	Computer Science	Chemistry	Biology	HuLaSoEc[1]	Programme-specific subjects
Biology	●●	●	●	●●	Part of the programme-specific subjects	●	●●
Biochemistry – Chemical Biology	●●	●	●	●●	●●	●	●●
Chemistry	●●	●	●	Part of the programme-specific subjects	●	●	●●●
Chemical Engineering	●●	●	●	Part of the programme-specific subjects	●	●	●●●
Interdisciplinary Sciences, physical-chemical	●●	●●		●●		●	●●
Interdisciplinary Sciences, biochemical-physical	●●	●	●	●●	●●	●	●●
Mathematics	Part of the programme-specific subjects	●●	●			●	●●●
Pharmaceutical Sciences	●●	●	●	●●	●●	●	●●
Physics	●●	Part of the programme-specific subjects	●			●	●●
Computational Science and Engineering	●●	●●	●●	●		●	●●

1 HuLaSoEc = subjects from Humanities, Law, Social and Economic Sciences

● 1–10% ●● 11–50% ●●● >50%

Biology

Biology studies at ETH focus on the understanding of the molecular and cellular processes of life, their retraceability to basic chemical, physical and mathematical principles and their emergence in the course of evolution.

Bachelor's studies (180 credits)
The first two years of Bachelor's studies provide students with a foundation in the natural sciences. In the third year, students pursue their individual interests to gain insights into research practice and to familiarise themselves with areas in which they would like to do further work in their studies for the Master's degree.

Subject matter
- General: chemistry, physics, mathematics, statistics, computer science
- Subject-specific: biochemistry, molecular biology, evolution, cell biology, microbiology, immunology, plant biology, genetics/genomics, bioinformatics, bioanalytics, system biology

Master's studies (90 credits)
Master's studies focus on experimental research. Students attend lectures in their individual specialisations and write two project papers and a Master's thesis.

Specialisation options
- Biochemistry
- Biological chemistry
- Microbiology and immunology
- Molecular health sciences
- Molecular plant biology
- Molecular and structural biology
- Ecology and evolution
- System biology
- Cell biology

Careers
Research, science coordination, product responsibility in pharmaceuticals, scientific journalism, academic-stream secondary school teaching, business consultancy and much more

Julia Vorholt,
Professor of Microbiology

"Biology students should be interested in natural sciences and the basic principles of life – from molecules to the interaction of organisms."

More information
ethz.ch/biology

Biochemistry – Chemical Biology

An understanding of the chemical properties of biological components and their transformation processes and interactions with their environment, both at a molecular and at a macromolecular level, is central.

Bachelor's studies (180 credits)
This degree programme provides a theoretical and practical education in chemistry, biochemistry and molecular biology with a later focus on organic chemical reaction mechanisms, including the chemical synthesis and the exploration of how biologically active substances work.

Subject matter
- Fundamentals of mathematics, statistics, physics, computer science, biology, inter alia
- Core subjects in inorganic, organic, physical and analytical chemistry, biochemistry, inter alia
- Block courses which combine lectures with experimental work, seminars and work on the literature

Master's studies (120 credits)
The degree course provides in-depth specialisation with a focus on experimental scientific work in the fields of chemical biology, biochemistry and organic chemistry, as well as their interfaces with biology, bio-analytics, pharmacy and areas of biomedicine.

Subject matter
- Core and elective subjects
- Block courses, semester papers and a six-month Master's thesis

Careers
This degree course qualifies students for responsible positions in academia, the biotechnological and pharmaceutical industries and in public services.

Jessica Bedregal Rivera,
is studying Biochemistry

"Don't put yourself under too much pressure when things don't go perfectly at the beginning of your studies. It's intensive, but it's easier to study with a cool head."

More information
ethz.ch/biochemistry-chemicalbiology

Chemistry

Chemistry is the natural science which deals with the fascinating world of molecules. Chemistry researches, understands and describes properties and behaviour patterns of molecules but also produces new molecules with desired properties.

Bachelor's studies (180 credits)
In the first two years, which are shared with Chemical Engineering, students acquire the fundamental knowledge of natural sciences and mathematics. Extensive laboratory practicals provide them with skilled craftsmanship. Besides the compulsory lectures, the third year of Bachelor's studies includes a wide range of electives.

Subject matter
- General: mathematics, physics, computer science and biology
- Subject-specific: inorganic, organic, physical and analytical chemistry with extensive laboratory practicals and case studies

Master's studies (90 credits)
The Master's programme extends the core subjects of Bachelor's studies and familiarises students with research work by means of current topics

Subject matter
- Core subjects in chemistry, extensive range of electives
- Extensive internships/practicals (industry or laboratory), project work, five-month Master's thesis

Careers
Private and public laboratories, (chemical) industry, service sector, health sector, academia, administration, teaching
The majority of students embark on a doctorate after they have obtained their Master's degree.

Ian Alexandre Warm,
is studying Chemistry

"Admittedly, the first year was intensive. Over time I learnt to organise my day though. In the summer, I like to go swimming in the Limmat or in the lake with friends. During a hard period of learning, a good balance is that much more important."

