RĪGAS TEHNISKĀ UNIVERSITĀTE

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Study programme "Chemistry and Chemical Technology"

Main attributes

Title	Chemistry and Chemical Technology
Identification code	KBM0
Education classification code	43528
Level and type	Academic Bachelor Study
Higher education study field	Chemistry, Chemical Technologies and Bio-Technology
Head of the study field	Māris Turks
Department responsible	Faculty of Material Science and Applied Chemistry
Head of the study programme	Māris Turks
Professional classification code	–
The type of study programme	Full time
Language	Latvian, English
Accreditation	19.04.2023 - 20.04.2029; Accreditation certificate No 2023/17-A
Volume (credit points)	160.0
Duration of studies (years)	Full time studies - 4,0
Degree or/and qualification to be obtained	Bachelor degree of engineering science in chemical technology/ –
Qualification level to be obtained	The 6th level of European Qualifications Framework (EQF) and Latvian Qualifications Framework (LQF)
Programme prerequisites	Secondary education

Description

Abstract	The study programme is the only programme in this field in Latvia, as it includes the acquisition of basic theoretical education in chemistry and chemical technology, acquisition of practical skills in teaching and research laboratories, as well as internship in the speciality. The study programme includes specialization in different fields of chemical technology: Production Technology and Environmental Aspects, Chemistry and Technology of Organic Substances, Chemistry and Technology of Biomaterials, Chemistry and Technology of Polymer Materials, Chemistry and Technology of Inorganic Materials, Analytical Chemistry. Simultaneously to theoretical studies during the elaboration of bachelor thesis and within speciality study courses student acquires research methods and technique, as well as can obtain practical skills at enterprises. Study programme trains specialists for enterprises dealing with processing and manufacturing chemistry, biotechnology and pharmaceutical products, food, cosmetics, fuel, wood, ceramics, textile and building materials, as well as specialists for corresponding research and quality control laboratories, research institutions and commercial companies. Knowledge of chemical technology allows graduates to work in companies of different branches, wherever there is a need for engineering specialists who are familiar with chemical processes, are able to ensure their quality, are able to develop new methods and equipment, create, design and implement new, innovative technologies. Such knowledge is necessary to work in testing, quality control and research laboratories of different products and materials. Graduates intended to research are prepared for further studies in master programmes.
Aim	To educate chemical technology specialists with academic knowledge and practical research skills in the fields of chemistry and chemical technology. To prepare graduates for independent work in companies related to the organization and control of chemical processes, quality assurance of materials and products in the field of chemical technology, chemistry and materials science, as well as for further studies in the master study programme.
Tasks	Tasks of the study programme: - to ensure competitive bachelor level education in chemical engineering corresponding to EFCE (European Federation of Chemical Engineering) Bologna recommendations; - to provide a scientific base for professional activities, to develop scientific analytical skills and the ability of independent solving of problems, as well as to prepare graduates for further master level studies.

