



University of East Sarajevo
Faculty of Technology Zvornik



FEASIBILITY STUDY

ON THE JUSTIFICATION OF THE IMPLEMENTATION OF
THE FIRST-CYCLE STUDIES OF THE STUDY PROGRAM OF
CHEMICAL ENGINEERING AND TECHNOLOGY
IN THE ENGLISH LANGUAGE



Zvornik, December 2023

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L.S.

DEAN

Dragan Vujadinović, PhD

Zvornik, December 2023

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BASIC DATA ABOUT THE ORGANIZATIONAL UNIT

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Dean of the organizational unit	Dragan Vujadinović, PhD

Teaching activities at the Faculty of Technology Zvornik are organized in three study cycles. Study cycles are carried out through study program and modules. The first study cycle prepares students for a higher degree of study and enables them to acquire general and specific knowledge needed for employment in certain professional jobs. Upon completion of the first study cycle, the academic title of Bachelor of Science (B.Sc.) in engineering and technology is acquired, with an indication of the study modules. Along with the diploma of the first study cycle, a diploma supplement is also issued for a more detailed insight into the level, nature, content, system and rules of study and the results achieved during studies. The educational degree of the first cycle in all study programs lasts four study years, i.e. eight semesters, which corresponds to 240 ECTS points.

The first study cycle is realized through the following study program and modules:

- “SP” Chemical Engineering and Technology,
 - Bachelor of Science in Technology - 240 ECTS Chemical Process Engineering and Technology,
 - Bachelor of Science in Technology - 240 ECTS, Food Technology,
 - Bachelor of Science in Technology - 240 ECTS, Environmental Engineering,
 - Bachelor of Science in Technology - 240 ECTS, Safety at work and protection from fire.

The general goals of the first study cycle at the Faculty of Technology Zvornik in East Sarajevo are efficient and rational higher education of personnel in the field of engineering and technology, through:

- guiding and helping the student during the teaching process,
- the introduction of only one-semester courses with a maximum of six hours of direct teaching,
- relieving teaching content of unnecessary repetitions and facts, with the necessary modernization that follows the rapid development in various areas of engineering, increasing the number of hours of exercises and practical work compared to lectures,
- establishing a system of rules and criteria for quality assurance (QA) of the educational process,
- guidance through optional subjects,
- continuous monitoring and checking of students' knowledge,
- application of modern didactic methods.

Also, a modern multidisciplinary educated chemical and food engineering graduate who can successfully work in the economy and services where there is a need for this profile of personnel, is educated through:

- the introduction of optional subjects, which under certain conditions can also be subjects from another study program,
- introduction of common program contents for all study programs,
- the introduction of two practically oriented projects, which are valued as special subjects and obligations of professional practice.

The goal of the first study cycle is the professional preparation of the candidate for continuing education, in the second study cycle through:

- hiring teaching staff with recognized scientific results who are capable of motivating students for further professional and scientific training,
- introduction of the most modern teaching content in the professional part of studies, which can be a motivation and challenge for students to engage in scientific work.

General outcome of the learning process at the end of the first study cycle:

- knowledge and understanding of basic principles in the field of study,
- recognition of problems that arise in practice and the possibility of their quick and economical solution, using the most modern technical achievements in the specific field,
- ability to work in a team in a multidisciplinary environment,
- within the specialty and beyond, to follow the development and latest technical achievements and recognize the needs and opportunities to apply these achievements in the environment,
- developing the skills of self-learning, which enables to get the necessary comprehensive education,
- to respect legal regulations and social norms of behavior.

The first two years of study are common for all students, regardless of the chosen study modules. All subjects in the first two years are compulsory. Here, students acquire the general knowledge necessary to continue with the chosen study modules.

In the third and fourth year of study, students are directed to the above four study modules. Students acquire knowledge specific to the study modules they have chosen. A number of subjects are compulsory, while the rest are optional and chosen by students based on their interests and affinities.

After completing eight semesters, each student works on and defends a final thesis. Students are able to apply the theoretical and practical knowledge acquired in targeted study programs in practice, and it also serves as a basis for continuing their studies in the second study cycle.

DEAN

Prof. dr. Dragan Vujadinovic

INTRODUCTION

The studies of *Chemical Engineering and Technology* in the eastern part of the Republic of Srpska started in 1993 with the foundation of The Faculty of Technology in Zvornik as part of The University of Srpsko Sarajevo. The degree program at that time involved a five-year Bachelor's degree studies with only one module available without specialization within specific narrower educational areas.

Over the course of the 20 years of the existence of the Faculty, the Curriculum and Program have been continuously developed and improved to enhance the efficiency of studying and the adoption of the latest scientific knowledge. This process has been aligned with the needs of the industry and has been harmonized with similar study programs.

In the academic year 2004/2005, the Faculty adopted a new curriculum adjusted to the concept of the European higher educational area, *the Bologna Process* and the *European Federation of Chemical Engineering* (EFCE) guidelines. The Faculty offers a three-cycle system of studies with the 4+1+3 model.

In 2007 the first cycle of the study program in Chemical Engineering and Technology was accredited, and in 2012, an external evaluation committee submitted a positive report to the Agency of the Republic of Srpska; as a result, this study program currently represents one of the five accredited study programs at the University of East Sarajevo.

The studies are organized in three education cycles following the 4+1+3 model. The first cycle lasts for four years and consists of 240 ECTS credits.

The primary goal of academic studies at the Faculty of Technology Zvornik is to offer a multidisciplinary knowledge in the field of chemical engineering and technology necessary for the *development, design, supervision, and management of environmentally sustainable processes*.

In the first two years, and partly in the third and fourth year of the first cycle of Chemical Engineering and Technology studies, students gain knowledge in basic scientific disciplines (mathematics, chemistry, physics, etc.), related disciplines (mechanics, electrical engineering, informatics, management, etc.) and disciplines of chemical engineering (thermodynamics, mass and energy transfer phenomena, mechanical and thermal process engineering, chemical reactors, material and energy balances, etc.). By choosing *elective* modules and subjects in the third and fourth year, as well as completing a thesis, students can specialize in specific narrower educational areas by studying various technologies and related subjects.

After completing the first cycle of studies, depending on the chosen elective module, students obtain the academic title *Bachelor of Science in Technology – Chemical Process Engineering and Technology, Bachelor of Science in Technology – Food Technology, Bachelor of Science in Technology – Environmental Engineering, or Bachelor of Science in Technology – Occupational Safety and Fire Protection*. They acquire interdisciplinary knowledge in the fields of *chemical process engineering, food engineering, environmental engineering and occupational safety* and technology with a focus on the respective educational area, making them suitable for work in the process industry (in general) and well-prepared for work in production with specific technologies.

The Faculty continually reviews the educational process to ensure that all its elements are in line with the latest trends and coordinated in the way that each element contributes to the study goals, thus improving educational outcomes in general.

Areas of work and employment for graduates with this education include research institutes, factory facilities, quality control laboratories, design studios for the creation and development of the new processes, quality and marketing institutes, business management, and many other institutions in the process industry.

1. QUALIFICATION STANDARD FOR THE (MODULAR) STUDY PROGRAM OF *CHEMICAL ENGINEERING AND TECHNOLOGY in the English language*

1.1. BASIC CHARACTERISTICS

- a) **Study cycle:** First
- b) **Grade:** Academic
- c) **Elective Modules:** Chemical Process Engineering and Technology
Food Technology
- d) **Name (s) of the Qualification (generic part + specific part)**
 - o Bachelor of Science in Technology – 240 ECTS – Chemical Process Engineering and Technology
 - o Bachelor of Science in Technology – 240 ECTS – Food Technology
- e) **Language of instruction:** English
- f) **Duration of Studies:** 4 years (8 semesters)
- g) **Minimum Volume:** 240 ECTS
- h) **Level:** 6
- i) **Access requirements/methods:** Completed four-year secondary education

1.1.1. Introduction to the Qualification

The European Federation of Chemical Engineering (EFCE) has defined *chemical engineering* as a multidisciplinary area that encompasses the concept, development, design, construction and exploitation of processes and plants. This includes economic development, engineering, control and management of plants where specific chemical processes take place.

Chemical process industry involves processes where raw materials undergo chemical transformation, involving the transfer of heat, mass and momentum. Therefore these processes are extremely complex. The process industry includes the production of oil and oil derivatives, petrochemistry, the production of non-ferrous metals, non-metal processing, the food industry, as well as the manufacture of pulp and paper, the manufacture of polymers, dyes and many other.

This study program for obtaining the title of Bachelor of Science in Technology - 240 ECTS is adapted to the European Higher Education Area in line with the concept of the Bologna Declaration and EFCE recommendations. Its primary goal is the acquisition of multidisciplinary knowledge in the field of chemical engineering and technology necessary for the development, design, supervision, and management of environmentally sustainable processes.

1.1.2. Reasons for the Qualification – Justification for the Implementation of the Study Program

As already mentioned, the study program of *Chemical Engineering and Technology* started at the Faculty of Technology Zvornik, University of East Sarajevo in 1993. The study program was

accredited in 2007, and it nowadays includes four elective modules which students choose after their second year of study. These modules are: Chemical Process Engineering, Food Technology, Environmental Engineering, Occupational Safety and Fire Protection. So far, only two modules have been active: Chemical Process Engineering and Food Engineering.

Currently, the faculty has 165 students enrolled in the first cycle, with the admission quota (50 students on a budget + 10 self-financed students, and 2 foreign students, 2022/2023) being satisfactorily filled in previous years (see Figure 1).



"Figure 1. Number of Enrolled Students in the First Year of the Study Program 'Chemical Engineering and Technology' for the Period 2008 - 2016."

To date, 539 students have graduated from the Faculty of Technology Zvornik, 103 have obtained their master's degrees, and 34 candidates have completed their PhD studies¹.