More information
ethz.ch/chemistry

Chemical Engineering

The focus is on the development of products made from industrially produced substances and modified raw products, and the realisation of the transformation processes required for this, while taking into consideration economy and ecology.

Bachelor's studies (180 credits)
In the first two years, which are shared with Chemistry, students acquire the fundamental knowledge of natural sciences and mathematics, as well as chemical laboratory skills. In the third year, students acquire the knowledge required for planning, developing and optimising industrial processes for the economical and ecological production of chemical products.

Subject matter
- General: mathematics, physics, computer science and biology
- Subject-specific: inorganic, organic, physical and analytical chemistry with extensive laboratory practicals and case studies
- Engineering disciplines

Master's studies (90 credits)
The Master's programme extends the disciplines of chemical engineering and familiarises students with research work by means of current topics

Subject matter
- Core subjects in the disciplines of chemical engineering and electives
- Industrial internship or project work, case studies and a five-month Master's thesis

Careers
Specialists in process development and production; in material production, processing and finishing; in the chemical and pharmaceutical industries; in the metal, food, textile and plastics industries; and much more

Cheyenne Diem,
is studying Chemical Engineering

"I opted for Chemical Engineering because the wide range of subjects and the numerous career options after graduation convinced me."

More information
ethz.ch/chemical-engineering

Interdisciplinary Sciences

Many rapidly evolving fields of research are situated at the interface between chemistry, physics and biology. This is why experts with a broad-based, well-founded education are increasingly sought after today.

Bachelor's studies (180 credits)
This degree programme provides students with an interdisciplinary knowledge of various natural sciences and mathematics. The characteristics of these studies are the great freedom of choice among subjects and the fact that students attend every lecture they choose with the students of the discipline in question.

Subject matter
- Physical/chemical or biochemical/physical subject area
- Fundamentals of natural sciences, mathematics and computer science
- Individual study programme and Bachelor's thesis from the second year

Master's studies (90 credits)
Choice of subjects which meaningfully complement the focal points of the second and third years of Bachelor's studies.

Subject matter
- Specialisation (major) in two of the eight disciplines: chemistry, physics, biology, mathematics, computer science, materials science, environmental sciences, earth sciences

Careers
This highly demanding degree programme paves the way towards research, teaching, the pharmaceutical and chemical industry, to business, and to authorities and consultancy firms.

Moritz Baumgarten,
is studying Interdisciplinary Sciences

"I'm studying Interdisciplinary Sciences at ETH Zurich because there's nowhere else that offers me a degree programme where I can be so flexible in my choice of lectures."

More information
ethz.ch/interdisciplinary-sciences

Mathematics

Technological innovations are based on mathematics: data encryption in networks, image processing in smartphones and medical diagnosis, as well as logistics in the transport business, make use of mathematical methods and knowledge.

Bachelor's studies (180 credits)
The Bachelor's studies provide students with a well-founded basic education in mathematics. Students are familiarised with fundamental mathematical terms, structures and methods.

Subject matter
- Fundamentals: analysis, linear algebra, computer science, physics
- Subject-specific: numerical mathematics, probability and statistics, geometry, graph theory, methods of mathematical physics, complex analysis, topology

Master's studies (90 credits)
The knowledge, the scientific way of thinking and the interdisciplinary competences which students have acquired in Bachelor's studies prepare them for the Master's programme, in which mathematical studies are continued and extended.

Master's pogramme in Mathematics
- Free choice from among a wide range of subjects

Master's pogramme in Applied Mathematics
- Specialisation in a field of application

Careers
Engineer in the transport sector, IT project leader in banks or technology companies, mathematics teacher at an academic-stream secondary school, scientist, actuary or consultant in the insurance industry, and much more

Lorraine Lambert,
is studying Mathematics

"ETH, this was the challenge of studying in a foreign language, of widening my horizons and exceeding my limits. The opportunity to discover a city full of culture&s."

More information
ethz.ch/mathematics

Pharmaceutical Sciences

Behind every drug, there is a well-founded knowledge of the chemical, physical and biological characteristics of the active substances and excipients, of the production technology and the effects of the drug on the human body.

Bachelor's studies (180 credits)
Bachelor's studies provide students with the scientific theory and practice for experimental work in the laboratory. Students are gradually introduced to the fields of research and activity in pharmaceutical sciences.

Subject matter
- Scientifi c fundamentals in theory and practice
- Pharmaceutical subjects and concomitant laboratory practicals
- A two-week internship in a pharmacy and an emergency aid course

Master's studies (90 credits)
The Bachelor's degree provides direct access to the Master's programmes in "Pharmacy" and "Pharmaceutical Sciences".

Master's programme in Pharmacy
This two-year programme leads to a Master's degree and the federal diploma for pharmacists.

Master's programme in Pharmaceutical Sciences
This programme lays the foundation for activities in pharmaceutical research and development.

