To participate in the Bachelor Research Project the student must have:
(1) successfully completed the first year of the degree programme.
(2) achieved a minimum of 130 ECTS in the curriculum after period 1b.
(If the Project is done in period 1a the student should have achieved 130 ECTS in the curriculum after period 2a of the previous year)
(3) applied for their diploma (by sending a study programme for approval to the Board of Examiners) one month before the start of the project.
(4) apply to the course coordinator before starting in 2b or the study advisor before starting outside of block 2b.

Appendices for the Bachelor's degree programme in Chemical Engineering

I. Learning outcomes of the Bachelor's degree programme
II. Majors and Minors
III. Course units first year of the degree programme
IV. Course units second and third years of the degree programme
V. Contact hours
VI. Additional Requirements Open degree Programmes
VII. Transitional provisions

Appendix 1. Learning outcomes of the Bachelor's degree programme (art. 3.1)

A. Generic learning outcomes – Knowledge

A1. Bachelor's graduates have general knowledge of the foundations and history of mathematics, natural sciences and technology, in particular those of their own discipline.

A2. Bachelor's graduates have mastered the basic concepts of their own discipline to a certain extent and are familiar with the interrelationships of these concepts within their own discipline as well as with other disciplines.

A3. Bachelor's graduates have in-depth knowledge of several current topics within their own discipline.

A4. Bachelor's graduates are familiar with the quantitative character of the fields of mathematics and natural sciences and have an understanding of the methods used in these fields, and particularly within their own discipline, including computer-aided methods.

A5. Bachelor's graduates have sufficient knowledge and understanding of mathematics and natural sciences to successfully complete a follow-up Master's degree programme in their own discipline.

A6. Bachelor's graduates are aware of the societal, ethical and social aspects involved in the fields of mathematics and natural sciences.

B. Generic learning outcomes – Skills

B1. (Research) Bachelor's graduates are able to draw up a research question, design, plan and conduct research and report on it independently with a certain degree of supervision. Bachelor's graduates are able to evaluate the value and limitations of their research and assess its applicability outside their own field.

B2. (Designing) Bachelor's graduates are able to translate a problem, in particular a design problem, into a plan of approach and – taking into account the requirements of the client and/or technical preconditions – find a solution.

B3. (Gathering information) Bachelor's graduates are able to gather relevant information using modern means of communication and to critically interpret this information.

B4. (Collaborating) Bachelor's graduates are able to collaborate in teams (including multidisciplinary teams) on technical-scientific problems.

B5. (Communicating) Bachelor's graduates are able to communicate orally and in writing in academic and professional contexts, with both colleagues and others. They are familiar with the relevant means of communication.

B6. (Reflecting) Bachelor's graduates are able to assess their own actions and those of others in a natural sciences context, bearing in mind the social/societal and ethical aspects.

B7. (Learning skills) Bachelor's graduates are able to apply learning skills that enable them to pursue a follow-up degree and acquire knowledge in new fields with a high level of autonomy.

B8. Additional subject-specific skills are listed in D.

C. Degree programme-specific learning outcomes – Basic Knowledge

The Bachelor's graduate in Chemical Engineering has:

C1. knowledge of the most important fields of i) process technology: physical transport phenomena, chemical reactor engineering, separation methods, and process design, ii) product technology: materials science, design methodology, and processing, and iii) basic aspects of chemistry: inorganic, organic, analytical, physical, and polymer chemistry and biochemistry.

C2. skilled in the use of standard laboratory procedures and in the use of equipment for synthetic and analytical work, necessary background knowledge of Mathematics and Physics,

C3. understanding of the position and role of the discipline within science and society, and also in the international character of the discipline.

The Bachelor's graduate has become familiar with the following key elements of Chemical Engineering:
C4. Important aspects of chemical terminology, nomenclature and conventions.
C5. Numerical and computational skills, including error analysis, understanding of the proper order of magnitude and correct use of units.
C6. The most important types of chemical reactions and their characteristics.
C7. The principles and procedures that are used in the chemical analysis and in the characterization of chemical compounds.
C8. The design of industrial processes, taking into account flow and transfer of matter and energy.
C9. The principles of Thermodynamics and phase diagrams.
C10. Kinetics of various chemical reactions.
C11. Dimensional analysis and its application in various (technological) problems.
C12. Basic knowledge of fluid dynamics and heat and mass transfer and their application in various part of process technology.
C13. Knowledge of equipment that is used in many chemical processes.
C14. The principles of separation methods and their application in industry.
C15. Basic knowledge of industrial chemistry and reactor engineering.
C16. Materials Science with emphasis on structure-property relationships and their application in various areas of Product Technology (production, analysis, etc.).
C17. The principles of production, structure and properties of polymers and the use of these in various types of chemical products.
C18. Basic knowledge of Product Technology.
C19. Thinking in systems that are relevant for industrial chemistry and technology.
C20. The properties of chemicals and the environmental and safety aspects of using them.

D. Degree programme-specific learning outcomes- Skills
The Bachelor's graduate in Chemical Engineering has developed the skills and competences mentioned below.

Chemical Engineering-related cognitive skills and competences
The Bachelor's graduate is:
D1. able to demonstrate and use their knowledge and understanding of essential facts, concepts, principles and theories related to the topics, as defined in B, for the (re)design of new chemical processes/products.
D2. able to apply knowledge and understanding to solve basic qualitative and quantitative problems,
D3. skilled in evaluating, interpreting and combining chemical and process/product technological information and data,
D4. able to recognize and implement 'good laboratory practice',
D5. familiar with project work,
D6. able to adopt a professional attitude regarding environmental and safety aspects and possible ethical implications in the context of research, education and industry.
D7. able to work at different levels of abstraction and detail, including system design level,
D8. able to see, where necessary, the importance of other disciplines (interdisciplinary) and their contribution in the design process.

