Appendix No 10a to Resolution No 38 of the NCU Senate of 29 April 2025

S t u d y p r o g r a m m e

Part A) of the study programme *

L e a r n i n g o u t c o m e s

Faculty offering the field of study:	**Faculty of Chemistry**
Field of study:	**chemistry**
Level of study:	**first-cycle studies**
Level of the Polish Qualifications Framework:	**level 6**
Degree profile:	**general academic**
Professional degree awarded to the graduate:	**licencjat**
Allocation of the field of study within academic or artistic discipline(s), to which learning outcomes for a given field of study refer:	**Discipline: Chemical Sciences (100%)** **Major discipline: Chemical Sciences**

Symbol	**Upon completion the graduate achieves the learning outcomes specified below:**
	KNOWLEDGE (the graduate knows and understands)
K_W01	The graduate has advanced knowledge of principles of chemistry and the nomenclature.
K_W02	The graduate knows most important chemical elements and their compounds. The graduate knows ways of correlations between elements' properties and their primary chemical compounds, and the place of the element in the periodic table.
K_W03	The graduate has advanced knowledge of the principles of linear algebra, mathematical analysis and statistics necessary for the description and modelling of chemical phenomena.
K_W04	The knows the role of experiments and computer simulations in chemical processes
K_W05	The graduate knows basic software packages for the analysis and development of data
K_W06	The graduate knows theoretical and practical aspects of performing qualitative and quantitative analysis by means of conventional and instrumental methods as well as equipment operation rules.
K_W07	The graduate has advanced knowledge of functional groups of organic compounds and reaction mechanisms
K_W08	The graduate knows states of matter, state equations, theory of chemical kinetics, intermolecular interactions, laws of thermodynamics, phase equilibria, basics of electrochemistry
K_W09	The graduate is familiar with basic terms, concepts, principles and laws of physics and with their universal character to the extent sufficient to continue education
K_W10	The graduate knows basic concepts and advanced research methods of contemporary inorganic and coordination chemistry
K_W11	The graduate knows the basics of biochemistry and chemistry of metabolic processes
K_W12	The graduate knows techniques of collecting and preparing samples from environmental matrices for analysis, water quality indicators, toxicity tests, and methods of wastewater neutralisation
K_W13	The graduate has advanced knowledge of aspects of the construction and methods of assessment of properties of materials and chemical substances. The graduate has knowledge enabling them to use materials for a specified practical purpose and to indicate a method of their management after their lifetime.
K_W14	The graduate knows and understands the basics of quantum chemistry; postulates of quantum mechanics and their application to the description of atoms and molecules. The graduate knows and understands theoretical fundamentals of various molecular spectroscopies.
K_W15	The graduate has knowledge of technology and chemical engineering