Chemical technology engineers are typically employed by companies and organizations with global operations. Areas of work and employment for such professionals include the chemical and petrochemical industry, process industry, food industry, energy plants, mines, defense industry, metal and electrical industry, electrochemical industry, water facilities, sanitary landfills, recycling plants, schools, faculties, design studios, research institutes, quality and marketing institutes, as well as state and local institutions, and more.

The strategy for the future development of the Republic of Srpska and Bosnia and Herzegovina is largely based on the construction and improvement of large economic systems in the energy sector (oil refineries, power plants, etc.), where engineers in the field of chemical engineering and technology play a key role.

Some of the factories and institutions where our graduates work are listed below:

- ✓ *Chemical and petrochemical process industry:* Oil Refinery "Modriča" a.d., Oil Refinery "Brod" a.d., NIS (Petroleum Industry of Serbia), Alumina Factory "Alumina" Zvornik, Victoria Group, Mineral Fertilizer Factory, Šabac, etc.

¹ The data refer to both the study program of Chemical Engineering and Technology and the study program of Biology

- ✓ *Energy and coal processing:* Ugljevik Mine and Thermal Power Plant, Gacko Mine and Thermal Power Plant, Electric Power Industry of the Republic of Srpska, Electric Power Industry of Serbia, etc.
- ✓ *Electrochemical protection and material control:* "Orao" a.d. Bijeljina, "Alpro" a.d. Vlasenica, etc.
- ✓ *Pharmaceutical industry:* "Blagoleks" d.o.o. Bijeljina, "Bosnalijek" d.d. Sarajevo, "Hemofarm" Vršac, Banja Luka, etc.
- ✓ *Food production:* "Sava" Semberija d.o.o., "ZP komerc" d.o.o., "Žitopromet" a.d. Bijeljina, "Žitopromet" d.d. Brčko, "Klas" Loznica, "Bimal" d.d. Brčko, "Vitamin" a.d. Banja Luka, "DAŽ", Zvornik, "Neli", Loznica, Sugar Refinery "Agrana Group" Brčko, etc.
- ✓ *Water production and processing:* Vitinka a.d. Kozluk, Water Treatment Plants - municipal waterworks, etc.
- ✓ *Education and scientific research:* universities and high schools, development centers, scientific research institutions, etc.
- ✓ *Legal regulations, ISO standards, and food safety – HACCP:* Food Safety Agency of Bosnia and Herzegovina, consulting agencies, Republic Institute for Standardization and Metrology of the Republic of Srpska, Institute for Metrology of Bosnia and Herzegovina, etc.
- ✓ *Official (state) controls:* Sanitary Inspection, Environmental Inspection, Food Inspection, Customs, etc.
- ✓ *Control laboratories:* Institute for Water d.o.o. Bijeljina, Agricultural Institute a.d. Bijeljina, Institute of Public Health of the Republic of Srpska with regional units, etc.
- ✓ *Storage of raw materials and food products:* Commodity Reserves of the Republic of Srpska, "Studen prom," Zvornik, etc.

The study program of *Chemical Engineering and Technology* is the first of five study programs at the University of East Sarajevo that, as part of the international Tempus project, received a positive evaluation from an international evaluation committee. In 2012, this program was accredited by the Accreditation Agency of the Republic of Srpska as part of these activities.

The Faculty of Technology in Zvornik has received special recognition from the Chamber of Commerce of the Republic of Srpska as the most successful higher education institution in the field of collaboration with the industry in 2012. It was also recognized by the Ministry of Science and Technology as the best scientific research institution in the Republic of Srpska in 2013. In recent years, the Faculty of Technology Zvornik has achieved significant success in the competition for the best technological innovation.

1.1.2.1. Justification for the Necessity of the Study Program in Chemical Engineering and Technology in the English Language

Although all reforms in curricula are based on the integration of knowledge and the development of tools that will enable students to gain a global awareness of their future profession, our reform must start from the very foundations. This implies that the existing education for technology engineers needs to be modernized, adapted to the European Higher Education Area, and conceptually changed in the direction of acquiring knowledge required for work in the chemical process industry.

The study program in *Chemical Engineering and Technology* has undergone several minor changes in the curriculum since the inception of the first "Bologna" curriculum in 2004 and initial accreditation in 2007. These changes have primarily referred to the organization, totaling up to 20 ECTS credits. However, there has been a long-standing need for their modernization by introducing new findings from the field of chemical engineering and technology, as well as related sciences. Furthermore, these changes need to be adapted to current market demands. In this context, this document proposes certain amendments to the curriculum of the mentioned study program.

Considering the need for rationalization and following the interests of the student population and labor market needs, a reduction and modification of the curriculum was carried out in the academic year 2016/2017. The previous version of the curriculum of the study program in *Chemical Engineering and Technology* was accredited with five elective modules: *Chemical Process Engineering, Food Engineering, Environmental Protection Engineering, Electrochemical Engineering, and Technology Management*. The current curriculum of the study program in *Chemical Engineering and Technology* is accredited with four elective modules: *Chemical Process Engineering and Technology, Environmental Engineering, Food Technology, and Occupational Safety and Fire Protection*. The first two years of studies are common to all elective modules, while the elective modules of *Chemical Process Engineering and Technology* and *Environmental Engineering* have some common subjects in the third and fourth years. The graphic representation of the study program structure is shown in Section 1.2.4 of the document. It should be noted that the modular concept of curricula is much more specific in terms of defined goals, learning outcomes, guidelines for teachers, assessment methods, and more.

Studies following the updated curriculum ensure that students acquire more comprehensive theoretical and practical knowledge in the field of chemical engineering and technology in accordance with the latest developments in this scientific field.

It is important to highlight that the Faculty of Technology Zvornik received laboratory equipment worth approximately four million BAM in the previous period as part of the project of the modernization of the University of East Sarajevo. This significantly improved the conditions for further educational and scientific research work at this institution. The new equipment has also imposed the modification of the educational programs of a large number of subjects in the curriculum, thus opening up the opportunities for enhancing the practical work of both teachers and students.

The study program of *Chemical Engineering and Technology* in the English language would have the same structure as the current Curriculum and would involve the first two years of studies common to all students and choosing one of the two elective modules offered in the English language (Module 1 - *Chemical Process Engineering and Technology* and Module 2 - *Food Technology*) after the second year of the first cycle studies.

1.1.3. Financial justification

Considering the financial justification for the implementation of the study program of *Chemical Engineering and Technology*, it should be emphasized that the proposal in this Feasibility Study pertains to re-licensing the existing (licensed) study program of the same name in the English language.

Considering the fact that the University of East Sarajevo and the Faculty of Technology Zvornik have a sufficient number of teachers and associates who can participate in teaching in the proposed study program, *there is no need to secure additional financial resources.*

Currently, 18 teachers and 7 associates in permanent employment are engaged in teaching within this study program. 1 teachers are engaged from other faculties of the University of East Sarajevo, 3 teachers in part-time, and 1 teacher in an honorary employment relationship.

The education for a certain number of permanent employees is in progress, some of whom are expected to acquire the title of a teacher within 3 years. This would also mean a further reduction in the need to engage teachers in part-time and honorary employment. Part 3 of the report Study provides a list of teachers and associates (as well as their employment status) who would conduct the teaching throughout the entire 1st cycle of studies.

1.2. COMPETENCIES / LEARNING OUTCOMES

1.2.1. List of competencies at the qualification level

KNOWLEDGE

- ✓ demonstrate fundamental knowledge in mathematics, physics, and chemistry that enables understanding and describing of operations and processes in the fields of chemical and food engineering and technology;
- ✓ demonstrate knowledge in the areas of environmental engineering and the economic use of natural resources in accordance with sustainable development principles;
- ✓ demonstrate knowledge in the field of occupational safety and fire protection and connect it with fundamental knowledge, as well as knowledge in technology and other sciences;
- ✓ know and understand the application of basic research methods and techniques and their limitations in the field of chemical engineering and technology;
- ✓ connect fundamental knowledge, procedures, and methods of chemical engineering and technology, economics, as well as work and production organization;
- ✓ know the methods of designing and possess the ability to apply them.

SKILLS

- ✓ identify, formulate, and solve technical, engineering problems in the chemical and food industry based on the knowledge from engineering and natural sciences, as well as the fundamentals of economics;
- ✓ apply the concept of chemical engineering based on a fundamental understanding of the principles of chemical and technical thermodynamics, mechanical, thermal, and diffusion operations, reactor engineering, process measurement technology, process dynamics and control;
- ✓ conduct experiments, perform statistical data analysis, analyze and interpret experiments, make conclusions with a purpose of improving processes;
- ✓ select and apply appropriate methods for process analysis, modeling, simulation, and optimization;
- ✓ develop basic projects for products and processes according to specified requirements;
- ✓ combine theory and practice to analyze and solve problems in the field of engineering, as well as in the field of occupational safety and fire protection;
- ✓ use professional literature and the internet to acquire information about equipment characteristics and design methods, physical properties, kinetic and thermodynamic data;

- ✓ plan and conduct experiments, interpret results under the supervision and guidance of senior scientists (technology engineers);
- ✓ utilize knowledge from various areas, taking safety measures responsibly, considering environmental and economic requirements, and be able to broaden knowledge autonomously;
- ✓ collaborate with experts from other disciplines;
- ✓ present the results of their work in both written and oral forms articulately.

COMPETENCIES

- ✓ work individually, and as a member of international and/or multidisciplinary teams; understand the impact of engineering solutions in an environmental and social context;
- ✓ understand professional and ethical responsibility;
- ✓ communicate effectively, including in a foreign language, with experts and non-experts, using modern presentation tools when necessary;
- ✓ learn independently and recognize the need for lifelong learning.

