

Bachelor's degree in Chemistry

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Chemistry

Creative processes

Chemistry is concerned with the conversion of all kinds of raw materials into substances with new chemical, physical and biological properties for many new exciting applications.

As a chemist you are at the centre of this creative process and can contribute to designing the future. You develop new products, analysis methods and production processes, tap new raw materials or secure our energy supply. While responsible handling of resources and the environment is vital for these activities, enthusiasm for connecting theory and practice is also essential for chemistry students at a university of applied sciences.

Study programme

Are you interested in scientific relationships? Do you enjoy experimenting? Do you want to get to grips with new problems and challenges in chemistry and biological chemistry? Then the degree programme in Chemistry is just the thing for you!

It provides broad technical knowledge in the natural sciences. Using mathematical, physical, chemical and biological models, the first step is to investigate how chemical processes work, and then to develop promising new substances and processes in the laboratory on the basis of what you have learnt. You can choose specialisations in **Chemistry** or **Biological Chemistry** as part of your study programme. These majors prepare you for the specific demands of your future professional career.

Our Bachelor's degree programme in chemistry in Wädenswil has been awarded the «Chemistry Eurobachelor®» quality label.



Structure

The programme spans six semesters of full-time study. The first two semesters, in which you obtain a solid foundation in general chemistry, biology, mathematics and physics, are identical for both specializations.

In the third semester you select the topics that best correspond to your prior knowledge, interests and career goals by choosing to specialize in either Chemistry or Biological Chemistry. You conclude your studies with a Bachelor's thesis. Project-oriented work, often in collaboration with industry, is a central part of this.

During the entire study programme, you are trained to enhance your communication skills, as well as your ability to work independently and as part of a team. Furthermore, the modular structure enables you to spend a semester studying abroad and take part in student exchanges with other universities.

The study programme can also be completed on a part-time basis.

Specialisations

Chemistry

The classic discipline of chemistry has lost none of its fascination and is now more in demand than ever: areas of application range from pharmaceutical and cosmetic active ingredients, plastics and renewable raw materials to the energy sources and fuels of the future.

Areas of focus

- Industrial chemistry
- Organic chemistry
- Physical chemistry
- Chemical engineering

Areas of activity

- Research and development in the fields of syntheses, materials and processes, active ingredients, research and development
- Development of methods and implementation of analyses
- Set-up and application of measurement and sensor technology
- Project, operation and production management
- Design and implementation of process and environmental technology
- Process control, quality assurance and quality management
- Operational safety, risk analysis and risk management
- Technical purchasing and sales
- Consulting and training for employees and customers