K_W16	The graduate is aware of occupational health and safety regulations and basic concepts in toxicology. The graduate knows legal regulations pertaining to standards and requirements binding in chemical laboratories as well as legal regulations concerning hazardous substances, their storage and labelling.
SKILLS (the graduate is capable of)	
K_U01	The graduate is able to use chemical terminology and concepts in general chemistry
K_U02	The graduate is able to correlate properties of chemical elements and their chemical compounds with their place in the periodic table and to correlate chemical properties of substance with their modern applications
K_U03	The graduate is able to apply the methods of linear algebra and mathematical analysis in selected issues in physics and chemistry
K_U04	The graduate displays the ability to describe and model chemical phenomena and uses selected numerical procedures in chemical calculations
K_U05	The graduate is able to perform basic chemical measurements and is able to develop the results of physicochemical experiments
K_U06	The graduate is able to perform quantitative analyses using gravimetric, volumetric and instrumental methods on the basis of analytical procedures. The graduate is able to prepare an analysis-based report.
K_U07	The graduate is able to recognise functional groups of organic compounds and to perform experiments in organic chemistry
K_U08	The graduate recognises states of matter, and is able to define and describe physicochemical processes
K_U09	The graduate is able to develop simple physical experiments, analyse their results, and explain physical phenomena occurring in the surrounding world. The graduate is able to solve basic problems relying on the laws of physics
K_U10	The graduate is able to synthesise and separate simple inorganic compounds and selected coordination compounds
K_U11	The graduate is able to describe the structure and functions of macromolecular compounds occurring in living organisms and to specify metabolic changes occurring in major metabolic pathways as well as ways of storing and processing chemical energy in the cell
K_U12	The graduate is able to collect and prepare environmental samples and analyse them .
K_U13	The graduate is able to find correlations between material behaviour during formation and use, and physicochemical properties, structure and structural type.
K_U14	The graduate is able to use basic quantum numerical methods to describe, in qualitative terms, properties, structures and reactivity of chemical systems
K_U15	The graduate is able to solve basic problems related to the completion of technological processes
K_U16	The graduate is able to behave properly while facing a variety of emergencies, such as fire or contact with chemical reagents
K_U17	The graduate displays language skills in a modern foreign language at the intermediate level (B2 level) in daily life, in education-related situations and while preparing their diploma thesis
SOCIAL COMPETENCES (the graduate is willing to)	
K_K01	Analytical thinking: The graduate is able to work on his/her own and effectively with large amounts of data, to perceive interrelations between phenomena and draw correct conclusions using the principles of logic.
K_K02	Creativity: The graduate thinks creatively in order to improve existing solutions or develop new ones.
K_K03	Conscientiousness and accuracy: The graduate strives to complete a task as effectively as possible. The graduate is sensitive to details and is systematic
K_K04	Communication skills: The graduate is able to communicate the achievements of chemical knowledge to other persons effectively and clearly. The graduate adjusts the level and form of presentations to the needs and capabilities of receivers.

K_K05	Pursuit of development: The graduate is focused on the constant acquisition of new knowledge, skills and experience. The graduate acknowledges the need for constant self-improvement and increasing his/her professional skills. The graduate is aware of the limitations of their knowledge and understands the need for further education.
K_K06	Perseverance and consistency: The graduate works systematically and has a positive attitude to obstacles standing in the way of reaching the desired objectives. The graduate observes deadlines. The graduate understands the need to be systematic in all projects undertaken
K_K07	Autonomy: The graduate implements agreed objectives on his/her own, taking autonomous and sometimes difficult decisions. The graduate is able to find information in the field literature.
K_K08	Professionalism and ethics: The graduate knows and abides by the standards binding for chemists, including ethical standards. The graduate understands the social role of the profession. The graduate understands and recognises the importance of intellectual honesty and integrity, care of one's health and of the natural environment in activities undertaken by themselves and by other persons.
K_K09	Team work: The graduate is able to establish and maintain long-term and effective collaboration with other persons. The graduate endeavours to achieve the objectives of the team by proper planning and organisation of their own work and the work of other persons. The graduate motivates collaborators to increase their efforts in order to achieve the assumed objectives

Part *B) of the study programme*

Description of the process resulting in the achievement of learning outcomes

Faculty offering the field of study:	Faculty of Chemistry
Field of study:	chemistry
Level of study:	first cycle (BSc)
Level of the Polish Qualifications Framework:	Level 6
Degree profile:	general academic
Allocation of the field of study within academic or artistic discipline(s), to which learning outcomes for a given field of study refer:	Discipline: chemical sciences (100%) **Major discipline**: chemical sciences
Mode of study:	full-time programme
Number of semesters:	6
Number of ECTS required for the award of qualifications corresponding to the level:	180
Total number of teaching hours:	2130
Professional degree awarded to the graduate:	BSc - licencjat
The relationship between the study programme and NCU mission and strategy:	Programme of first-degree Chemistry is closely related to the mission of the Nicolaus Copernicus University involving the development and dissemination of knowledge. At the Faculty of Chemistry research in all major fields of experimental and theoretical chemistry are conducted for years. The results of these studies are well known not only in the country but in the international arena and published worldwide as well as presented during national and international scientific conferences. Teaching first degree chemistry is taught at university level, and other forms of education and popularization are implemented, corresponding to the current and future needs and aspirations of society. According to the strategy of Nicolaus Copernicus University the teachers and students work are evaluated and self-estimated, measure of which is reliability, high quality and a deep commitment to the universal ethical values.