1.2.2. Qualification and Subject Structure

Distribution of ECTS points by subject groups

Subject Group	ECTS (min.)
<p>Group of generic core subjects (SG 1):</p> <ol style="list-style-type: none"> 1. General Chemistry 2. Technical Physics I 3. Mathematics I 4. Computer Application in Engineering 5. Inorganic Chemistry 6. Technical Physics II 7. Mathematics II 8. Fundamentals of Environmental Protection 9. English Language I 10. English Language II 11. English Language III 12. English Language IV <p>Description of outcomes and competencies:</p> <ul style="list-style-type: none"> ✓ Solve tasks and problems from mathematical areas of computational operations, analysis, algebra, differential equations, probability and statistics, and numerical mathematics; ✓ interpret and analyze basic physical phenomena and laws in the fields of mechanics, electricity and magnetism, atomic physics, and the basics of quantum mechanics; ✓ solve tasks and problems in general and inorganic chemistry; ✓ effectively use standard IT equipment and commercially available software for general engineering applications; ✓ recognize and understand pollution problems and various aspects of environmental protection; ✓ understand the importance of proper waste management and waste flow management, the concept of clean technologies, and sustainable development; ✓ communicate (read, write, and speak) in a foreign language, both generally and professionally. 	56 ECTS

Subject Group	ECTS (min.)
<p>Group of generic core subjects for study program (SG 2):</p> <ol style="list-style-type: none"> 1. Analytical Chemistry 2. Mass and Energy Transfer Phenomena 3. Engineering Thermodynamics 4. Construction Materials 5. Organic Chemistry 6. Physical Chemistry I 7. Instrumental Methods 8. Material and Energy Balances 9. Chemical Thermodynamics 	51 ECTS
<p>Description of outcomes and competencies:</p> <ul style="list-style-type: none"> ✓ solve tasks and problems in analytical, organic, and physical chemistry; ✓ know instrumental techniques and their application possibilities; ✓ recognize, differentiate, and mathematically analyze mass and energy transfer phenomena; ✓ understand the thermodynamic properties of ideal and real gases and vapor; ✓ know one- and multi-phase systems and processes that occur in them, which are necessary for defining basic practical problems in chemical engineering calculations; ✓ master the most important engineering equations for correlating and predicting thermodynamic properties of pure substances, simple and complex mixtures; ✓ set up and solve material and energy balance equations for processes that take place under stationary conditions, with or without chemical reactions, as well as for simpler cases of non-stationary processes; ✓ know the types of materials and their physico-chemical characteristics, as well as their behavior in different environments; 	
<p>Group of specific subjects for the study program (SG 3) (Elective module: Chemical Process Engineering and Technology):</p> <ol style="list-style-type: none"> 1. Physical Chemistry II 2. Mechanical Process Engineering 3. Corrosion and Protection 4. Process Modeling and Simulation 5. Catalysis and Catalysts 6. Thermal and Diffusion Process Engineering 7. Fundamentals of Reaction Engineering 8. Process Measurement and Control 9. Fundamentals of Electrochemical Engineering 10. Process Equipment Design 11. Inorganic Chemical Technology I 12. Organic Chemical Technology I 13. Water Technology 14. Process and Plant Design 15. Inorganic Chemical Technology II 16. Organic Chemical Technology II 	98 ECTS

Subject Group	ECTS (min.)
<p>Description of outcomes and competencies:</p> <ul style="list-style-type: none"> ✓ identify, formulate, and solve technical engineering problems in the chemical industry based on the connection of knowledge from engineering and natural sciences, as well as the basics of economics; ✓ apply the concept of chemical engineering based on fundamental knowledge and understanding: principles of chemical and technical thermodynamics, mechanical, thermal, and diffusional operations, reactor engineering, process measurement techniques, dynamics and process control; ✓ know the kinetics of chemical reactions, analyze and monitor reactor performance; ✓ formulate mathematical models of simpler chemical engineering problems and choose appropriate methods for their solution; ✓ use process simulators for simulating chemical processes; ✓ know and understand the action of different corrosion agents on metals and metal alloys and select and propose appropriate corrosion protection methods; ✓ know the basic principles of electrochemical engineering; ✓ know the basic technologies for obtaining inorganic products; ✓ know the basic technologies for obtaining organic products; ✓ understand the importance of water in industry and everyday life, as well as the concept of water treatment operations and processes; ✓ know the basic lines and systems in water treatment processes; ✓ prepare project documentation based on the project task according to relevant technical standards. <p>Group of Elective Subjects Specific to the Study Program (SG 4) (Elective Module: Chemical Process Engineering and Technology):</p> <ol style="list-style-type: none"> 1. Alumina Technology 2. Fuel and Combustion Technology 3. Natural and Synthetic Zeolites, Technology and Applications 4. Technology of Metallic Materials 5. Technology Of Building Materials 6. Cement Technology 7. Technology of Ceramics 8. Inorganic Pigment Technology 9. Technology of Protective Metal Coatings 10. Energy in Industrial Processes 11. High-Pressure Technology 12. Cooling Technology/Refrigeration systems 13. Energy Efficiency in Industrial Processes 14. Preparation of Mineral Raw Materials 15. Project Management 16. Quality Management 17. Design and Analysis of Experiments 18. Oil Refining Technology 19. Synthetic Polymer Technology 20. Plastics Processing Technology 	<p>11 ECTS</p>

Subject Group	ECTS (min.)
21. Oil and Lubricant Technology 22. Polymer Material Recycling Technology 23. Technology of Tensides and Tenside-Based Products 24. Technology of Natural Polymers 25. Biofuel Technology 26. Technology of Protective Non-Metal Coatings	
Description of outcomes and competencies: <ul style="list-style-type: none"> ✓ understand specific technologies for obtaining inorganic and organic products; ✓ recognize the importance of energy efficiency and efficiency of process equipment; ✓ analyze various high-pressure industrial processes; ✓ apply principles and basic knowledge from technical sciences to describe simple refrigeration engineering problems; ✓ be familiar with project management standards and the basics of applying information technology in project management; ✓ recognize the application and significance of quality management. 	
Group of Basic Subjects Specific to the Study Program (SG 7) (Elective Module: Food Technology): 1. Colloid Chemistry 2. Operations in Food Engineering 3. Nutritional Value of Food 4. Biochemistry in Food Technology 5. General Microbiology 6. Principles of Food Preservation 7. Methods of Food Product Analysis 8. Fundamentals of Food Technology 9. Microbiology of Food Products 10. Biochemical Engineering 11. Meat Production and Processing Technology 12. Grain and Flour Technology 13. Food Safety and Quality Management 14. Fruit and Vegetable Technology 15. Technology of Dairy Products 16. Sensory Evaluation Methods of Food Products	99 ECTS
Description of outcomes and competencies: <ul style="list-style-type: none"> ✓ apply knowledge and skills from fundamental, applied, and engineering sciences in the field of food technology; ✓ practically apply acquired knowledge and skills in food engineering in technological processes of production and food processing; ✓ Identify, analyze, and solve simpler problems and perform tasks of the corresponding level of complexity in physical-chemical, microbiological, and control laboratories in the food industry; ✓ apply and integrate acquired knowledge and skills to participate in activities related to process control and food quality; 	

Subject Group	ECTS (min.)
<ul style="list-style-type: none"> ✓ plan and manage tasks and run the technological processes of smaller production units in the food systems; ✓ evaluate the impact of specific ingredients and processing on product quality; ✓ identify production problems and discuss them with superiors and subordinates; ✓ assess the impact of raw materials and processing on the composition and quality of products; ✓ collect and interpret the results of food laboratory analysis; ✓ develop learning skills necessary for further study at the master's level and an awareness of the need for lifelong learning; ✓ apply legal regulations and ethical principles and norms related to the specific requirements of the profession. 	
<p>Group of Elective Subjects Specific to the Study Program (SG 8) (Elective Module: Food Technology):</p> <ol style="list-style-type: none"> 1. Cooling Technology 2. Food Packaging Technologies 3. Hygiene and Sanitation in Food Industry 4. Application of Food Additives in Food Industry 5. Functional Food and Nutraceuticals 6. Food Allergens 7. Sugar and Starch Technology 8. Confectionery Technology 9. Beer and Malt Technology 10. Technology of Edible Oils and Fats 11. Fermented Product Manufacturing Technology 12. Ready-to-Eat Food Technology 	13 ECTS
<p>Description of outcomes and competencies:</p> <ul style="list-style-type: none"> ✓ recognize the importance of the food industry, the complexity of the issues, and the connection between the development of the food industry with the latest scientific findings related to food science, nutrition, and the development of new technologies; ✓ name the most important product groups depending on the basic groups of raw materials and the basic differences among them while respecting legal regulations; ✓ valorize the impact of raw materials and processing on the composition and quality of fresh and fermented products; ✓ interpret physical, chemical, and biochemical changes that occur during the processing of oilseeds; ✓ critically analyze the impact of the technological process on the nutritional value of plant and animal origin products; ✓ identify chemical and biochemical changes during fermentation, ripening, and storage that affect the quality of fermented products; ✓ differentiate the specifics of production and the possibilities of using certain carbohydrates sweeteners and hydrocolloids in the confectionery industry; ✓ select key ingredients and optimal conditions for the production of ready-to-eat dishes of plant and animal-origin, ensuring product quality and safety; ✓ present results of work in written and oral form using professional terminology; ✓ participate in homogeneous or interdisciplinary expert teams in the field of food technology; ✓ present modern trends in food technology and popularize the profession; 	

Internship (I)	3 ECTS
Description of outcomes and competencies: ✓ describe, analyze, and critically assess the possibility of solving a specific practical problem; ✓ communicate and work in a multidisciplinary team; ✓ confirm professional and ethical responsibility; ✓ recognize the need for lifelong learning.	
Diploma thesis/Project (DT)	5 ECTS
Description of outcomes and competencies: ✓ Independently solve (design, implement, document, and present) a simpler engineering problem in the field of chemical engineering and technology, synthesizing acquired knowledge, skills, and competencies, using adequate professional literature; ✓ Present in written reports and oral presentations the connection between individual sets of learning outcomes and competencies at the level of qualification.	