Learning outcomes	Graduate of the study programme: - demonstrates knowledge and understanding of the basic theories and processes of chemistry, chemical technology and the selected specialization; - is familiar with basic methods and equipment for the planning, implementation, result processing, analysis and interpretation of industrial production and scientific research and understands their nature and application areas; - is able to apply practically and theoretically basic theories and processes of chemistry, chemical technology and selected specializations to the practice; - is able to independently use the basic methods and equipment of planning, implementation, processing of results, analysis and interpretation; able to formulate, compare and summarize the obtained research or production results in instructions, reports and is able to present these results to industry professionals and the general public; - is able to independently plan, obtain, structure, analyse and implement the basic theories of chemistry, chemical technology and the selected specialization in research and production processes; - is able to independently select and implement methods for processing, analysis and interpretation of results and determine the suitability of equipment for the problem to be solved.
Final/state examination procedure, assessment	The fulfilment of the study programme ends with the state examination, organized as a public defence of the bachelor thesis at the meeting of the Final Examination Committee (FEC). This includes also an examination of theoretical knowledge, scientific background and practical competencies essential for the selected specialization. The FEC consists of at least 3 persons, including the head of the structural unit implementing the study programme. Alternatively, the FEC consists of a professor or associated professor approved by the head of the structural unit and at least two scientific degree-holding specialists of the selected field, which can be invited from another structural unit. The FEC is approved by the dean of the faculty. The student's knowledge, skills and competence are evaluated collegially by the FEC in a closed meeting on a 10-grade scale, based on the author's presentation, the quality of answers to questions related to the developed work, the most important fundamental and branch/sub-branch theoretical study courses, and reviewer's notes, as well as considering the evaluation of the supervisor and reviewer.
Description of the future employment	A holder of a bachelor degree in chemical engineering implements, organizes and supervises chemical processes by applying and developing necessary methods, equipment and technologies. Such specialist designs projects of production units, technological lines and automatization of processes, elaborate management and monitoring methods of processes, as well as methods of quality control and conformity evaluation of products and materials, sets up measures for occupational safety and environmental protection, appraises production risks and makes responsible decisions; such specialist analyses, evaluates, creates, spreads and implements in practice processes and technologies, as well as methods of quality management and improvement in order to promote the technological development of enterprise, to increase effectiveness and quality of operation and to guarantee occupational safety. Graduate can work as laboratory assistant or technologist at any enterprise dealing with the realization of chemical or biotechnological processes, at research, testing and quality control laboratories, which are engaged in elaboration or quality control of new technologies, materials and products. Graduates can work as self-employed persons or individual businessmen, as well as laboratory assistants or research assistants at research institutions.
Special enrollment requirements	English language proficiency equivalent to at least CEFR B2 level.
Opportunity to continue studies	Graduates of the study programme can continue studies in an academic master study programme.

Courses

No	Code	Name	Credit points
A		**Compulsory Study Courses**	**117.0**
1	DIM710	Mathematics	9.0
2	DIM206	Engineering Mathematics (for chemical engineers)	4.0
3	KFO704	Physics	8.0
4	ĶOS744	Chemical Safety and the Environment	3.0
5	ĶVĶ742	General Chemistry	4.0
6	ĶTM107	Inorganic Chemistry	9.0
7	ĶTM103	Analytical Chemistry	4.0
8	ĶVĶ738	Methods for Optical Analysis	3.0
9	ĶVĶ741	Organic Chemistry	13.0
10	ĶVĶ739	Physical Chemistry, Thermodynamics	6.0
11	ĶVĶ740	Physical Chemistry, Electrochemistry, Kinetics	7.0
12	ĶTM104	Chromatography and Mass Spectrometry	3.0
13	ĶTM105	Nuclear Magnetic Resonance Spectroscopy	2.0
14	ĶOS743	Information Literacy in Chemistry and Materials Science	2.0
15	RTR708	Introduction to the Programming Language MATLAB	2.0
16	ĶTM106	Basics of Materials Science	4.0
17	ĶOS745	Biological Chemistry	2.0
18	ĶVT760	Unit Operation of Chemical Engineering	12.0
19	BTG701	Fundamentals of Graphics Communication	2.0
20	ĶVT771	Process Automation and Modeling	4.0
21	ĶVT770	Chemical Reactors and Reaction Engineering	3.0
22	ĶVT762	Basics of Chemical Plant Design	4.0
23	ĶVT761	Unit Operations of Chemical Engineering (Course Project)	2.0
24	SDD701	Innovative Product Development and Entrepreneurship	4.0
25	ICA301	Civil Defence	1.0
B		**Compulsory Elective Study Courses**	**22.0**
B1		**Field-Specific Study Courses**	**17.0**
		Production technology and environmental aspects	*17.0*
1	ĶVT758	Environmental Engineering	6.0
2	ĶVT772	Design of the Experiments and Experimental Data Processing	2.0
3	ĶVT759	Heat Exchange Processes and Equipment	3.0
4	ĶVT774	Mass Transfer Engineering	3.0
5	ĶVT773	Basics of Biotechnological Processes	3.0
6	ĶVT767	Basics of Biomaterials	3.0
7	ĶVT784	Analysis of Food Contaminants	3.0
8	ĶVĶ734	Chemistry of Sustainable Environment	3.0
		Chemistry and technology of polymer materials	*17.0*
1	ĶPI726	Introduction to Polymer Materials	3.0
2	ĶPI730	Polymer Chemistry and Physics	5.0
3	ĶPI307	Fibre Materials	3.0
4	ĶPI761	Polymer Composite Materials and Technologies	3.0
5	ĶPI759	Polymer Adhesives	3.0
6	ĶPI760	Polymer Coatings	3.0
7	ĶPI757	Polymer 3D Printing and Additive Technologies	3.0
8	ĶPI727	Advanced Polymer Materials	2.0
9	ĶPI728	Soft Matter	2.0
10	ĶPI729	Polymer Additives	2.0
11	ĶPI762	Colour Science	3.0
		Chemistry and technology of organic substances	*17.0*
1	ĶOS300	Electron Flow in Organic Compounds	3.0
2	ĶOS741	Methods of Organic Synthesis	5.0
3	ĶOS720	Practicum in Organic Qualitative Analysis	3.0
4	ĶOS735	Introduction to Stereochemistry	2.0
5	ĶOS724	Purification and Analysis of Organic Compounds	6.0
6	ĶOS726	Chemistry of Lipids	3.0
7	ĶVĶ749	Chemistry and Technology of Advanced Fuels	3.0
8	ĶVĶ750	Chemistry of Photonic Organic Compounds	3.0