Courses/course modules along with expected learning outcomes

Course module	Course	Expected learning outcomes	Forms and methods of teaching ensuring the achievement of learning outcomes	Methods of verifying and assessing expected

				learning outcomes achieved by the student
Basic course module I	Informatics in chemistry (+ USOS) Mathematics Health and safety training and ergonomics Fundamentals of analytical chemistry Physics Physical chemistry Fundamentals of quantum chemistry Organic chemistry Inorganic chemistry	As knowledge of the foundations of analytical, physical, organic, inorganic, quantum chemistry and biochemistry. Has knowledge of basic terms, concepts, principles and laws of physics and their universal nature. He knows the postulates of quantum mechanics and their application to the description of atoms and molecules. He knows the role of computer simulations in chemistry and is able to use software package for data analysis and development. Knows the basic rules of safety and health at work in chemistry. Knows the basics of linear algebra, calculus and statistics necessary for the description and modeling of phenomena. Gains skills of geometric interpretation of problem solving, knowledge of elementary functions (single and multi-variable), their properties, the ability to manipulate matrices, solving systems of linear equations (including functions of several variables). He/she can plan and take measurements of chemical	Lecture: introductory method - problematic lecture, informative (conventional) Exercises: independent work of students Laboratory: independent student work; experiment method; methods with the use of a computer	Continuous assessment (involvement of conscientiousness, theoretical preparation for classes, manual proficiency, knowledge and respecting safety regulations); Written tests; short tests; evaluation of individual exercise reports; final test; written exam

		and physical values, and analyze samples by classical methods. Can suggest a chemical reaction mechanism and identify functional groups of organic compounds. Can conduct experiments in the field of organic and inorganic chemistry. Can use basic quantum numerical methods for qualitative description of the properties, structure, and reactivity of chemical systems. Is able to estimate the results of experiments and apply the methods of linear algebra and mathematical analysis of selected topics in physics and chemistry. using the mathematical analysis apparatus to the study of functions and determining their approximate value. Is able to calculate basic parameters of a random variable. Works unassisted with large amounts of information, recognizes relations and correctly draws conclusions using the principles of logic. Is set to the best execution of the task. He knows and restricts the rules and standards of being a chemist. Develops the ability to think logically.		

Major course module II	Instrumental analysis Environmental chemistry and ecology Applied and materials chemistry Chemical technology and engineering Fundamentals of chemistry of biological processes and bioanalitycs	Acquires knowledge of theoretical and practical aspects of the implementation of the familiar qualitative and quantitative analysis of instrumental methods and principles of operation of the apparatus. Knows the techniques of sample collection and preparation for analysis of environmental matrices, indicators of water quality, toxicity tests, methods of waste neutralization. Knows the basic aspects of construction of the materials and chemicals and methods of determine their properties. Knows how to use the materials for a particular purpose and knows practical indications of their management methods after usage. Has knowledge of the basics of the technology and chemical engineering It can collect environmental samples and perform quantitative analyzes using instrumental methods based on analytical procedures. Can prepare reports. Can find the relationship between behavior of the material during its formation and use and its	Lecture: introductory method - problematic lecture, informative (conventional) Exercises: independent work of students Laboratory: independent student work; experiment method	written or oral exam credit - final test for assessment, preparation of the project for assessment, preparation paper The continuous assessment determined by the lecturers (commitment, diligence, theoretical preparation for classes, manual proficiency, knowledge and compliance with health and safety regulations); written tests of "tickets"; assessment of individual reports on the exercises performed; final colloquium