Careers
Pharmacy, pharmaceutical industry, health authority, university research (doctoral studies)

Patricia Eichenberger,
is studying Pharmaceutical Sciences

"Per aspera ad astra – studying at ETH is a full-time job which requires your full commitment."

More information
ethz.ch/pharmaceutical-sciences

Physics

What holds the world together in its very core? Physics deals with the big questions about the fundamental phenomena of nature, using mathematics for the purpose of description and computer science as a tool.

Bachelor's studies (180 credits)
Bachelor's studies cover the fundamentals of physics and mathematics, as well as practical work in the laboratory. Theoretical and experimental subjects introduce students to modern physics. The programme is concluded with either an experimental semester paper, a theoretical proseminar or a research-related internship.

Subject matter
- Fundamentals of classic and modern physics
- Scientific argumentation, as well as mathematical, physical and algorithmical thinking
- Laboratory practicals
- Autonomous work with a theoretical or experimental focus

Master's studies (90 credits)
In this programme, students learn about and deal with complex scientific topics at a high level.

Subject matter
- Wide range of electives
- Master's thesis in a research group of the student's own choice

Careers
Researchers and teachers, leading employees in industry and business, entrepreneurs

Andreas Vaterlaus,
Professor of Physics and Education

"An ETH study programme prepares you for the challenges of the future. It makes great demands on you, but also provides targeted support and an encouraging learning climate."

More information
ethz.ch/physics

Computational Science and Engineering

The degree programme in Computational Science and Engineering provides an interdisciplinary education in applied mathematics, numerics and practical computer science (computer architecture, machine learning and high-performance computing).

Bachelor's studies (180 credits)
Computational Science and Engineering (CSE) deals with the application of numerical algorithms and programming techniques and the use of computers for simulation and data analysis.

Subject matter
- General: analysis, linear algebra, stochastics, optimisation, physics, computer science
- Subject-specific: numerics, software development, high-performance computing, machine learning
- A specialisation to be chosen by students provides them with the knowledge of the application of computer-based natural and engineering sciences.

Master's studies (90 credits)
In the CSE Master's studies, the foundations acquired in CSE Bachelor's studies and knowledge from at least one field of application of numerical simulation are extended.

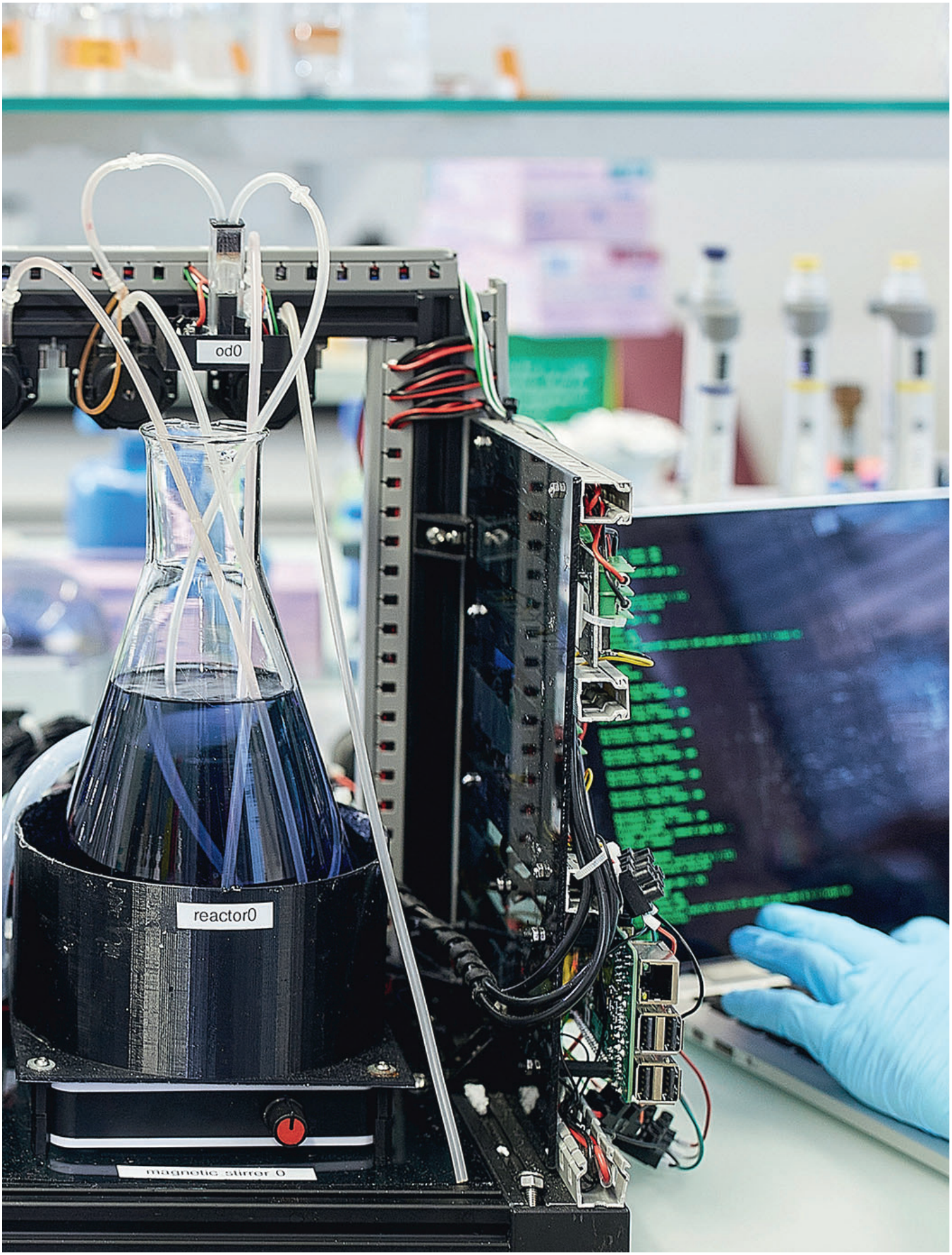
Specialisation options
- Astro- or geophysics
- Atmospheric physics
- Biology, chemistry or physics
- Fluid dynamics
- Robotics or control technology
- Computational finance
- Electromagnetics