		Chemistry and technology of biomaterials	*17.0*
1	ĶVT767	Basics of Biomaterials	3.0
2	ĶVT768	Biomaterials Engineering	5.0
3	ĶVT769	Anatomy and Physiology	3.0
4	ĶVT766	Methods for Material Analysis	4.0
5	ĶVT772	Design of the Experiments and Experimental Data Processing	2.0
6	ĶVT784	Analysis of Food Contaminants	3.0
		Chemistry and technology of inorganic materials	*17.0*
1	ĶST767	Introduction to the Chemistry and Technology of Silicates and Other Inorganic Materials	3.0
2	ĶST773	Chemistry and Technology of Silicate Materials	2.0
3	ĶST768	Chemistry and Technology of Ceramics	3.0
4	ĶST775	Experimental Research Methods of Silicate Materials	3.0
5	ĶST774	Inorganic Binders	3.0
6	ĶST772	Chemistry and Technology of Glass	3.0
		Analytical chemistry	*17.0*
1	ĶVT784	Analysis of Food Contaminants	3.0
2	ĶVĶ748	Analytical Chemistry of Fuels	3.0
3	ĶVT788	Pharmaceutical Analytical Chemistry	5.0
4	ĶVT787	Metrology and Quality Control in Chemistry	3.0
5	ĶVT766	Methods for Material Analysis	4.0
6	ĶVT785	Biomolecule Analysis Methods	2.0
B2		**Humanities and Social Sciences Study Courses**	**2.0**
1	HSP375	Sociology of Management	2.0
2	HSP380	United Europe and Latvia	2.0
3	HSP378	Politology	2.0
4	HSP376	Sociology of Personalities and Small Groups	2.0
5	IVZ756	Startup Entrepreneurship	2.0
6	ĶOS733	History of Chemistry	2.0
B6		**Languages**	**3.0**
1	HVD153	The Terminology Minimum in English	3.0
C		**Free Elective Study Courses**	**5.0**
D		**Practical Placement**	**6.0**
1	ĶOS742	Internship in Chemical Technology of Organic Compounds	6.0
2	ĶVT780	Internship in Chemical Technology of Production and Biomaterials	6.0
3	ĶVĶ737	Internship in Sustainable Development Chemistry and Technology	6.0
4	ĶPI764	Internship in Polymer Materials Chemistry and Technology	6.0
5	ĶST777	Internship in Technologies of Inorganic Materials	6.0
E		**Final Examination**	**10.0**
1	ĶOS746	Bachelor Thesis	10.0
2	ĶVT781	Bachelor Thesis	10.0
3	ĶVĶ001	Bachelor Thesis	10.0
4	ĶST776	Bachelor Thesis	10.0
5	ĶPI763	Bachelor Thesis	10.0
6	ĶNĶ001	Bachelor Thesis	10.0