A minimum of 224 ECTS belong to the mandatory groups of learning outcomes listed in the table. The remaining number of ECTS up to 240 ECTS belongs to groups of learning outcomes in other scientific areas.

1.2.3. Curriculum of the Study Program

The curriculum of the study program is provided in Annex 1.

The syllabi are provided in Annex 2.

1.2.4. Structure of the (modular) study program

<u>First Year</u>	
<u>Second Year</u>	
<u>Third Year</u>	Common Foundations { Chemical Process Engineering and Technology
	Environmental Engineering
	Food Technology
	Occupational safety and fire protection
<u>Fourth Year</u>	Common Foundations { Chemical Process Engineering and Technology
	Environment Engineering
	Food Technology
	Occupational safety and fire protection

1.3 RELEVANCE

The web addresses of some of the higher education institutions offering studies in the field of chemical engineering and technology are provided below:

University of Banja Luka, Faculty of Technology, Banja Luka (www.tfbl.org)
University of Tuzla, Faculty of Technology, Tuzla (www.tf.untz.ba)
University of Belgrade, Faculty of Technology and Metallurgy, Belgrade (www.tmf.bg.ac.rs)
University of Novi Sad, Faculty of Technology, Novi Sad (www.tf.uns.ac.rs)
University of Zagreb, Faculty of Chemical Engineering and Technology, Zagreb (www.fkit.unizg.hr)
Josip Juraj Strossmayer University in Osijek, Faculty of Food Technology, Osijek (www.ptfos.unios.hr)
University of Ljubljana, Faculty of Chemistry and Chemical Technology, Ljubljana (www.fkkt.uni-lj.si)
University of Maribor, Faculty of Chemistry and Chemical Engineering, Maribor (www.fkkt.um.si)
University of Niš, Faculty of Technology, Leskovac (www.tf.ni.ac.rs)
University of Niš, Faculty of Occupational Safety, Niš (www.znrfak.ni.ac.rs)
University "St. Cyril and Methodius," Faculty of Technology and Metallurgy, Skopje (www.tmf.ukim.edu.mk)
Massachusetts Institute of Technology, Department of Chemical Engineering (<http://web.mit.edu/cheme/>)
Imperial College London, Chemical Engineering (<http://www.imperial.ac.uk/chemical-engineering>)
Columbia University, Chemical Engineering Department (<http://cheme.columbia.edu/>)

In order to provide evidence of the compatibility of the study program with at least three study programs conducted at accredited higher education institutions in countries that are signatories to the Bologna Declaration, a detailed overview of the curricula and programs of a certain number of faculties is given in Annex 3.

1.3.1 Labor Market

- ✓ Employment opportunities in manufacturing companies - managing technological processes in production plants in different industries, e.g. chemical, petrochemical, food, pharmaceutical, construction material, metallurgy, etc., as well as in other systems requiring graduates of the first-cycle studies;
- ✓ Employment opportunities in business entities and public institutions in the fields of chemical process engineering and technology, environmental protection, food technology, occupational safety and fire protection;
- ✓ Employment opportunities in research and scientific institutions: development departments in the industry, institutes, universities, schools, etc;
- ✓ Employment in the field of official (state) control and enforcement: sanitary, environmental inspection, food inspection, customs, etc;
- ✓ Employment in the field of legal regulations and food safety standards: food safety agencies, consulting agencies, standardization and metrology institutes, etc...

1.3.2 Further Education / Progression

Upon finishing the first cycle or the Bachelor degree, the diploma holder is eligible to engage in further education, namely the second cycle of *Chemical Engineering and Technology* studies (master's degree) or related study programs in the fields of natural and technical sciences.

1.4 University Regulations

<http://www.ues.rs.ba/media/document/akti/uis-zakon-o-visokom-obrazovanju.pdf>
<http://www.ues.rs.ba/media/document/akti/uis-izmjene-i-dopune-zakona-o-visokom-obrazovanju.pdf>

<http://www.ues.rs.ba/media/document/akti/2015/uis-zakon-o-izmjenama-zakona-o-visokom-obrazovanju-republika-srpska-84-12-bos.pdf>
<http://www.ues.rs.ba/media/document/akti/uis-statut-univerziteta.pdf>
<http://www.ues.rs.ba/media/document/akti/uis-izmjene-i-dopune-statuta-univerziteta-u-istocnom-sarajevu.pdf>
<http://www.ues.rs.ba/media/document/akti/2015/uis-izmjene-i-dopune-statuta-od-27-06-2012.pdf>
<http://www.ues.rs.ba/media/document/akti/2015/uis-izmjene-i-dopune-statuta-uis-od-27-02-2013.pdf>
<http://www.ues.rs.ba/media/document/akti/2015/uis-izmjene-i-dopune-statuta-uis-od-01-07-2013.pdf>
<http://www.ues.rs.ba/media/document/akti/2015/uis-izmjen%D0%B5-i-dopun%D0%B5-statuta-univerziteta-od-19-02-2014.pdf>
<http://www.ues.rs.ba/media/document/akti/2015/uis-izmjen%D0%B5-i-dopun%D0%B5-statuta-univerziteta-od-novembra-2014.pdf>
<http://www.ues.rs.ba/media/document/akti/uis-pravila-o-studiranju-na-prvom-ciklusu-studija.pdf>
<http://www.ues.rs.ba/media/document/akti/2015/uis-izmjene-i-dopune-pravila-studiranja-na-prvom-ciklusu-studija.pdf>
<http://www.ues.rs.ba/media/document/akti/uis-pravilnik-o-organizaciji-i-radu-katedri.pdf>
<http://www.ues.rs.ba/media/document/akti/2015/uis-pravilnik-o-izmjenama-i-dopunama-pravilnika-o-organizaciji-i-radu-katedri-na-univerzitetu-u-istocnom-sarajevu-11-09-2015-godine.pdf>
<http://www.ues.rs.ba/media/document/akti/2015/uis-troskovnik-za-studente-univerziteta-u-istocnom-sarajevu.pdf>
<http://www.ues.rs.ba/media/document/akti/2015/uis-izmjene-i-dopune-troskovnika-za-studente-univerziteta-u-istocnom-sarajevu-od-08-10-2015.pdf>

1.5 ACCESS REQUIREMENTS AND SPECIFIC QUALIFICATION REGULATIONS

Candidates who have completed a four-year high school in the Republic of Srpska, the Brčko District, and the Federation of BiH, or an equivalent education abroad, are eligible to enroll in the first cycle of the study program in *Chemical Engineering and Technology*.

After completing the second year of the first cycle study program in Chemical Engineering and Technology, students choose an elective module (see Section 1.2.4) within which they wish to specialize.

Other details related to qualification and rules for studying are stipulated in the Statute of the Faculty of Technology Zvornik.

1.6 Methods of Learning

The methods of learning are designed to encourage students to work independently and as part of a team. They are also designed to raise the awareness of the importance of lifelong learning. These methods include:

- ✓ lectures,
- ✓ classroom and laboratory exercises,
- ✓ seminar papers,
- ✓ student presentations,
- ✓ case studies,
- ✓ projects,
- ✓ workshops,
- ✓ industrial visits,
- ✓ teamwork, etc.

Lectures, exercises, seminar papers, and possibly presentations, are predominant form of instruction during the first few semesters, while later on the focus is on workshops, teamwork, case studies, and projects.

1.7 ASSESSMENT METHODS

The methods of knowledge/skills assessment are designed to correspond to the expected learning outcomes. Various techniques will be used to assess knowledge and skills, such as:

- ✓ Mid-term tests(“colloquia”)
- ✓ Final exams
- ✓ Written tests
- ✓ Oral presentations
- ✓ Seminar papers
- ✓ Problem-solving exercises
- ✓ Case studies
- ✓ Laboratory work
- ✓ Project work

Student knowledge and skills will be assessed based on their ability to search for information, analyze issues, present arguments coherently. Assessment during the specific course is based on topics covered in lectures, exercises, seminars, workshops, etc., and usually involves demonstrating a series of both general and subject-specific skills.

1.8 ASSESSMENT AND EVALUATION CRITERIA

For all activities, students receive points that are an integral part of the final exam grade. During pre-exam obligations for one subject, students can earn a maximum of 70 points out of a total of 100 points. The final part of the exam is evaluated with 30 points.

The student's achievement is expressed through grades as follows:

- ✓ Grade 10 (Extraordinary) for achieving 91-100 points (A),
- ✓ Grade 9 (Excellent) for achieving 81-90 points (B),
- ✓ Grade 8 (Very Good) for achieving 71-80 points (C),
- ✓ Grade 7 (Good) for achieving 61-70 points (D),
- ✓ Grade 6 (Satisfactory) for achieving 51-60 points (E),
- ✓ Grade 5 (Unsatisfactory) for achieving 50 points or fewer (F).

1.9 LEARNING RESOURCES

The Faculty of Technology Zvornik is equipped with adequate infrastructure capable of fulfilling all the purposes of conducting the teaching, learning, and research processes. This includes six classrooms with a total capacity of 280 seats, three computer classrooms with internet access and a capacity of 35 seats, well-equipped laboratories, a library, and reading rooms. A detailed overview of classroom and laboratory space and library resources is provided in Section 5 of the Elaborate.

1.10 EMPLOYABILITY AND TRANSFERABLE SKILLS

Technology engineers have exceptional employment opportunities in different areas, from the chemical, petrochemical, pharmaceutical and food industries, as well as in economic entities and public institutions in the areas of environmental protection, occupational safety, and fire protection,

to research institutes, universities, schools, etc. Therefore, it is not surprising that the employment rate of technology engineers is among the highest in Bosnia and Herzegovina.