Careers
High-technology industries in research and development, computer centres, experts for the use of software and quantitative services

Katharina Gutmann,
is studying Computational Science and Engineering

"I'm studying CSE because I find many of the subjects fun. Also, owing to the small degree programme size, almost all of us know each other, like in a big class at school."

More information
ethz.ch/computational-science-and-engineering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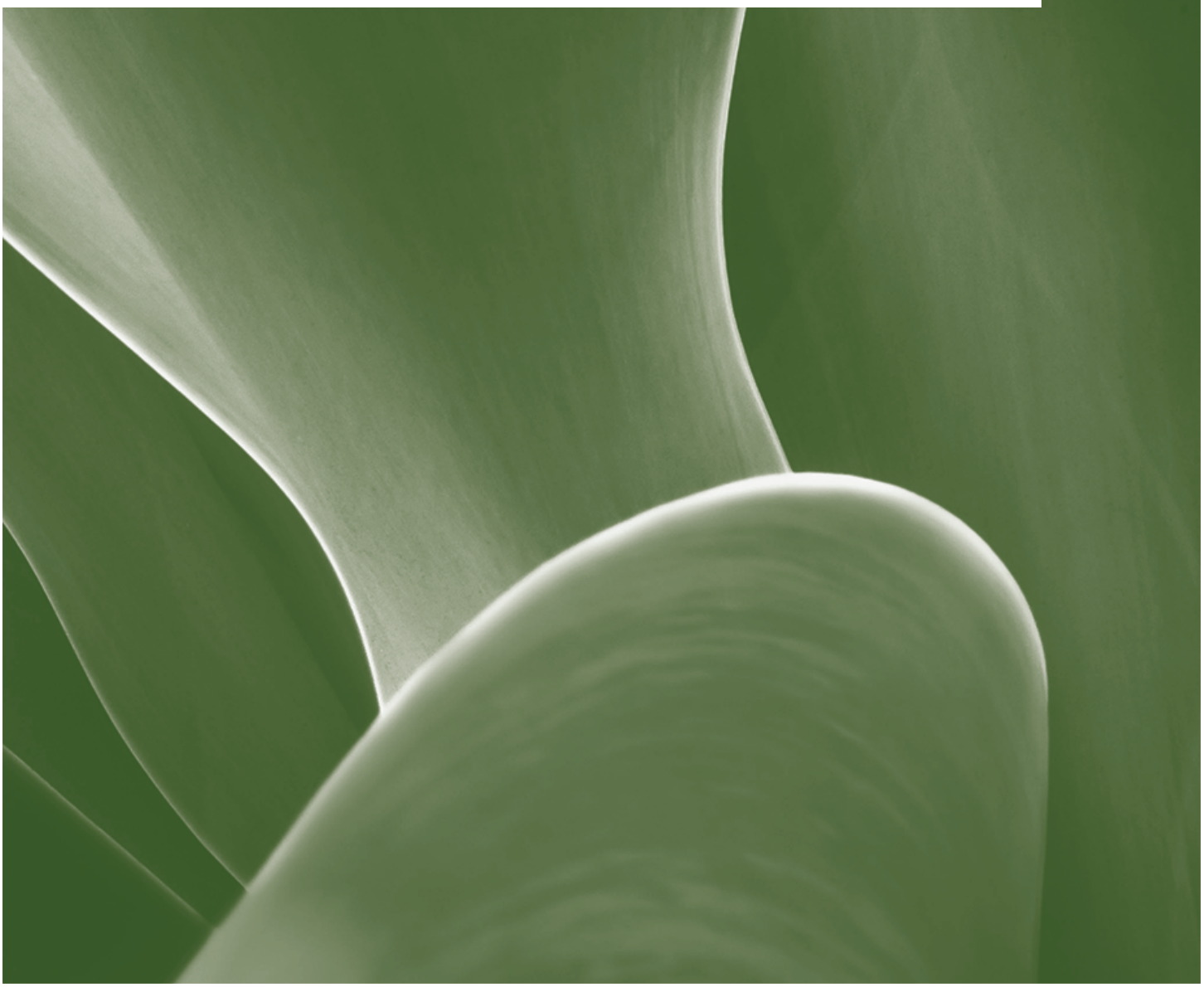
System-oriented Natural Sciences

The system-oriented natural sciences deal in an inter-disciplinary way with the foundations of human life and health, from the natural resources of our earth to the molecular level of the human body.