Biological Chemistry

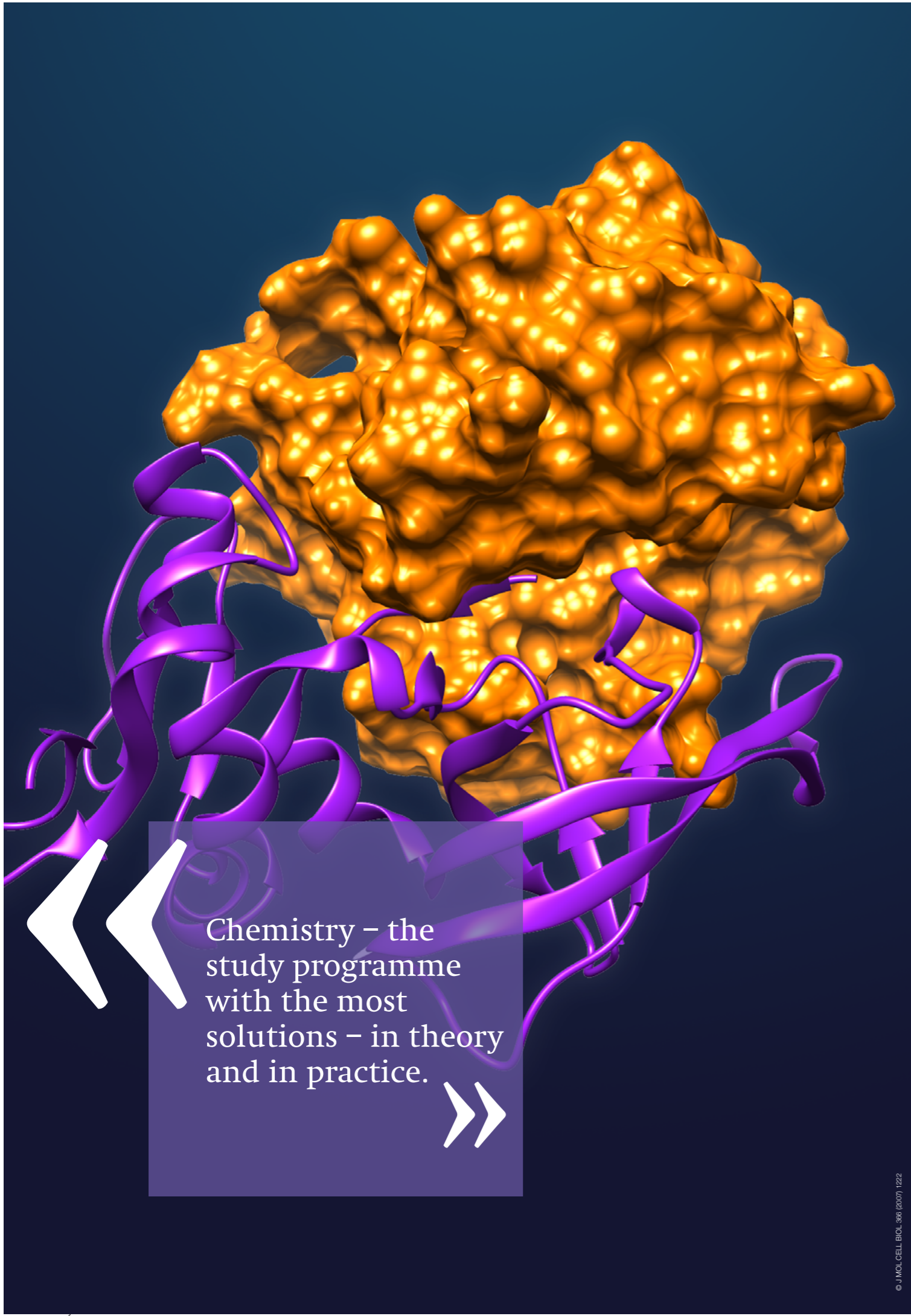
The young discipline of biological chemistry uses an interdisciplinary approach to enhance understanding of the mysteries of life and to enable this understanding to be turned to practical use. It involves investigation of the chemical processes in living organisms. This requires additional theoretical and practical knowledge of biochemistry, micro and cell biology, biochemical engineering and molecular genetics. Career opportunities can especially be found in the life sciences industry, where the detection of correlations at the interface of chemistry and biology has a high priority.

Areas of focus

- Biochemistry
- Microbiology
- Cell biology
- Bioengineering

Areas of activity

- Research and development in the fields of pharmaceuticals, materials and processes.
- Development of methods and implementation of bioanalyses
- Development and production of cell and tissue material
- Production of chemicals using biological methods
- Project, operation and production management
- Process control, quality assurance and quality management
- Operational safety, risk analysis and risk management
- Technical purchasing and sales
- Consulting and training for employees and customers



Chemistry – the study programme with the most solutions – in theory and in practice.



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Overview

	1 st and 2 nd semesters Foundation studies	3 rd and 4 th semesters Professional studies	5 th and 6 th semesters Specialised studies
Scientific foundations	General chemistry Biology Computer science Mathematics Physics	Computer science for chemistry	
Chemistry	Organic chemistry	Inorganic chemistry Biochemistry Organic chemistry Physical chemistry	Bioinorganic chemistry Biochemistry Organic chemistry Physical chemistry
Biology	Micro- and cell biology	Micro- and cell biology ^{BC} Molecular genetics ^{BC}	
Analytics	Analytical chemistry	Analytical chemistry	Bioanalytics Quality management in life sciences
Technology		Chemical engineering Modelling and simulation Process and workflow technology Bioprocess technology ^{BC} Industrial chemistry ^{CH}	Chemical engineering Measurement and control technology Ecology for chemists Bioprocess technology ^{BC} Industrial chemistry ^{CH}
Society and communication	Culture, Society, Language English	Communication and presentation Personnel management English	
Practical work	General chemistry Analytical chemistry	Analytical chemistry Organic chemistry 1 Organic chemistry 2 ^{CH} Chemical engineering ^{CH} Microbiology ^{BC} Cell biology ^{BC}	Biochemistry ^{BC} Bioprocess technology ^{BC} Industrial chemistry ^{CH} Physical chemistry ^{CH} Specialisation practical work Bachelor's thesis

Specializations: Chemistry ^{CH}
Biological chemistry ^{BC}



Chemistry student

«The versatility of my studies at the ZHAW allows me to combine my passion for model making and electronics with chemistry.