		physicochemical properties, composition and type of structure. Is able to solve problems related to the implementation processes. It is set to the best execution of the task. He knows and restricts the regulations and standards of being a chemist, including ethical standards; understand the social role of the profession; understands and appreciates the importance of intellectual honesty, attention to health and the environment in his/her own and other people activities. Establishes and maintains long-term and effective cooperation with others; seeks to achieve team goals through proper planning and organization of teamwork; motivates employees to the effort in order to achieve his/her objectives.		
Course module IV general chemistry	General chemistry – basic level General chemistry – advanced level	Has knowledge of basic chemistry. Can perform basic laboratory operations and measurements. Is able to analyses and estimate the results of experiments. Can plan a simple chemical experiment and choose the equipment necessary for its implementation.	Lecture: introductory method - problematic lecture, informative (conventional) Exercises: independent work of students Laboratory: independent student work; experiment method	written or oral exam credit - final test for assessment The continuous assessment determined by the lecturers (commitment, diligence, theoretical preparation for classes, manual proficiency, knowledge and compliance with health and safety

		He knows and restricts the regulations and standards of being a chemist, including ethical standards; understand the social role of the profession; understands and appreciates the importance of intellectual honesty, attention to health and the environment in his/her own and other people activities		regulations); written tests of "tickets"; assessment of individual reports on the exercises performed; final colloquium
Elective course module, e.g., university-wide courses or courses included in another field of study that are unrelated to a specific field of study	Course related to chemistry studies (to be chosen from the available list) Blocks of items to choose Bioethics or Philosophy of Nature University-wide courses	Acquires additional chemical knowledge. He meets new analytical methods and the interpretation of research results and methods. Acquires the binding ability of the chemical properties of the chemical structure. Has an extended knowledge of basic chemistry departments, its development and importance for the progress of science and the knowledge of the world and of human development. Has in-depth knowledge in his/her chosen field of chemistry. Can apply modern analytical apparatus. Can use the extended knowledge of the fundamental branches of chemistry and use it creatively in terms of his/her speciality. Knows the limitations of his/her knowledge and understands the need to	Lecture: introductory method - problematic lecture, informative (conventional) Exercises: independent work of students Laboratory: independent student work; experiment method	written or oral exam credit - final test for assessment The continuous assessment determined by the lecturers (commitment, diligence, theoretical preparation for classes, manual proficiency, knowledge and compliance with health and safety regulations); written tests of "tickets"; assessment of individual reports on the exercises performed; final colloquium Credit without assessment

		continue learning throughout life; can independently take action to broaden and deepen knowledge of chemistry. Can interact in a team (assuming there different roles) and creatively solve problems relating to research and chemical synthesis. Is able to prioritize appropriately to solve chemical problems. Is aware of professionalism, appreciation of intellectual honesty and respect for professional ethics, both in his own activities and others. Is able to formulate and present opinions on the fundamental chemical issues and developments in this discipline. Acquires general knowledge from other fields and disciplines, including the humanities. Takes skill of directing his/her own learning and interdisciplinary interests. Is set to the constant acquisition of new knowledge, sees the limitations of his/her knowledge and understands the need for continuous learning. Acquires the ability to self-direct his/her own intellectual development and interdisciplinary interests.		

Physical Education		Has knowledge of physical culture and knows how to lead health-promoting lifestyle. Promotes the sport and pursue his/her own preferences in the field of physical culture.	Exercises: independent work of students	Credit without assessment
Foreign language classes	English in chemistry	Achieves B2 reference level	Lecture: introductory method - problematic, informative (conventional) lecture. Exercises: Cognitive and communication method using various techniques, media, authentic materials	Determined by lecturers, pass mark or exam written or oral exam The continuous assessment determined by the lecturers (commitment, diligence, preparation for classes)
Internships*		Acquires knowledge about the functioning of various branches of the chemical industry and related (food, cosmetics, pharmaceuticals etc.) and meets the practical aspects of technological processes. Can bind the research process and analytical technology practice. He works steadily and has a positive approach to the difficulties standing in the way of the objective pursued; miss deadlines; understands the need for systematic work on all projects.	Laboratory: experiment method	Assessment basing on the practice register
Diploma project and/ or diploma examination **	Seminar Diploma laboratory Diploma project	Knows the basic properties of inorganic and organic compounds, the types of reactions and their mechanisms. Has	Seminar: discussion, preparation of the paper Laboratory: independent student work; experiment method	Diploma exam, Credit The continuous assessment determined by the lecturers (commitment, diligence,