Distribution of the basic subjects in the first two years of Bachelor's studies

	Mathematics	Physics	Computer Science	Chemistry	Biology	HuLaSoEc[1]	Programme-specific subjects
Agricultural Science	●●	●	●	●	●	●	●●
Earth and Climate Sciences	●●	●	●	●	●	●	●●●
Health Sciences and Technology	●●	●●	●	●●	●●	●	●●
Human Medicine	●●	●		●	●		●●●
Food Science	●●	●	●	●●	●●	●	●●
Environmental Sciences	●●	●	●	●	●●	●●	●●

1 HuLaSoEc = subjects from Humanities, Law, Social and Economic Sciences

● 1–10% ●● 11–50% ●●● >50%

Agricultural Sciences

Climate change, scarcity of resources and the growing world population are making it increasingly difficult to produce sufficient high-quality foodstuffs. Agronomists develop concepts and solutions for ecological, economical and socially compatible food production.

Bachelor's studies (180 credits)
In Bachelor's studies, students are taught the fundamentals of natural, social and agricultural science subjects. The specialist knowledge acquired in the degree programme is extended in practice by means of field trips and an agricultural internship.

Subject matter
- General: biology, chemistry, mathematics, physics, computer science, soil science
- Subject-specific: agricultural economics, plant sciences, animal sciences, field trips, agricultural internship, inter alia
- Social science subjects: economics, law

Master's studies (120 credits)
In the Master's programme, the specialist agricultural knowledge is extended and applied in a professional environment during a professional internship.

Specialisation options
- Agricultural economics
- Animal sciences
- Plant sciences

Careers
Specialists in consultancy and education, in insurance companies, associations and networks, in agriculture, in authorities, as well as in research and international development cooperation, and much more

Anik Thaler,
is studying Agricultural Sciences

"Agricultural Science at ETH provides a very wide range of knowledge and skills which helped me to set up my own start-up (fynfoods.ch)."

More information
ethz.ch/agricultural-sciences

Earth and Climate Sciences

The earth and climate sciences explore the system earth from its inside and various spheres to the entire solar system. The future development of the climate is also an important field of research.

Bachelor's studies (180 credits)
Besides the basic education in natural sciences, great value is attached to practical education. The theory acquired by students is complemented by experiments in the field or the laboratory. In the third year, students choose between "Geology" and Geophysics" and "Climate and Water".

Subject matter
- Fundamentals of mathematics and natural sciences
- General earth science subjects
- Integrated earth systems: specific topic areas are worked on in an interdisciplinary way
- Laboratory practicals
- Field trips and field courses

Master's studies (120 credits)
Students develop into sought-after experts for academia and practice in one of four specialisation options.

Specialisation options
- Engineering geology
- Geology
- Geophysics
- Mineralogy and geochemistry

Careers
Research, geology and environment offices, resource and natural hazard management, banks, insurance companies, education, international organisations, public relations, and much more

Xenia Meier-Ruge,
is studying Earth and Climate Sciences

"Even as a child I wanted to be one of ETH's fascinating researchers. Now I've got the opportunity to become part of the international network, and this opens incredibly many doors for me."

More information
ethz.ch/earth-and-climate-sciences

Health Sciences and Technology

This degree programme in medical science provides an education for students who will act as bridge builders between natural science and technology, thus creating new possibilities for the prevention, diagnosis and therapy of diseases.

Bachelor's studies (180 credits)
Besides a foundation in natural science and technology, Bachelor's studies also convey the fundamentals of human anatomy and physiology, deal with disease mechanisms and with current and future biological/technological diagnosis and therapy options.

Subject matter
- General: fundamentals of natural sciences, mathematics and technological sciences
- Subject-specific: molecular, cellular and systemic health and disease mechanisms and their transformation as a consequence of aspects such as age, stress, exercise, nutrition and medication

Master's studies (90 credits)
In the Master's programme, the knowledge acquired in the field of human health is extended, with the focus being on (experimental) scientific work.

Specialisation options
- Human movement sciences and sport
- Medical technology
- Molecular health sciences
- Neurosciences
- Human health, nutrition and environment

Careers
Scientific staff members, project leaders or consultants in the medical technology or pharmaceutical industry, in medical or preventive institutions/doctorate

Jenny Imhof,
is studying Health Sciences and Technology

"Since I'm fascinated by the nervous system, I'd like to do research in neurorehabilitation later on and help people with neurological impairments to become more independent again."