With my flying environmental laboratory, which I developed for my Bachelor's thesis, I can track down environmental offenders and gas leaks, even in inaccessible areas.»

Alexander

Prospects

Educational objectives

The study programme provides a broad education in chemistry, biology and chemical engineering, with mathematics and physics as foundations, which enables you to react flexibly to a rapidly changing professional environment.

The two specialisations allow you to focus on a particular area without losing sight of the overall goal of acquiring a thorough education in general chemistry.

The inclusion of biological chemistry in the study programme extends the variety of career paths available to you on graduation. You practise implementing the concepts acquired in lectures through tasks in the laboratory in step with actual practice. In addition, you learn to study independently to cope with new areas of work through the individual self-study component (around 50 percent of the degree programme). In the final year, your knowledge and skills are deepened through participation in applied research and development projects.

Career prospects

Chemistry graduates from a university of applied sciences are particularly sought after by private and public enterprises and government departments because of the practical orientation of the degree programme. In large companies, they tend to work in specialized fields, while in small and medium-sized enterprises they often assume broad responsibilities in technological positions, leadership and management. Working in big companies also opens up a wide range of opportunities.

Industry and manufacturing

- Fine and speciality chemicals
- Agricultural, construction and cleaning chemicals
- Plastics, textile, paint and coating chemicals
- Manufacturers of cosmetics, fragrances and flavours
- Food chemistry
- Pharmaceutical industry
- Biotechnology
- Nanotechnology

Research and development

- Universities and research institutes
- Chemical or related industries
- Manufacturers of analytical instruments and chemical and biotechnological equipment

Consulting, cantonal and federal agencies

- Analytical laboratories
- Energy, environmental and engineering offices
- Hospitals
- Public administration

Master's degree programme / Continuing education

After successfully completing your Bachelor's degree at the ZHAW in Wädenswil, you can opt for the research-based and practically-oriented Master of Science in Life Sciences degree with the specialisation «Chemistry for the Life Sciences». A Master's degree enhances your career opportunities, particularly in international companies.

www.zhaw.ch/icbt/master-chemistry

You can also attend practice-related continuing education courses or study programmes (MAS, DAS, CAS) at a university of applied sciences or traditional university. Participation in conferences, for example those taking place at the Institute of Chemistry and Biological Chemistry, equips you with new knowledge and fosters professional networking.

www.zhaw.ch/icbt/weiterbildung

Important information

Conditions for acceptance

The study programme is multidisciplinary and taught in German*. Students come from a broad variety of educational backgrounds.

- Candidates with a vocational baccalaureate (Berufsmaturität) and related vocational training can begin their studies directly:
 - Laboratory technician with a state-recognised qualification (EFZ) in one of the following fields:
 - chemistry
 - biology
 - paints and coatings
 - physics
 - textiles
 - Chemical and pharma technologist with a state-recognised qualification (EFZ)
- Candidates trained as biomedical analysts can also start their studies directly.
- Candidates with a vocational baccalaureate (Berufsmaturität) and an apprenticeship in an unrelated profession are required to have work experience in a profession related to their field of study. General professional experience is taken into account so that, depending on the apprenticeship, a 6 to 12 months' work experience must still be completed.
- Candidates with an academic baccalaureate or professional baccalaureate (Fachmaturität) must have 12 months' work experience in a relevant field.

The recognition of work experience or internships completed is granted by the programme director 'sur dossier'.

For information on additional admission options and for special cases (e.g. foreign qualifications), please contact the programme director.

*German at C1 level (Cambridge Advanced or equivalent) is required.

Support from the ZHAW

If you do not have the relevant work experience, you can take a laboratory introduction course here at the ZHAW. This prepares you for the internship in industry which you need for admission to the Chemistry degree programme. The introductory internship, which transfers important laboratory skills and techniques, lasts two months and starts at the end of July.

Other ways of preparing for the Bachelor's degree programme, such as preparatory courses, e-learning for mathematics, literature etc. can be found at:

www.zhaw.ch/lisfm/preliminary-courses

Dates

The study programme begins mid-September. The registration deadline is 30 April.