		specialized knowledge in the field of chemistry and can use it during a presentation at a seminar and writing the thesis. Knows the rules of health and safety enough to work unassisted on a test or measurement. Thinks creatively to improve existing solutions. Fully independently carries out agreed objectives, taking sometimes difficult decisions. Can independently search for and critically evaluate information in the literature		theoretical preparation for classes, manual proficiency, knowledge and compliance with health and safety regulations); presentation of results

Internships*	
Duration of internships	120 hours
Form of internships	laboratory work
Rules of internships	rules of internship are set out in the internship regulations

Detailed allocation of ECTS credits

Academic or artistic disciplines, to which learning outcomes refer:

	Artistic or academic discipline	**ECTS credits**	
		number	**%**
1.	**Chemical sciences**	**180**	**100**

Course modules	Course	No of ECTS credits	No of ECTS credits in the discipline: *(enter names of disciplines)***					No of ECTS credits for elective courses	No of ECTS credits obtained by the student in classes within contact hours with the teacher or tutor	No of ECTS credits obtained by the student as a result of: courses related to academic activity within a discipline or disciplines, to which the field of study is assigned *****/ courses focused on training practical skills ******
			chemical sciences	physical sciences	mathematics	philosophy, linguistics	other			
Course module I basic subject	Informatics in chemistry (+ USOS)	6	6						2,8	6
	Mathematics	12			12				5,2	
	Health and safety training and ergonomics	1	1						0,4	
	Fundamentals of analytical chemistry	12	12						6,6	12
	Physics	6		6					3	
	Physical chemistry	19	19						9,4	19
	Fundamentals of quantum chemistry	5	5						3	5
	Organic chemistry	15	15						9,4	15
	Inorganic chemistry	12	12						10,2	12

Major course module II	Instrumental analysis	8	8						5,6	8
	Environmental chemistry and ecology	7	7						3,2	7
	Applied and materials chemistry	2	2						1,2	2
	Chemical technology and engineering	3	3						1,6	3
	Fundamentals of chemistry of biological processes and bioanalitycs	4	4						2,6	4
Course module general chemistry	General chemistry – basic level	16-17	16-17					16-17	8,2-9	16-17
	General chemistry – advanced level									
Elective course module, e.g., university-wide courses or courses included in another field of study that are unrelated to a specific field of study	Course related to chemistry studies (to be chosen from the available list)	2	2					2	1,2	2
	Blocks of items to choose from	18	18					18	9	18
	Bioethics or Philosophy of Nature	4				4		4	1,2	
	University-wide courses	2-3					2-3	2-3		
Physical Education	Physical Education									
Foreign language classes	English in chemistry	7				7			4,8	
Internships*	Internships	4	4					4		4
Diploma project and/or diploma examination **	Seminar	1	1					1	0,8	1
	Diploma laboratory	6	6					6	3	6

	Diploma project	**7**	**7**					**7**	**7**	**7**
	IN TOTAL:	**180** **100%**	**148-149** **82,2%** **-82,8%**	**6/180** **3,3%**	**12/180** **6,7%**	**11/180** **6,1%**	**2-3/180** **1,1-1,7%**	**60/180** **33,3%**	**97,4/180** **54,1%**	**147/180** **81,7%**

* The programme of practically oriented studies provides for vocational internships that last at least:
- 6 months – on first cycle and long cycle studies,
- 3 months – on second cycle studies.