More information
ethz.ch/health-sciences-and-technology

Human Medicine

The older and more dynamic our society becomes, the more crucial the preservation and improvement of human health. Correspondingly, the field of human medicine is many-faceted and covers both the identification and therapy of diseases and injuries, as well as their prevention.

Bachelor's studies (180 credits)
For the medicine of the future: this degree programme combines medical aspects with technological/scientific aspects of human health. To be able to exhaust the possibilities, for instance in medical technology or in personalised medicine, it takes physicians with well-founded knowledge in several disciplines.

Subject matter
- Medical and clinical fundamentals
- Clinical skills (doctor/patient interaction)
- Mathematics and natural sciences
- Digital medicine
- Interdisciplinary teamwork
- Translational research practical

Master's studies (180 credits)
For the Master's studies, students move to a partner university in Basel, Lugano or Zurich, where their medical knowledge and skills are extended.

Subject matter
- Extension of clinical skills
- Preparation for the federal examination in human medicine

Careers
Working as a doctor in a hospital or in a doctor's practice/in academia / in the fields of biomedicine, medical technology and pharmaceuticals (research and development)

Selin Candan,
is studying Human Medicine

"I wanted to go to ETH Zurich because it's a university with a personal touch. I saw the newly introduced degree programme as an opportunity to profit from an innovative curriculum."

More information
ethz.ch/human-medicine

Food Science

People's desire for health and well-being is the focus of food science. It explores the relations between the quality of foodstuffs, their production and their impact on health.

Bachelor's studies (180 credits)
Bachelor's studies provide students with the fundamentals in natural science, social science, engineering and food science. From the second year onwards, the focus is increasingly on food science issues. Field trips, internships and the Bachelor's thesis complement these studies.

Subject matter
- General: mathematics, biology, chemistry, physics, inter alia
- Subject-specific: food chemistry, process engineering, microbiology, human nutrition, inter alia
- Social science subjects: economics, law, management

Master's studies (90 credits)
Master's studies focus on deepening specialist knowledge and are extended by further additions and the Master's thesis.

Specialisation options
- Food process engineering
- Food quality and safety
- Nutrition and health
- Health, nutrition and environment

Careers
Product development, quality assurance, marketing, teaching and research, administration, development cooperation, and much more

Andrew Schürch,
is studying Food Science

"I'm studying Food Science because I'm passionate about food and we have to feed almost 8 billion people sustainably and properly."

More information
ethz.ch/food-science

Environmental Sciences

The study programme in Environmental Sciences is devoted to the latest developments in science, society and politics. It provides students with the ability to tackle environmental problems at a regional and global level.

Bachelor's studies (180 credits)
Bachelor's studies predominantly provide knowledge in natural sciences. Exercises, internships and field trips help students to acquaint themselves with the theory in more depth. With the help of methods from social science and humanities, environment-related issues are worked on in groups.

Subject matter
- General: mathematics, physics, chemistry, biology
- Subject-specific: environmental problem-solving, environmental systems, spheres, field trips, internships
- Social science subjects
- Electives in natural science and technology

Master's studies (120 credits)
During Master's studies, students extend their knowledge in one of six specialisations. A professional internship provides an insight into professional life.

Specialisation options
- Atmosphere and climate
- Biogeochemistry and pollutant dynamics
- Ecology and evolution
- Environmental systems and policy
- Forest and landscape management
- Health, nutrition and environment

Careers
Teaching and research, engineering offices, banks, insurance companies, business consultancies, energy sector, public transport, agriculture and forestry, authorities, NGOs, and much more

