

Health Sciences and Technology

Information about the study programme





Why Health Sciences?

Have you ever thought about whether your muscle activity also has an effect on the development and degeneration of your brain? Do you think you can influence the development of metabolic diseases such as diabetes with your diet? Do you expect the replacement of your damaged cartilage to be able to adapt to the strain just like the original?

Health scientists are dealing with all these questions and many more, investigating the mechanisms, analysing and seeking solutions to maintain and improve human health, whether in healthy people, patients or the ageing population.

The findings from health sciences form the basis for new therapies and preventive measures. But they also help to develop new diagnostic tools and verify the effectiveness of existing interventions. This creates the basis for evidence-based medicine and health promotion.

How does it work?

Innovative technologies and the fundamental knowledge of the functioning of the human organism – from the whole person to the cellular and molecular level – are needed to find solutions for maintaining and improving health. This requires the multidisciplinary approach to health and technology that these professionals bring to the table. Depending on the subject matter, the way to achieve this is not only via humans, but also via animal models and cell lines. However, the focus is on human health.



Who is best suited to the programme?

Health sciences and technology is primarily a scientific course of study – albeit one with a medical orientation and broad areas of contact with technology.

Are you interested in the subject of human health for different age groups? Are you fascinated by natural sciences and applications of technology? Do you enjoy getting to the bottom of physiological mechanisms both theoretically and practically? Do you have a flair for analytical and networked thinking? Then health sciences and technology is right for you!

As with any other course of study, however, you will also need stamina (the course takes at least 4 ½ years!) and the joy of learning and experimenting.

What are the benefits of the programme?

Graduates of the health sciences and technology programme deal with the topic of human health in an interdisciplinary way. They are bridge builders between engineers and doctors/therapists as well as between macro and micro worlds.

Where can I work?

Thanks to their interdisciplinary training, there are a wide variety of professional fields for health scientists:

Research and development

- at universities and universities of applied sciences
- in private industry, e.g. medical technology, biomedicine and pharmaceuticals
- in the field of rehabilitation and occupational medicine and ergonomics

Consulting

- in health promotion and prevention
- in performance diagnostics and training consulting
- in health policy and insurance

Teaching

- at vocational schools and colleges of higher education (with HST teaching certificate)
- at upper secondary schools (with teaching diploma in sports or biology)

More information

www.hest.ethz.ch/studies

The study programme

At ETH Zurich, a study period of around 1800 hours (60 credits) per year is expected. This includes attendance time at lectures, exercises and practical courses, the preparation and post-processing of the lecture material, the solving of exercises, the time spent on independent work, as well as examination preparation and the examination itself. Unlike at other universities, many examinations do not take place directly after the semester, but during examination sessions in January/February and August,

Bachelor's degree in HST – min. 180 credits

At the beginning of the study programme, the basics in natural sciences, mathematics and the technical sciences are taught. This is followed by specific health science content such as the effects of stress, nutrition, ageing and medication on the human system and its health, molecular mechanisms of diseases as well as the properties and adaptability of biological tissues.

Knowledge and application of modern technologies for maintaining and improving health and for diagnosing diseases is integrated. In addition, elective subjects allow for a deepening or broadening of specific contents.

The language of instruction is initially German, then increasingly also English.

Electives		
Labs	Electives	Electives
Introduction UCT		
introduction HS1	Labs	Labs
Biology	Anatomy and Physiology	Neurosciences and/or Molecular Health Sciences and/or
		Medical Technology and/or Movement Sciences
Chemistry	Biology	(Selection)
	Medical Technology	Neurosciences (Selection)
Physics		Molecular Health Sciences (Selection)
Informatics	Dhusias	
Statistics	Physics	Medical Technology (Selection)
Mathematics	Statistics	Movement
	Mathematics	Sciences and Sport (Selection)
Bachelor 1st year of studies (58 CP + electives)	Bachelor 2nd year of sudies (51 CP + electives)	Bachelor 3rd year of studies (51 CP + electives)

Master's degree in HST – min. 90 credits

In addition to compulsory content on translational research, during the master's programme different subjects from the natural and/or technical sciences are available as electives, depending on the major chosen. This allows for an individual in-depth study in specific areas of health sciences. However, the main focus is on the introduction to (experimental) scientific work, which is done by means of internships and ends with the master's thesis.

The language of instruction is generally English.

The master's majors described on the following page may be attended unconditionally after the completion of a bachelor's degree in HST (consecutive master). Admission to other master's major courses is possible, but is subject to certain conditions.





Majors (Master)

Human Movement Sciences and Sport

This major deals in particular with the function and trainability of the cardiovascular system, the respiratory system and the musculoskeletal system of humans (muscles, bones, etc.) and the associated neural control as well as its age- and disease-related changes.

Rehabilitation and Inclusion

This major deals with holistic rehabilitation with the aim of developing suitable solutions for everyday challenges. Relevant disciplines are on the one hand rehabilitation technology and data science, but on the other hand also the rehabilitation process and the health care system in and of itself as well as social, environmental and economic aspects of inclusion.

Medical Technology

This major deals with various methods of biomedical engineering for recording the mechanical and physiological properties of biological tissues. On the other hand, it addresses developments and improvements of technical and biological solutions (e.g. prostheses, tissue replacement) for the replacement and reconstruction of body structures and body functions.

Molecular Health Sciences

This major focuses on understanding the molecular adaptation mechanisms of tissues and organs as a result of stress, nutrition, environmental influences and ageing. The aim is to develop preventive, diagnostic and therapeutic strategies for the successful management of complex common diseases such as diabetes and cancer.

Neurosciences

This major deals with the structure, plasticity and diseases of the nervous system and the functions of neuronal networks and processes such as learning and emotions in animal models and in humans. Students acquire competences to approach neuroscientific questions with molecular and cellular approaches as well as systemically.

Human Health, Nutrition and Environment

In this major, the effects of pollutants, infectious diseases and nutrition on human health are dealt with in depth. It also focuses on understanding how changing environmental conditions such as urbanisation, migration, climate change or pollution affect these factors.

Continuing education

Doctorate

The doctorate comprises independent scientific work under the supervision of a professor. A doctorate at ETH generally lasts four years and is usually combined with a position as an assistant. A doctoral degree is a prerequisite for an academic career, but is also advantageous for certain professional profiles in industry and the public sector.

Teaching Diploma in Sport

This additional formation in didactics, sports science and sports practice, which can be completed at the same time or after a bachelor's or master's degree, entitles the holder to teach physical education at upper secondary schools.

Teaching Diploma in Biology

This additional formation in didactics and biology, which can be completed at the same time or after a bachelor's or master's degree, entitles the holder to teach biology at upper secondary schools.

Teaching Certificate Health Sciences and Technology

This additional formation in didactics can be completed at the same time or after the master's degree. The teaching certificate is suitable for teaching in the corresponding subject at vocational schools and colleges of higher education, as well as for training and continued education within companies and institutions.







ETH Zurich – Where the future begins

Freedom and individual responsibility, entrepreneurial spirit and open-mindedness: ETH Zurich stands on a bedrock of true Swiss values. Our university for science and technology dates back to the year 1855, when the founders of modern-day Switzerland created it as a centre of innovation and knowledge. At ETH Zurich, students discover an ideal environment for independent thinking, researchers a climate which in-spires top performance. Situated in the heart of Europe, yet forging connections all over the world, ETH Zurich is pioneering effective solutions to the global challenges of today and tomorrow.





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