The Chemical Engineering and Technology program is designed to provide students with numerous important transferable skills, such as:

- ✓ Problem-solving
- ✓ Organization
- ✓ Effective communication
- ✓ Meeting deadlines
- ✓ Management and leadership
- ✓ Decision-making
- ✓ Research skills

1.11 STUDENT SUPPORT

The Faculty has a Student Service that handles student requests, performs activities related to enrollment, exam registration, issuing relevant certificates, etc.

The Faculty of Technology Zvornik also offers students the opportunity to participate in decision-making through their representatives in the Faculty Council.

The Student Union, a general type of student organization that represents all students at the Faculty of Technology Zvornik and advocates for the realization of the rights and interests of all students, was established at the Faculty in 1998. The primary goals and tasks of the Student Union of the Faculty of Technology Zvornik are the following:

- ✓ Improving the quality of studies and the position of students in society,
- ✓ Advocating for student rights and standards ,
- ✓ Collaborating with student organizations in the country and abroad,
- ✓ Organizing and participating in project development and implementation,
- ✓ Organizing student field trips,
- ✓ Enhancing faculty and inter-faculty cooperation,
- ✓ Organizing knowledge and sports competitions (the so-called “Tehnologijada”), student excursions, and similar events,
- ✓ Representing the interests and rights of union members and any other form of assistance to union members.

1.12 COMPETENCY MATRIX

Learning Outcomes at the Program Level	SG1	SG2	SG3	SG4	SG5	SG6	SG7	SG8	SG9	SG10	IN	DT
Demonstrate fundamental knowledge in mathematics, physics, and chemistry that enables the understanding and description of operations and processes in the field of chemical and food engineering and technology.	X	x	x	x			x	x			X	x
Demonstrate knowledge in the field of environmental engineering and the economical use of natural resources in accordance with the principles of sustainable development.					x	x					X	x
Demonstrate knowledge in the area of occupational safety and fire protection and connect it with fundamental knowledge as well as knowledge from the field of technology and other sciences.	X	x	x	x	x	x	x	x	x	x	X	x
Know and understand the application of basic research methods and techniques and their limitations in the field of chemical engineering and technology.		x	x	x	x	x	x	x	x	x	X	x
Connect basic knowledge, procedures, and methods from chemical engineering and technology, economics, and production organization.	X	x	x	x	x	x	x	x	x	x	X	x
Know the methods of design and have the ability to apply them.			x		x				x		X	x
Identify, formulate, and solve technical engineering problems in the chemical and food industry based on the connection of knowledge from engineering and natural sciences, as well as the fundamentals of economics.		x	x	x			x	x			X	x
Apply a concept of chemical engineering based on a fundamental understanding of the principles of chemical and technical thermodynamics, mechanical, thermal, and diffusion operations, reactor engineering, process measurement techniques, process dynamics and control.		x	x	x	x	x	x	x	x	x	X	x
Conduct experiments, perform statistical data analysis, analyze and interpret experiments, and formulate conclusions to improve processes.	X	x	x	x	x	x	x	x	x	x	X	x
Select and apply appropriate methods of analysis, modeling, simulation, and process optimization.			x	x		x			x		X	x
Develop basic projects for products and processes in accordance with specified requirements.			x	x	x	x	x	x	x	x	X	x
Combine theory and practice to analyze and solve problems in engineering, as well as in the fields of occupational safety and fire protection.			x	x	x	x	x	x	x	x	X	x
Use professional literature and the internet to gather information regarding equipment characteristics and design methods, physical properties, kinetic and thermodynamic data.		x	x	x	x	x	x	x	x	x	X	x
Plan and conduct experiments, interpret results under the supervision and guidance of a senior scientist (chemical engineer).		x	x	x	x	x	x	x	x	x	X	x
Apply knowledge from various fields, taking safety measures responsibly, considering environmental and economic requirements, and expanding knowledge independently.		x	x	x	x	x	x	x	x	x	X	x
Collaborate with experts from other disciplines.		x	x	x	x	x	x	x	x	x	X	x
Present the results of work articulately in both written and oral form.	X	x	x	x	x	x	x	x	x	x	X	x
Work individually and as a member of international and/or multidisciplinary teams.			x	x	x	x	x	x	x	x	X	x
Understand the impact of engineering solutions in an environmental and social context.			x	x	x	x	x	x	x	x	X	x
Understand professional and ethical responsibility.	X	X	x	x	x	x	x	x	x	x	X	x
Communicate effectively, including in a foreign language, with experts and non-experts, using modern presentation tools if needed.	x	X	x	x	x	x	x	x	x	x	X	x
Learn independently and recognize the need for lifelong learning.	x	X	x	x	x	x	x	x	x	x	X	x

1.13 Quality Assurance

The University of East Sarajevo conducts regular annual evaluation of the teaching process and the first-cycle study program through student surveys. This evaluation includes various quality indicators of the study program. Additionally, student pass rates, achievement and progress are analysed and monitored throughout their studies. The development of a quality strategy is currently underway, which will elaborate on other forms of evaluation and procedures for rectifying deficiencies and enhancing the quality of the study program.

1.13.1. Persons Responsible for Implementing the Curriculum and Quality Program

Dragan Vujadinović, PhD, associate professor, Dean;

Slavko Smiljanić, PhD, associate professor, Vice Dean for Teaching

Svetlana Pelemiš, PhD, full professor, Vice Dean for Research and Development

2. LIST OF PERMANENT EMPLOYEES

2.1. LIST OF PERMANENT TEACHERS AND ASSOCIATES

No.	Teacher/associate	Employment agreement	Decision on the appointment to the position	Employment (percentage)
1	2	3	4	5
Full professors				
1.	Dr Dragan Tošković	3203-38/18	125-II/06	100 %
2.	Dr Dragica Lazić	3168-310/18	01-C-115-XIX/09	100 %
3.	Dr Mitar Perušić	3203-42/18	01-C-390-I/15	100 %
4.	Dr Goran Tadić	3203-39/18	01-C-37-XLIII/18	100 %
5.	Dr Milorad Tomić	3202-43/18	01-C-38-XLIII/12	100 %
6.	Dr Vladan Mičić	4749-2/19	01-C-383-III/19	100 %
7.	Dr Ljubica Vasiljević	4417-1/20	01-C-281-VII/20	100 %
8.	Dr Svetlana Pelemiš	642-11/22	21-C-386-XXVI/21	100 %
Associate professors				
9.	Dr Zoran Petrović	3204-231/18	01-C-170-XLVII/18	100 %
10.	Dr Slavko Smiljanić	3223-14/22	01-C-197-XLVIII/18	100 %
11.	Dr Dragan Vujadinović	3223-13/22	01-C-199-I/20	100 %
12.	Dr Milenko Smiljanić	3223-8/22	01-C-224-IV/20	100 %
13.	Dr Dragana Kešelj	3223-7/22	01-C-28-XIII/21	100 %
14.	Dr Aleksandar Došić	3046-1/23	01-C-129-XVII/21	100 %
Assistant professors				
15.	Dr Milan Vukić	710-1/21	01-C-32-XIII/21	100 %
16.	Dr Vesna Gojković	331-2/21	01-C-9-XII/21	100 %
17.	Dr Mirjana Šipovac	4977-5/22	01-C-354-XLIV/22	100 %
18.	Dr Marija Mitrović	1787-1/22	01-C-107-XXXII/22	100 %
Foreign language teacher				
19.	Vesna Cvjetinović, MA	1593-3/20	01-C-64-X/20	100 %
Senior assistants				
20.	Srđan Vuković, MSc	3223-24/22	01-C-175-I/20	
21.	Danijela Rajić, MSc	3223-17/22	01-C-35-XXVIII/22	100 %
22.	Jelena Vulinović, MSc	599-2/21	01-C-390-XI/20	100 %
23.	Maja Palangetić, MSc	3444-2/18	01-C-224-XLIX/18	
24.	Milomirka Obrenović, MSc	3223-22/22	01-C-165-XXXVI/22	
25.	Jelena Vuković, MSc	4977-4/22	01-C-358-XLIV/22	
26.	Duško Kostić, MSc	3223-19/22	01-C-101-XV/21	
27.	Nebojša Vasiljević, MSc	684-3/23	01-C-48-XLVII/23	
Assistants				
28.	Milenko Aćimović, MSc	2004-2/23	01-C-122-XLIX/23	

2.2. LIST OF PERMANENT EMPLOYMENT ADMINISTRATIVE WORKERS

S/N	Teacher/associate	Workplace according to systematization	Employment contract number
1	2	3	4
1.	Biljana Stevanović	Head of Legal, Personnel and General Affairs	4306-1/20
2.	Snežana Obrenović	Librarian	3186-141/18
3.	Snežana Ristić	Senior professional/technical associate for financial and accounting affairs	3186-43/18
4.	Mirko Radić	Professional/Technical associate in teaching	3186-36/18
5.	Svjetlana Mitrović	Professional/Technical associate for student affairs	3186-142/18
6.	Nada Pejić	Professional/Technical associate for student affairs	3186-133/18
7.	Zorica Mrkajić	Technical Secretary	3186-145/18
8.	Slaviša Memedović	General utility worker	3186-156/18
9.	Mirče Dragić	General utility worker	3186-146/18
10.	Jovanka Pejić	Housekeeper	3186-132/18
11.	Željka Pajić	Housekeeper	3186-139/18
12.	Boro Cvjetković	Guard	3186-130/18
13.	Milan Riđošić	Guard	3186-152/18
14.	Miodrag Popović	(Courier) driver	3186-151/18
15.	Sladana Lazić	Lab technician	1617-1/22
16.	Jasminka Lazarević	Lab technician	1228-6/22
17.	Zorica Stevanović	Accounting clerk	3186-137/18
18.	Snežana Grujić	Computer operator	3186-150/18
19.	Goran Mrkajić	Guard	3186-131/18
20.	Marko Ivanović	System engineer in semi-industr. lab.	3186-143/18
21.	Tanja Aćimović	Lab technician	3186-140/18
22.	Slavica Đokić	Housekeeper	3186-200/18