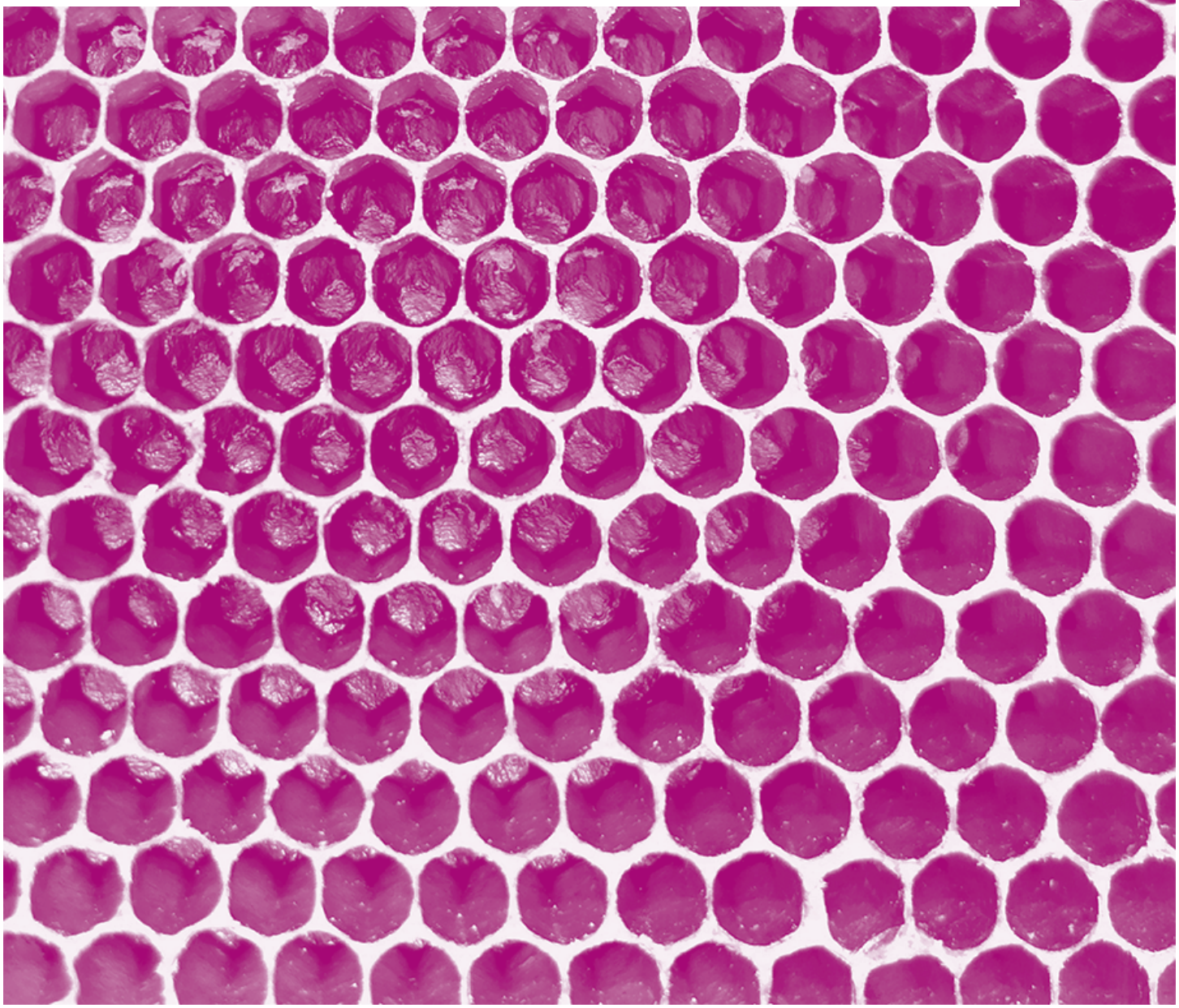
Céline Gauye,
is studying Environmental Sciences

"At ETHZ for a course that is unique in Switzerland, German was a challenge for me but has become an asset: I'm now able to order *Älplermagronen mit Apfelmus*."

More information
ethz.ch/environmental-sciences

Management and Social Sciences

ETH students should not merely be specialists in their own fields but also perceive their actions in an ethical, cultural and social dimension.



Science in Perspective

In the field of teaching, the social sciences of ETH Zurich are responsible for the Science in Perspective (SiP) programme: every year, more than 15 000 ETH students attend a compulsory semester course. The course programme opens up new views on the contents of their core subjects.

In some interdisciplinary degree programmes, these general knowledge subjects are already integrated in the curriculum and cannot be chosen. In other degree programmes, students can choose from among the whole range of SiP subjects.

This range is very wide, with the following examples being cases in point:

“Environmental Ethics”

“Globalization – Theories, Concepts, Aspects”

“Philosophy of Physics”

“Simulation of Negotiations”

“The Science of Learning from Failure”

Master in Management, Technology, and Economics

Understanding and helping to shape interactions between technology, organisations and society, particularly their effects on the sustainable use of natural and human resources.

Admission requirements
The degree programme is aimed at applicants with a recognised Bachelor's degree in engineering or natural sciences.

Master's studies (120 credits)
Students learn to develop innovative and systematic solutions for business and society: creation of innovative business practices, design of agile working processes and creation of sustainable solutions in a world of limited resources. The programme extends over three semesters of lectures, and includes an industrial internship and a Master's thesis.

Competence areas
- General management and human resource management
- Strategy, markets and technology
- Information and operations management
- Quantitative and qualitative methods for solving complex problems
- Micro- and macroeconomics
- Financial management

Careers
Project leaders and entrepreneurs in the production industry, the finance industry, the technology sector and business consultancy, as well as economists

Stefano Brusoni,
Professor of Technology and Innovation Management

"Our programme is for engineers and natural scientists who want to leverage new technologies in a responsible manner to achieve both societal and business impact."

More information
ethz.ch/management-technology-and-economics

Public Policy (Professional Officer)

In line with the requirements of contemporary armed forces, prospective professional officers are educated in subjects from social science, humanities and military science. The degree programme leads to an internationally recognised Bachelor of Arts ETH in Public Policy.

Bachelor's studies (180 credits)
This degree programme provides prospective professional officers of the Swiss Army with fundamental knowledge of political, social and military science tailored to the requirements of their professional activities.