Chemical Engineering-related practical skills
The Bachelor's graduate is:
D9. skilled in the use of standard laboratory procedures and in the use of equipment for synthetic and analytical work,
D10. able to verify chemical properties, to observe and measure events or changes, and to systematically archive and document data,
D11. able to interpret data, obtained from observations and measurements, and relate it to the right theories,
D12. able to assess the risks of laboratory procedures and the use of chemicals,
D13. skilled in the safe handling of chemicals, taking into account physical and chemical properties, including the various specific risks of use, and is also able to act adequately in emergency situations in the laboratory,

D14. able to use IT skills appropriate to the chosen specialization.

Appendix II. Majors and Minors of the Bachelor's degree programme (art. 3.7 and 7.1.3)

The degree programme has the following Major(s):
Students take compulsory courses for 165 ECTS, see the tables for course units in appendix III and appendix IV.

The degree programme has the following Minor(s):
Students can choose an elective for 15 ECTS, see table for course units in appendix IV.

Appendix III. Course units in the first year of the degree programme

- **List of course units (art. 4.1.1)**
- **Compulsory order of examinations (art. 9.3)**

Practicals are defined as lab practicals.

Course unit name	**Course code**	**ECTS**	**Practical**	**Entry requirements**
Maths for Chemistry and Engineering	WBCH048-05	5		
Molecules: Structure, Reactivity, and Function	WBCH004-05	5	x	
Concepts of Chemical Engineering	WBCE034-05	5	x	
Transport Phenomena	WBCE023-05	5		
Organic Chemistry 1	WBCH013-05	5		
Practical Synthesis and Analysis 1	WBCH016-05	5	x	Molecules: Structure, Reactivity, and Function and Organic chemistry 1
Biochemical Technology	WBCE035-05	5	x	
Sustainability Projects	WBCE024-05	5		
Physical Chemistry	WBCH066-05	5		
Inorganic Chemistry	WBCH039-05	5		
Spectroscopy	WBCH044-05	5		
Linear Algebra & Multivariable Calculus for Chemistry	WBCH011-05	5		

Appendix IV. Course units in the second and third year of the degree programme

- **Admission to the second year**
- **List of course units (art. 7.1.1)**
- **Compulsory order of examinations (art. 9.3)**

The following candidates will be admitted to the second year:
Students who have been issued a positive study advice from the degree programme in question
Students who have been issued a positive study advice from one of the following degree programmes:
- BSc Chemistry.

Course unit name	Course code	ECTS	Practical	Entry requirements
Industrial Organic Chemistry and Catalysis	WBCE003-05	5		Organic Chemistry 1
Single-Phase Reactors	WBCE006-05	5		
Physical Transport Phenomena 2	WBCE011-05	5		Transport Phenomena
Chemical Engineering Practical	WBCE033-05	5	x	Practical synthesis and analysis 1
Numerical Analysis for Chemical Engineers	WBCE032-05	5		
Technical Thermodynamics	WBCE014-05	5		
Polymer Chemistry	WBCE037-05	5		
Green Chemistry: Technological, Societal and Ethical Aspects	WBCE026-05	5		
Polymer analysis and engineering practical	WBCE028-05	5	x	
Product Technology	WBCE019-05	5		
Separation Processes	WBCE020-05	5		
Process Control & Dynamics	WBCE005-05	5		
General Process Equipment	WBCE002-05	5		Single-Phase Reactors
Chemical Process Development and Design	WBCE007-05	5		
Special Process Equipment	WBCE012-05	5		General Process Equipment
Multiphase Reactors	WBCE016-05	5		
Process Design	WBCE018-10	10		Separation Processes, General Process Equipment
Electives: courses from bachelor programmes, which must be individually approved by the BoE.		15		See programme-specific appendices of the Teaching and Examination Regulations.
Bachelor Project	WBCE901-15	15	x	

Electives

Course unit	Code	ECTS	Prac.	Entry requirements
Polymer Engineering	WBCE030-05	5		
Biochemical Engineering	WBCE029-05	5	x	
Research trends in sustainable chemical engineering	WBCE031-05	5		
Electrochemical Technology	WBCE021-05	5	x	
Physical Properties of Materials 1	WBCH006-05	5		

Appendix V. Contact hours (art. 3.6)

Degree programme year 1	
Structure contact hours	**Contact hours per year**
Lectures	290
Tutorial / (pc) practicals	286 / 252
Tutoring	8
Assignment	24
Supervision during an internship	-
Examinations	26

Degree programme year 2	
Structure contact hours	**Contact hours per year**
Lectures	238
Tutorial / (pc) practicals	214 / 238
Tutoring	-
Assignment	178
Supervision during an internship	-
Examinations	20

Degree programme year 3 (excluding minor)	
Structure contact hours	**Contact hours per year**
Lectures	76
Tutorial / (pc) practicals (incl. Bachelor project)	148 / 40
Tutoring	-
Assignment	178
Supervision during an internship	-
Examinations	6
BSc Research Project	420

Appendix VI. Additional Requirements Open degree Programmes (art. 7.3)

In exceptional circumstances students wishing to pursue an open degree programme may file a request with the Board of Examiners of Chemistry and Chemical Engineering. The Board of Examiners will evaluate whether the proposed curriculum meets the learning outcomes of the degree programme.

Appendix VII. Transitional provisions (art. 12.1)

For cohort 2024-2025 and earlier

Course	May be replaced with	Info
Macromolecular Chemistry (WBCH023-05)	Polymer Chemistry (WBCE037-05)	