**The diploma project is:
- obligatory on second cycle and long cycle studies,
- optional on first cycle studies.

*** names of academic and artistic disciplines must be compliant with the regulation of the Minister of Science and Higher Education of 11 October 2022 on fields of science and academic disciplines and artistic disciplines (Journal of Laws [Dz. U.] of 2022, item 2202 as amended)
******** refers to academically oriented profile
********* refers to practically oriented profile

Course modules	**Course**	**Programme content**
Course module I basic subject	Informatics in chemistry (+ USOS)	The aim of the course is the acquisition of theoretical knowledge and practical skills to apply of computers in the analysis and interpretation of experimental results, experimental design and simulation of chemical processes and perform simple numerical calculations.
	Mathematics	Part of the tutorials will be devoted to the repetition and systematization of selected issues from the secondary school curriculum, taking into account a very different level of student preparation. We will pay particular attention to the correct mathematical notation. Some issues will be extended compared to the basic scope of the math program for high school. There will also be new issues illustrating problems discussed in the lecture, such as the basics of one variable's function differential calculus. The derivatives will be used to study the course of the function variability. The lecture will begin with an introduction to the basics of differential calculus. Then, we will discuss the fundamentals of integral calculus of functions of one variable. We will introduce the basics of linear algebra, matrices, determinants discussed, inverse matrix, and the eigenproblem. We will present the usage of matrices for solving systems of linear equations. We will discuss the scalar and vector products. Basic information about the function of several variables will be presented. The tutorials will illustrate the issues discussed during the lecture.
	Health and safety training and ergonomics	The aim of the lecture is to familiarise study participants with the basic issues of occupational health and safety and to sensitise them to the main problems.
	Fundamentals of analytical chemistry	The course aims to introduce analytical methods and key terms and definitions in quantitative analysis. It covers knowledge, understanding, and skills related to solving analytical problems, applying theoretical concepts in titrimetric determinations, and understanding the practical application of theoretical knowledge

		to titration and gravimetric methods. Students develop proficiency in using analytical equipment and preparing analytical reports. The course includes lectures with titration demonstrations for all students. The laboratory component provides hands-on training in basic titration and gravimetric analysis techniques
	Physics	Physical knowledge is fundamental to natural sciences. The course aims to extend and systematize this knowledge that students acquire in the earlier stages of education and extend it significantly. The problems presented in the class will allow you to familiarize yourself with the fundamental interactions occurring in nature and the laws governing physical phenomena. We will show that many of the phenomena we can observe around us have relatively simple physical explanations, and understanding their essence can provide personal satisfaction. By discussing physical problems, we will show the importance of mathematics in describing physical phenomena, including tools such as differential and integral calculus, which students will learn in math classes.
	Physical chemistry	Basics of the equilibrium thermodynamics, laws of thermodynamics, criteria of the behavior of systems Chemical potential of the component. Chemical reaction equilibrium. Phase change equilibria. Properties of matter (gas, liquids, solids). Properties of the interphase surfaces. Conductivity of electrolytes. Electrochemical cells. Polarization of electrodes. Corrosion. Chemical kinetics, mechanism of chemical reactions. Catalysis.
	Fundamentals of quantum chemistry	Fundamentals of Quantum Chemistry is intended to be an introductory course of the electronic theory of atoms and molecules, focusing on fundamental concepts rather than going deeply into formal details. Particular attention is given to building theoretical models for chemistry, including their origin, validity and limitations. The primary goal of the course is to enhance the understanding of chemistry through basic physics principles. The course also provides an introduction to vibrational, rotational and electronic spectroscopy of atoms and molecules.
	Organic chemistry	The subject includes content related to the chemistry of carbon compounds and aims to familiarize students with basic information on the types of organic compounds and their reactions and experimental techniques in this field. This subject includes content connected with a chemistry of carbon atoms and intends to acquaint of students with basic informations concerned with types of organic compounds and their reactions. The actual subject consists of 30 hours of lecture and 15 hours of exercixes and ended by a test exam.
	Inorganic chemistry	The aim of the course is to provide a sound foundation for undergraduate students in physical inorganic principle, main concepts, theoretical background and descriptive inorganic chemistry, synthesis, separation, identification and studies on some physicochemical properties of classical inorganic and coordination compounds.
Major course module II	Instrumental analysis	The scope of instrumental analysis is to teach students contemporary instrumental analytical methods. Students obtain knowledge about spectroscopic, electrochemical and chromatographic methods and their applications in analyses of different matrices. Knowledge covers: theoretical background, quantitative and qualitative aspects of instrumental analytical methods and understanding of instruments work and performance. In this block students acquire skills of sample preparation for analysis, calibration rules,