3. CURRICULUM FOR THE STUDY PROGRAM OF CHEMICAL ENGINEERING AND TECHNOLOGY WITH THE LIST OF RESPONSIBLE TEACHERS AND WORK STATUS

Study program: Chemical engineering and technology						
Common grounds						
	Full subject name	Lectures	Exercises	ECTS	Title, name and surname of the responsible teacher	Employment Status
1.	General chemistry	3	3	7	Dr Aleksandar Došić, Assoc. Prof.	permanent
2.	Technical physics I	3	2	6	Dr Svetlana Pelemiš, Assoc. Prof.	permanent
3.	Mathematics I	3	2	6	Dr Boban Marinković, Full Prof.	honorary
4.	Application of computers in engineering	2	2	5	Dr Goran Tadić, Full Prof.	permanent
5.	Engineering drawing	2	1	4	Dr Bojan Međo, Assoc. Prof.	honorary
6.	English language I	1	1	2	Vesna Cvjetinović, Prof.	permanent
	Total	14	11	30	I SEMESTER	
	Total per week / semester	25				

Study program: Chemical engineering and technology						
Common ground						
	Full subject name	Lectures	Exercises	ECTS	Title, name and surname of the responsible teacher	Employment Status
1.	Inorganic chemistry	3	3	7	Dr Aleksandar Došić, Assoc. Prof.	permanent
2.	Technical physics II	3	2	6	Dr Svetlana Pelemiš, Assoc. Prof.	permanent
3.	Mathematics II	3	2	6	Dr Boban Marinković, Full Prof.	honorary
4.	Fundamentals of environment protection	2	2	5	Dr Slavko Smiljanić, Assoc. Prof.	permanent
5.	Fundamentals of mechanical engineering	2	1	4	Dr Bojan Međo, Assoc. Prof.	honorary

6.	English language II	1	1	2	Vesna Cvjetinović, Prof.	permanent
Total		14	11	30	II SEMESTER	
Total per week / semester		25				

Study program: Chemical engineering and technology Common ground						
	Full subject name	Lectures	Exercises	ECTS	Title, name and surname of the responsible teacher	Employment Status
1.	Analytical chemistry	2	3	6	Dr Zoran Obrenović, Assoc. Prof.	part-time
2.	Mass and energy transfer phenomena	3	3	7	Dr Mitar Perušić, Full Prof.	permanent
3.	Engineering thermodynamics	3	2	6	Dr Mitar Perušić, Full Prof.	permanent
4.	Construction materials	2	1	4	Dr Dragana Kešelj, Assoc. Prof.	permanent
5.	Fundamentals of electrical engineering	2	2	5	Dr Srđan Lale, Asst. Prof.	?
6.	English language III	1	1	2	Vesna Cvjetinović, Full Prof.	permanent
Total		13	12	30	III SEMESTER	
Total per week / semester		25				

Study program: Chemical engineering and technology Common ground						
	Full subject name	Lectures	Exercises	ECTS	Title, name and surname of the responsible teacher	Employment Status
1.	Organic chemistry	4	2	7	Dr Ljubica Vasiljević, Full Prof.	permanent
2.	Physical chemistry I	3	3	7	Dr Dragan Tošković, Full Prof.	permanent
3.	Instrumental methods	2	2	5	Dr Zoran Obrenović, Assoc. Prof.	part-time
4.	Material and energy balances	2	2	5	Dr Goran Tadić, Full Prof.	permanent
5.	Chemical thermodynamics	2	1	4	Dr Dragan Tošković, Full Prof.	permanent
6.	English language IV	1	1	2	Vesna Cvjetinović, Prof.	permanent

	Total	14	11	30	IV SEMESTER
	Total per week / semester	25			

Study program: Chemical engineering and technology						
Elective module: Chemical Process Engineering and Technology (HPET)						
	Full subject name	Lect ures	Exer cise s	ECTS	Title, name and surname of the responsible teacher	Employment Status
1.	Physical Chemistry II*	3	3	7	Dr Dragan Tošković, Full Prof.	permanent
2.	Mechanical Process Engineering*	3	3	7	Dr Radislav Filipović, Full Prof.	part-time
3.	Corrosion and Protection*	3	2	6	Dr Milorad Tomić, Full Prof.	permanent
4.	Modeling and process simulation	2	2	5	Dr Goran Tadić, Full Prof.	permanent
5.	Catalysis and catalysts	2	2	5	Dr Milorad Tomić, Full Prof.	permanent
	T o t a l	13	12	30	V SEMESTER	
	Total per week / semester	25				

	Full subject name	Lect ures	Exer cise s	ECTS	Title, name and surname of the responsible teacher	Employment Status
1.	Thermal and Diffusion Process Engineering*	3	3	7	Dr Radislav Filipović, Full Prof.	part-time
2.	Fundamentals of Reaction Engineering*	3	2	6	Dr Vladan Mičić, Full Prof.	permanent
3.	Measurement and process regulation	3	2	6	Dr Goran Tadić, Full Prof.	permanent
4.	Fundamentals of electrochem. engineering	3	3	7	Dr Marija Mitrović, Asst. Prof.	permanent
5.	Projecting of process equipment	2	1	4	Dr Mitar Perušić, Full Prof.	permanent
	T o t a l	14	11	30	VI SEMESTER	
	Total per week / semester	25				

*) Common subjects of the 3rd year for HPET and EE modules

Study program: Chemical engineering and technology						
Elective module: Chemical Process Engineering and Technology (HPET)						
	Full subject name	Lectures	Exercises	ECTS	Title, name and surname of the responsible teacher	Employment Status
1.	Business economics and management*	2	1	3	Dr Željko Đurić, Assoc. Prof.	part-time
2.	Inorganic chemical technology I	3	3	7	Dr Dragica Lazić, Full Prof.	permanent
3.	Organic chemical technology I	3	3	7	Dr Zoran Petrović, Assoc. Prof.	permanent
4.	Technology of water	2	1	3	Dr Slavko Smiljanić, Assoc. Prof	permanent
5.	Elective subject 1	2	2	4		
6.	Elective subject 2	2	1	3		
7.	Professional practice**	-	-	3		
	Total	14	11	30	VII SEMESTER	
	Total per week / semester	25				

Study program: Chemical engineering and technology						
Elective module: Chemical Process Engineering and Technology (HPET)						
	Full subject name	Lectures	Exercises	ECTS	Title, name and surname of the responsible teacher	Employment Status
1.	Process and plant design*	3	3	7	Dr Mitar Perušić, Full Prof.	permanent
2.	Inorganic chemical technology II	3	3	7	Dr Dragica Lazić, Full Prof.	permanent
3.	Organic chemical technology II	3	3	7	Dr Zoran Petrović, Assoc. Prof.	permanent
4.	Elective subject 3	2	2	4		
5.	Thesis**	0	3	5		
	Total	11	14	30	VIII SEMESTER	
	Total per week / semester	25				

*) Common subjects of the 3rd year for HPET and EE modules

**) Professional practice and thesis are common to all optional modules

Студијски програм: Хемијско инжењерство и технологија
Изборни модул: Хемијско процесно инжењерство и технологија (ХПИТ)

	Elective subject 1	Lect ures	Exer cise s	ECTS	Title, name and surname of the responsible teacher	Employment Status
1.	Alumina technology	2	2	4	Dr Dragana Kešelj, Assoc. Prof	permanent
2.	Fuel and combustion technology				Dr Dragana Kešelj, Assoc. Prof	permanent
3.	Natural and synthetic zeolites, technology and application				Dr Dragica Lazić, Prof.	permanent
4.	Technology of metal materials				Dr Dragica Lazić, Prof.	permanent
5.	Technology of building materials				Dr Dragica Lazić, Prof.	permanent
6.	Cement technology				Dr Dragica Lazić, Prof.	permanent
7.	Technology of ceramics				Dr Dragica Lazić, Prof.	permanent
8.	Fertilizer technology				Dr Dragana Kešelj, Assoc. Prof.	permanent
9.	Metal coating protection technology				Dr Marija Mitrović, Asst. Prof.	permanent
	Elective subject 2	Lect ures	Exer cise s	ECTS	Title, name and surname of the responsible teacher	Employment Status
1.	Energy in industry	2	1	3	Dr Mitar Perušić, Prof.	permanent
2.	High pressure technology				Dr Vladan Mičić, Prof.	permanent
3.	Refrigeration technology				Др Vladan Mičić, Prof.	permanent
4.	Energetic efficiency of process				Dr Mitar Perušić, Prof.	permanent
5.	Preparation of mineral raw materials				Dr Radislav Filipović, Prof.	part-time
6.	Project management				Dr Mitar Perušić, Prof.	permanent
7.	Quality management				Dr Mitar Perušić, Prof.	permanent
8.	Experimental design and analysis				Dr Goran Tadić, Prof.	permanent
	Elective subject 3	Lect ures	Exer cise s	ECTS	Title, name and surname of the responsible teacher	Employment Status
1.	Oil refining technology	2	2	4	Dr Zoran Petrović, Assoc. Prof.	permanent
2.	Technology of synthetic polymers				Dr Zoran Petrović, Assoc. Prof.	permanent

3.	Plastic processing technology				Dr Zoran Petrović, Assoc. Prof.	permanent
4.	Oil and lubricant technology				Dr Zoran Petrović, Assoc. Prof.	permanent
5.	Polymer material recycling technology				Dr Zoran Petrović, Assoc. Prof.	permanent
6.	Surfactant and product technology based on surfactants				Dr Zoran Petrović, Assoc. Prof.	permanent
7.	Technology of natural polymers				Dr Zoran Petrović, Assoc. Prof.	permanent
8.	Biofuel technology				Dr Zoran Petrović, Assoc. Prof.	permanent
9.	Non-metal coating protection technology				Dr Milorad Tomić, Prof.	permanent

Study program: Chemical engineering and technology						
Elective module: Food Technology (FT)						
	Full subject name	Lectures	Exercises	ECTS	Title, name and surname of the responsible teacher	Employment Status
1.	Colloidal chemistry	3	2	6	Dr Dragan Tošković, Prof.	permanent
2.	Operations in food engineering	3	3	7	Dr Vladan Mičić, Prof.	permanent
3.	Nutritional value of food	3	1	5	Dr Vesna Gojković Cvjetković, Asst. Prof.	permanent
4.	Biochemistry in food technology	3	3	7	Dr Milenko Smiljanić, Assoc. Prof.	permanent
5.	Microbiology of food products 1	2	2	5	Dr Dragan Vujadinović, Assoc. Prof.	permanent
	T o t a l	14	11	30	V SEMESTER	
	Total per week / semester	25				

Study program: Chemical engineering and technology						
Elective module: Food Technology (FT)						
	Full subject name	Lectures	Exercises	ECTS	Title, name and surname of the responsible teacher	Employment Status
1.	Principles of conservation	3	2	6	Dr Dragan Vujadinović, Assoc. Prof.	permanent
2.	Methods of analysis of food products	3	3	7	Dr Milenko Smiljanić, Assoc. Prof.	permanent
3.	Basics of food technologies	3	3	7	Dr Vladimir Tomović, Prof.	?