International exchange

Would you like to do part of your studies abroad? The ZHAW provides this valuable opportunity. An exchange semester, a foreign internship, attendance at a summer school, a field trip or a language course all bring many advantages: you get to know a different culture and language as well as another educational and research system, and gain experience for your professional life.

Chemistry students, for example, can participate in a bilateral exchange programme at the Worcester Polytechnic Institute (WPI) in the USA or University College Cork (UCC) in Ireland. Moreover, students at the School of Life Sciences and Facility Management have the opportunity to take part in an exchange semester at partner universities through the Swiss European Mobility Programme (SEMP). Our specialist academic counsellors and the staff of the International Relations Office at the ZHAW (IRO) will be pleased to provide individual consultation without obligation. For more information on international student online registration for an exchange semester, and reports of students' experiences, see:

www.zhaw.ch/lisfm/international/en


Chemistry student

«Studying chemistry is exactly the right way to find my dream job, because it combines my enthusiasm for natural sciences with the best professional perspectives. I find my research work on new biomolecules, which are used as therapeutics in medicine, particularly exciting.

In Switzerland in particular, this new class of active ingredients is being used in state-of-the-art equipment.»

Raffaella

At a glance

Degree programme Specialisations	Chemistry Chemistry, Biological Chemistry
Title	ZFH Bachelor of Science in Chemistry
Duration	Full-time (six semesters), part-time (individually planned). Part-time studies are integrated into full-time studies and last 4 to 6 years depending on individual workloads.
Start of studies	Mid-September (week 38); one week earlier for all new 1 st semester students (week 37)
Workload	180 ECTS credits (1 credit represents 25 to 30 hours of work).
Preparation	Preliminary courses in mathematics, chemistry, physics, and a laboratory introductory internship. Details at: www.zhaw.ch/en/lisfm/study
Campus	Wädenswil on Lake Zurich (25 km from Zurich)
Tuition fees	Semester fees: CHF 720 (subject to change) plus study materials, membership of the ASVZ sports association and individual living expenses. An additional fee of CHF 500 per semester is also applicable for all students who travel to Switzerland for study purposes and do not have permanent Swiss residence when commencing their studies.
Conditions of acceptance	Candidates with a vocational apprenticeship (relating to chemistry) and a federally recognised vocational baccalaureate can begin their studies directly. Candidates with a federal certificate of proficiency in another professional field other than chemistry require 6 to 12 months' work experience. Candidates with an academic baccalaureate, a technical baccalaureate or a higher education diploma must prove 12 months' work experience in a field related to chemistry before beginning their studies. Alternatively, candidates with an academic baccalaureate have the option of starting their studies with a four-year, practice-integrated Bachelor's programme via PIBS (Practice-Integrated Bachelor's programme). We will be happy to advise you.
Important information	Excellent supervisor to student ratio. Dedicated lecturers. State-of-the-art laboratories and equipment. Semester or internships abroad. Laboratory internships with creative solutions for «real-world problems.» Direct implementation of theory into practice. Bachelor's thesis in applied research & development.
Information events	Four times per year, in March and October. Details at: www.zhaw.ch/lisfm/veranstaltungen
Study advisor	 Achim Ecker studienberater.ch.lisfm@zhaw.ch

After studying chemistry here in Wädenswil, you will be ideally equipped and sought after for positions of responsibility.

Study and research in Wädenswil: practically-oriented, creative, passionate and reflective

ZHAW Campus Reidbach / Einsiedlerstrasse

ZHAW Campus Reidbach / Seestrasse

ZHAW Campus Grüental

The ZHAW is one of the leading Swiss universities of applied sciences. The School of Life Sciences and Facility Management currently has around 1500 students and over 600 employees. Its study and continuing education options include five Bachelor's and three Master's degree programmes as well as a broad selection of continuing education courses.

Our expertise in life sciences and facility management in the areas of the environment, food, health and society enables us to make a vital contribution to solving social challenges and improving quality of life. Our success is based on five dynamic institutes with extensive competence in research, development and services in the disciplines of chemistry and biotechnology, food and beverage innovation, natural resource sciences, applied simulation, and facility management.



Environment | Food | Health | Society
Our competencies in Life Sciences
and Facility Management.

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www.zhaw.ch/icbt/bachelor-chemie

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