		checking of analytical instruments, running analyses, methods of results preparation using statistical analysis, writing reports according to good laboratory practices.
	Environmental chemistry and ecology	Philosophical aspects of ecology, ecosystem (atmosphere, hydrosphere, lithosphere), local and global changes in the environment, wastewater, solid waste, noise, food and human health., bioindication, bioaccumulation
	Applied and materials chemistry	The aim of the subject is to acquaint students with the problems of producing and applying chemical materials and substances, the principles of their rational utilisation and management. • Fundamental problems associated with the structure of solids, transitional phases and allotropy. • Band theory of solids – conducting and semiconducting properties of materials. • Metals, alloys, metal oxides. • Ceramics, glasses, building materials. • Natural and synthetic polymers – structure, properties, manufacture, application and recycling methods. • Energy production – types of fuels and techniques of their combustion; renewable sources of raw materials and energy. • The problem of post-consumer communal and hazardous wastes. Technologies for the management (recycling) of wastes.
	Chemical technology and engineering	The aim of the course is to acquaint students with selected aspects of modern chemical technologies, including the principle of rational use of raw materials and energy complex development of industrial waste on the basis of selected processes in the field of inorganic technology. Classes also cover issues related to sustainable development, with the introduction of the principles of "green chemistry" into industrial practice and the generation of energy from renewable sources..
	Fundamentals of chemistry of biological processes and bioanalitycs	Lecture: to familiarize students with the basic biochemical processes. Students will be familiarized with the metabolic transformations of compounds in connection with the cell structure, basic biogenic elements as well as the biological role of compounds (proteins, nucleic acids, lipids). Learn about biochemical processes (biosynthesis, degradation, oxidation, transformations of basic metabolites). Students will also be introduced to instrumental methods used in the analysis of, inter alia, proteins and nucleic acids. Laboratory exercises: designed to prepare for work in research, control and diagnostic laboratories in terms of interpreting results in comparison with standards, identifying chemical substances in biological material and determining their content. As part of the experimental exercises, the skills of assessing the risks resulting from working with chemical substances as well as learning about the principles of occupational health and safety will be consolidated.
Course module general chemistry	General chemistry – basic level	Introduction to chemistry as a science of the structure of matter, chemical compounds, molecular systems, their properties, structure and reactions, as well as practical solving of simple chemical problems as part of laboratory and auditorium classes.

	General chemistry – advanced level	An extended introduction to chemistry as a science of the structure of matter, chemical compounds, molecular systems, their properties, structure and reactions, as well as practical solving of advanced chemical problems as part of laboratory and auditorium classes.
Elective course module, e.g., university-wide courses or courses included in another field of study that are unrelated to a specific field of study	Course related to chemistry studies (to be chosen from the available list) Blocks of items to choose from Bioethics or Philosophy of Nature University-wide courses	Syllabus content depending on the student's choice of subject.
Physical Education	Physical Education	Syllabus content depending on the student's choice of subject.
Foreign language classes	English in chemistry	The student participates in a 120 hour specialist language course (ES)P. The program of the course is aimed at developing language skills according to the Common European Framework of Reference for Languages criteria for B2 level with the emphasis on the specialist terminology. The effects of study are evaluated with the final specialist exam at B2 level.
Internships*	Internships	Individual 120-hour professional practice held at a workplace chosen by the student at any time. The student arranges the details of the practice and its date personally with the workplace. The selected workplace can be both production plants as well as companies and institutions whose activities are related to the chemical aspect.
Diploma project and/or diploma examination **	Seminar Diploma laboratory Diploma project	Syllabus content dependent on the student's choice of supervisor and thesis topic.

This study programme is effective as of winter semester of the academic year 2022/2023.