					Dr Dragan Vujadinović, Assoc. Prof.	permanent
4.	Microbiology of food products 2	2	2	5	Dr Dragan Vujadinović, Assoc. Prof.	permanent
5.	Biochemical engineering	2	2	5	Dr Vladan Mičić, Prof.	permanent
	T o t a l	13	12	30	VI SEMESTER	
	Total per week / semester	25				

Study program: Chemical engineering and technology Elective module: Food Technology (FT)						
	Full subject name	Lec tur es	Exerc ises	ECTS	Title, name and surname of the responsible teacher	Employment Status
1.	Technology of meat production and processing	3	3	7	Dr Vladimir Tomović, Prof.	honorary
2.	Grain and flour technology	3	3	7	Dr Milan Vukić, Asst. Prof.	permanent
3.	Food safety and quality management	3	2	5	Dr Vladimir Tomović, Prof.	honorary
4.	Elective subject 1	2	2	4		
5.	Elective subject 2	2	2	4		
6.	Professional practice**	-	-	3		
	T o t a l	13	12	30	VII SEMESTER	
	Total per week / semester	25				

Study program: Chemical engineering and technology Elective module: Food Technology (FT)						
	Full subject name	Lect ures	Exer cise s	ECTS	Title, name and surname of the responsible teacher	Employment Status
1.	Fruit and vegetable technology	3	3	7	Dr Vesna Gojković Cvjetković, Asst. Prof.	permanent
2.	Technology of milk products	3	3	7	Dr Milenko Smiljanić, Assoc. Prof.	permanent
3.	Sensory methods of analysis of food	3	2	6	Dr Vladimir Tomović, Prof.	Honorary

	products					
4.	Elective subject 3	3	2	5		
5.	Diploma Thesis**	0	3	5		
	Total	12	13	30	VIII SEMESTER	
	Total per week / semester	25				

**) Professional practice and thesis are common to all optional modules

Study program: Chemical engineering and technology						
Elective module: Food Technology (FT)						
	Elective subject 1	Lectures	Exercises	ECTS	Title, name and surname of the responsible teacher	Employment Status
1.	Cooling technology	2	2	4	Dr Dragan Vujadinović, Assoc. Prof.	permanent
2.	Packaging technology of food products				Dr Zoran Petrović, Assoc. Prof.	permanent
3.	Hygiene and sanitation in food production				Dr Vesna Gojković Cvjetković, Asst. Prof.	permanent
	Elective subject 2	Lectures	Exercises	ECTS	Title, name and surname of the responsible teacher	Employment Status
1.	Application of food additives in food production	2	2	4	Dr Dragan Vujadinović, Assoc. Prof.	permanent
2.	Functional foods and nutraceuticals				Dr Vesna Gojković Cvjetković, Asst. Prof.	permanent
3.	Allergens in food				Dr Milenko Smiljanić, Assoc. Prof.	permanent
	Elective subject 3	Lectures	Exercises	ECTS	Title, name and surname of the responsible teacher	Employment Status
1.	Sugar and starch technology	3	2	5	Dr Milan Vukić, Asst. Prof.	permanent
2.	Technology of confectionery products				Dr Milan Vukić, Asst. Prof.	permanent
3.	Technology of beer and malt				Dr Milan Vukić, Asst. Prof.	permanent
4.	Technology of edible oils and fats				Dr Zoran Petrović, Assoc. Prof.	permanent
5.	Fairmented product production				Dr Milenko Smiljanić, Assoc. Prof.	permanent

	technology					
6.	Technology of prepared meals				Dr Dragan Vujadinović, Assoc. Prof.	permanent

4. OVERVIEW OF THE LOAD AND ANALYSIS OF THE NECESSARY NUMBER OF TEACHERS AND ASSOCIATES

4.1. OVERVIEW OF THE LOAD OF TEACHERS AND ASSOCIATES ON THE CURRENT STUDY

PROGRAM "CHEMICAL ENGINEERING AND TECHNOLOGY" IN THE I CYCLE IN THE ACADEMIC YEAR 2023/2024

ЗАПОСЛЕНИ У ПУНОМ РАДНОМ ОДНОСУ (П)

НАСТАВНИЦИ		РАД НА МАТИЧНОМ ФАКУЛТЕТУ							
Р.бр.	Име и презиме	Семестар	Норма	Часова предав.	Часова вјежби	Укупно	%	Просјечно по сем.	

1	Др Драган Тошковић	Зимски	6	6	0	6	100	5.5	9
		Летњи	6	5	0	5	83		
2	Др Драгица Лазић	Зимски	6	3	0	3	50	3.0	5
		Летњи	6	3	0	3	50		
3	Др Митар Перушић	Зимски	6	8	1	8.6	143	6.8	1
		Летњи	6	5	0	5	83		
4	Др Горан Тадић	Зимски	6	4	4	6.4	107	6.3	1
		Летњи	6	5	2	6.2	103		
5	Др Милорад Томић	Зимски	6	5	2	6.2	103	5.3	8
		Летњи	6	2	4	4.4	73		
6	Др Владан Мићић	Зимски	6	5	0	5	83	5.0	8
		Летњи	6	5	0	5	83		
7	Др Љубица Васиљевић	Зимски	6	0	0	0	0	2.0	3
		Летњи	6	4	0	4	67		
8	Др Светлана Пелемиш	Зимски	6	3	0	3	50	3.0	5
		Летњи	6	3	0	3	50		
9	Др Зоран Петровић	Зимски	6	3	1	3.6	60	3.6	6
		Летњи	6	3	1	3.6	60		
10	Др Славко Смиљанић	Зимски	6	2	0	2	33	2.00	3
		Летњи	6	2	0	2	33		
11	Др Драган Вујадиновић	Зимски	3	2	3	3.8	127	4.4	1
		Летњи	3	5	0	5	167		
12	Др Миленко Смиљанић	Зимски	6	5	5	8	133	7.9	1
		Летњи	6	6	3	7.8	130		
13	Др Драгана Кешељ	Зимски	6	2	4	4.4	73	3.1	5
		Летњи	6	0	3	1.8	30		
14	Др Александар Дошић	Зимски	6	3	0	3	50	3.0	5
		Летњи	6	3	0	3	50		

15	Др Весна Гојковић Цвјетковић	Зимски	6	5	5	8	133	7.9	1
		Летњи	6	3	8	7.8	130		
16	Др Милан Вукић	Зимски	6	3	5	6	100	7.2	1
		Летњи	6	3	9	8.4	140		
17	Др Марија Митровић	Зимски	6	2	10	8	133	7.0	1
		Летњи	6	3	5	6	100		
18	Ма Весна Цвијетиновић	Зимски	10	2	2	4	40	4.0	4
		Летњи	10	2	2	4	40		
УКУПНО:		Зимски		58	32	78		57.9	
		Летњи		56	32	76			

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19	Ма Данијела Рајић	Зимски	10	0	7	7	70	6.0	6
		Летњи	10	0	5	5	50		
20	Ма Срђан Вуковић	Зимски	10	0	5	5	50	4.0	4
		Летњи	10	0	3	3	30		
21	Ма Миломирка Обреновић	Зимски	10	0	11	11	110	8.0	8
		Летњи	10	0	5	5	50		
22	Ма Душко Костић	Зимски	10	0	7	7	70	9.5	9
		Летњи	10	0	12	12	120		
23	Ма Јелена Вуковић	Зимски	10	0	1	1	10	5.5	5
		Летњи	10	0	10	10	100		
24	Ма Небојша Васиљевић	Зимски	10	0	9	9	90	8.5	8
		Летњи	10	0	8	8	80		
25	Миленко Аћимовић	Зимски	10	0	8	8	80	6.5	6
		Летњи	10	0	5	5	50		
УКУПНО:		Зимски		0	47	40		18.0	
		Летњи		0	43	43			