Subject matter
- Business administration, economics and military economics
- Security policy, including cyber security policy and technological aspects
- Conflict research
- History and military history
- Social psychology, military psychology and military educational science
- Leadership
- Inter alia

Training at the Military Academy (MILAC) at ETH Zurich
- 9 weeks' practical modules (part of the degree programme)
- Military training between semesters
- Military training after completion of Bachelor's studies (a further 33 weeks)

Admission requirements
Besides the educational requirements that are customary at ETH, admission to this degree programme is contingent on additional military requirements: the rank of lieutenant with completed practical service and a successful assessment for prospective professional officers of the Swiss Army.

Students are employed by the Federal Department of Defence, Civil Protection and Sports (DDPS) throughout their training.

Specialisation options
The electives serve to extend students' knowledge and to complement specific disciplines. They are offered to students for individual choice and have to be related to political science.

Careers
Professional officers of the Swiss Army are high-level personnel who assume leadership functions both at home and abroad, work as instructors/educators and experts in military matters, and also comment on non-military matters as well-educated high-level staff.

More information
ethz.ch/public-policy

Tips on selecting a study programme

The choice of a study programme is an important decision-making process which can be tackled systematically. Take enough time to go through the following steps.

01

Getting to know you

When you start considering your study programme options, take a conscious look at your interests, abilities and values. Ask yourself questions like:

› What do I like to do?
› What can I do well?
› What is important to me?

02

Obtaining information

You know what you like, what you can do and what you want. Now you'll probably ask yourself the following questions:

› Which degree programmes suit me?
› How can I find them?
› How can I get an overview of the many degree programmes?

↗ **berufsberatung.ch**

03 Making a decision

A good decision requires time, head and gut-feeling. It requires weighing of the facts, discussions with family, and friends. You might also want to consult with study programme advisors. Plan enough time for sober consideration.

↗ ethz.ch/which-study-programme

04 Applying

You can register or apply for a study programme at ETH Zurich from 1 December onwards. Please note the relevant application deadlines.

↗ ethz.ch/application-bachelor

05 Start

Get ready for your ETH journey. You yourself can contribute quite a lot to a successful start of your studies. Our diverse services and the checklist for the start of your studies will help you in this.

↗ ethz.ch/beginning-your-studies

Please bear in mind:
Decisions regarding the choice of a study programme are important, but they are never final. There are always different paths to a destination.

More tips on selecting a study programme
ethz.ch/tips-selecting-study-programme

Student life in Zurich

Besides outstanding academic conditions, Zurich offers extensive sport and leisure facilities with a vibrant cultural and night life.

Student associations

Students can join the ETH student association (VSETH) or one of the subject-specific organisations. They provide a wide range of leisure activities and support students in everyday university life.

↗ vseth.ethz.ch

Student Project House

This creative Think- and Makerspace enables students from all disciplines to exchange ideas. Here, students also receive support in the implementation of their own project ideas.

↗ sph.ethz.ch

Sports and relaxation

The Zurich Academic Sports Association (ASVZ) offers an attractive and varied range of sports. There is something for everybody from top athletic performances to relaxation – an ideal counterbalance to studying.

↗ asvz.ch

Culture and music

ETH Zurich offers a many-faceted range of cultural options and numerous possibilities for playing in bands.

↗ ethz.ch/culture

Learning languages

The academic environment is increasingly international in nature. German and English as teaching and research languages and English as a lingua franca are among the indispensable requirements for studying and professional life.

↗ sprachenzentrum.uzh.ch

Orientation and advisory services

↗ Orientation events at ETH Zurich

This is where you can discover the possibilities of getting acquainted with ETH Zurich as a place for study and research.

↗ Personal advice on selecting a study programme

Are you about to choose a degree programme and do you have specific questions about our Bachelor's degree programmes?

↗ Prestudy events

The start of university life can be challenging. The prestudy events provide you with the support to enable you to focus on your studies right from the start.

↗ Coaching and advisory services

Successful studies also include the development of methodological, social and personal competencies. We accompany you along the way with a variety of services.

↗ Special study situations

We provide support in the following situations:

- Studying with a disability/chronic illness
- Studying and top-level sports
- Studying as a parent

↗ Starting your studies and military service

Please obtain information about the coordination of the start of your studies with military service or civilian service/civil protection service.

↗ Registration and application

This is where you can find all the information about admission to the first semester of a Bachelor's programme.

Further information

↗ Financial matters

If you and your family do not have sufficient financial resources, grants and/or loans from the canton or from foundations will contribute towards defraying living and tuition costs.

↗ Campus

All the information about the campus of ETH Zurich (addresses, opening hours, routes, maps)

↗ International students

This is where you can find information about practical questions such as immigration, visas, residence permits and health insurance.

↗ Accommodation

You can find a current list of bedsits and flats at the Housing Office. Please obtain this information early on: housing facilities in and around Zurich are scarce.

↗ Student portal

The portal provides ETH students with relevant information about studies.

↗ Course catalogue

This is where all the courses offered in the semester are published.

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