PROGRAM "CHEMICAL ENGINEERING AND TECHNOLOGY" IN THE I AND II CYCLE IN THE ACADEMIC YEAR 2016/2017

НАСТАВНИЦИ

Р.бр.	Име и презиме	Семестар	Норма	Часова предав.	Часова вјежби	Бр. часова на Технолошком фак.	Бр. часова на другом ОЈ (ДУИС)	Укупни бр. часова на Универзит.	%	Просјечно по сем.	%	У норми	Преко норми	Број предмета	
														зимски	летњи
1	Др Миладин Глигорић	Зимски	3	5	0	5	3	8	267	6,5	217	3,0	3,5	3	2
		Летњи	3	3	0	3	2	5	167						
2	Др Радослав Грујић	Зимски	3	8	0	8		8	267	8,0	267	3,0	5,0	4	3
		Летњи	3	8	0	8		8	267						
3	Др Милован Јотановић	Зимски	6	5	0	5		5	83	5,5	92	5,5	0,0	2	2
		Летњи	6	6	0	6		6	100						
4	Др Миомир Павловић	Зимски	6	10	5	13		13	217	8,0	133	6,0	2,0	5	1
		Летњи	6	3	0	3		3	50						
5	Др Драган Тошковић	Зимски	6	4	0	4		4	67	4,1	68	4,1	0,0	2	1
		Летњи	6	3	2	4,2		4,2	70						
6	Др Живан Живковић (50%)	Зимски	3	4	1	4,6		4,6	153	3,3	110	3,0	0,3	2	1
		Летњи	3	2	0	2		2	67						
7	Др Драгица Лазић	Зимски	6	5	0	5	2	7	117	5,0	83	5,0	0,0	3	1
		Летњи	6	3	0	3	0	3	50						
8	Др Бранко Пејовић (50%)	Зимски	3	2	4	4,4		4,4	147	3,8	127	3,0	0,8	2	1
		Летњи	3	2	2	3,2		3,2	107						
9	Др Митар Перушић	Зимски	6	6	3	7,8		7,8	130	6,5	108	6,0	0,5	2	2
		Летњи	6	4	2	5,2		5,2	87						
10	Др Горан Тадић	Зимски	6	3	2	4,2		4,2	70	5,5	92	5,5	0,0	1	2
		Летњи	6	2	8	6,8		6,8	113						
11	Др Милорад Томић	Зимски	6	3	4	5,4		5,4	90	4,0	67	4,0	0,0	3	2
		Летњи	6	2	1	2,6		2,6	43						
12	Др Војислав Алексић	Зимски	6	3	0	3		3	50	4,5	75	4,5	0,0	1	2
		Летњи	6	6	0	6		6	100						
13	Др Владан Мићић	Зимски	6	6	2	7,2		7,2	120	5,8	97	5,8	0,0	3	3
		Летњи	6	2	4	4,4		4,4	73						
14	Др Љубица Васиљевић	Зимски	6	6	0	6	0	6	100	7,1	118	6,0	1,1	2	2
		Летњи	6	4	0	4	4,2	8,2	137						
15	Др Светлана Пелемиш	Зимски	6	5	8	9,8	3,2	13	217	11,1	185	6,0	5,1	3	2
		Летњи	6	3	5	6	3,2	9,2	153						
16	Др Зоран Петровић	Зимски	6	2	7	6,2		6,2	103	4,6	77	4,6	0,0	3	2
		Летњи	6	0	5	3		3	50						
17	Др Славко Смиљанић	Зимски	6	6	10	12		12	200	7,6	127	6,0	1,6	3	1
		Летњи	6	2	2	3,2		3,2	53						
18	Др Драган Вујадиновић	Зимски	6	4	2	5,2		5,2	87	4,5	75	4,5	0,0	3	2
		Летњи	6	2	3	3,8		3,8	63						
19	Др Миленко Смиљанић	Зимски	6	3	2	4,2	5,2	9,4	157	4,7	78	4,7	0,0	3	0
		Летњи	6	0	0	0	0	0	0						
20	Др Драгана Кешел	Зимски	6	0	6	3,6	1,2	4,8	80	3,9	65	3,9	0,0	3	2
		Летњи	6	0	5	3	0	3	50						
21	Др Александра Новаковић (50%)	Зимски	6	2	5	5		5	83	4,3	72	4,3	0,0	3	2
		Летњи	6	0	6	3,6		3,6	60						
22	Др Александар Дошић	Зимски	6	0	10	6	5,6	11,6	193	8,8	147	6,0	2,8	4	2
		Летњи	6	0	8	4,8	1,2	6	100						
УКУПНО:		Зимски		92	61	128,6	14,6	143,2		118,3		98,4	19,9		
		Летњи		57	45	84	9,4	93,4							

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23	Мр Милан Вукић	Зимски	10	0	6	6		6	60	7,5	75	7,5	0,0	3	4
		Летњи	10	0	9	9		9	90						
24	Мр Весна Гојковић	Зимски	10	0	10	10		10	100	7,5	75	7,5	0,0	4	2
		Летњи	10	0	5	5		5	50						
25	Мр Јелена Вулиновић	Зимски	10	0	4	4		4	40	6,0	60	6,0	0,0	2	3
		Летњи	10	0	8	8		8	80						
26	Мр Мирјана Берибака	Зимски	10	0	11	11		11	110	9,0	90	9,0	0,0	4	2
		Летњи	10	0	7	7		7	70						
27	Мр Весна Цвијетиновић	Зимски	10	4	5	9	0	9	90	10,0	100	10,0	0,0	4	4
		Летњи	10	4	5	9	2	11	110						
28	Мр Марија Риђошић	Зимски	10	0	4	4		4	40	4,0	40	4,0	0,0	2	2
		Летњи	10	0	4	4		4	40						
29	Мр Данијела Рајић	Зимски	10	0	7	7		7	70	8,0	80	8,0	0,0	2	2
		Летњи	10	0	9	9		9	90						
30	Стефан Павловић	Зимски	10	0	6	6		6	60	7,0	70	7,0	0,0	2	3
		Летњи	10	0	8	8		8	80						
УКУПНО:		Зимски		4	53	57	0	57		59,0		59,0	0,0		
		Летњи		4	55	59	2	61							

4.2. ANALYSIS OF THE NECESSARY NUMBER OF TEACHERS AND ASSOCIATES FOR TEACHING THE CHEMICAL ENGINEERING AND TECHNOLOGY STUDY PROGRAM

The analysis of the required number of permanent full-time teachers and associates at the Faculty of Technology Zvornik for the implementation of the Curriculum for I and II cycle of the study program of Chemical Engineering and Technology was carried out based on Article 15 of the Law on Higher Education and Article 3 of the Regulation on the Conditions for Establishment and the Beginning of the work of Higher Education Institutions and the Procedure for Determining the Fulfillment of Conditions.

The table below shows the required number of teachers and associates in the event that classes are held in all optional modules I and II of the study program of Chemical Engineering and Technology during the academic year (maximum required teaching staff).

The number of students in lecture groups (L) is 50, theoretical exercises (TE) is 30 and laboratory exercises (LE) is 15 in the first year, i.e. 10 in the higher years of study, and it is calculated in accordance with the provisions of the Rulebook on Standards and Norms for financing public higher education institutions (Official Gazette No. 84/14). The maximum weekly norm for teachers is 12 hours of lectures, and for associates 10 hours of exercises (Article 3, paragraph 4 of the Regulation on the Conditions for Establishment and the Beginning of the work of Higher Education Institutions and the Procedure for Determining the Fulfillment of Conditions).

Comparing the number of conditionally required teachers and associates (table below) and the number of permanent full-time employees (100%) at the Faculty of Technology Zvornik (19 teachers and 8 associates - see Section 2.1 of the Feasibility Study), it can be concluded that the Faculty meets the condition set in the article 15, paragraph 2, of the Law on Higher Education, which states that a higher education institution meets the staffing requirements for starting work and carrying out activities if the number of full-time teachers in each study program is *at least one half* of the total number of teachers required for teaching all subjects, for all years of study.

Required number of teachers and associates for teaching in the study program "Chemical Engineering and Technology"

Студијски програм	Хемисјко инжењерство и технологија (I, II год. заједничке а III, IV и мастер се дијеле на четири изборна модула)															
	I ГОДИНА			II ГОДИНА			III ГОДИНА			IV ГОДИНА			МАСТЕР			
Година студија	60			40			30			20			10			
Број првоуписаних студената (план):	60			40			30			20			10			
Предавање (П), вјежбе (ТВ), лаб.вјежбе (ЛВ)	П	ТВ	ЛВ	П	ТВ	ЛВ	П	ТВ	ЛВ	П	ТВ	ЛВ	П	ТВ	ЛВ	
Величина групе (према Правилнику 84/14)	50	30	15	50	30	10	50	30	10	50	30	10	50	30	10	
Број часова седмично (просјеч. на нивоу године)	14	7	4	13,5	7	4,5	44,5	18	24	46,5	22	27	26	10	16	
Број група	1	2	4	1	1	4	1	1	3	1	1	2	1	1	1	
Укупно часова	17	14	16	14	9	18	45	18	72	47	22	54	26	10	16	
Потребан број професора	1			1			4			4			2			12
Потребан број асистената		1	2		1	2		2	7		2	5		1	2	25

5. SPACE AND EQUIPMENT

5.1. DATA ON TOTAL USEFUL SPACE

The specification of the total useful office space, as well as the average area per student, are given in the following table:

No.	Description of the space	Number of rooms	Number of seats	Total area (m ²)
1	Classrooms	6	280	384
2	Computer classrooms	3	35	110
3	Laboratories	6	114	393
4	Center for Food Technology	6	52	248
5	The library	1	8	50
6	Reading room	1	30	54
7	Student services	1	-	38
8	Office for Student Union	1	5	30
9	Teaching staff offices	26	80	602
10	Apartments	3	6	88
11	Utility rooms	-	-	362
12	Entrance hall, corridors, stairs	-	-	370
13	Toilets	12	-	86
			Total area:	2815 m²
Total number of students (without graduates):				231
			Area per student:	12,2 m²
14	Space in preparation	-	-	3657
			Total area including the area under preparation:	6472 m²
			Area per student (including space under preparation):	28 m²

5.2. LABORATORIES

The Faculty's educational and scientific research activities are carried out in modern laboratories of the Faculty of Technology Zvornik and the Center for Food Technology. In the previous period, as part of the "Modernization of the University in East Sarajevo" project, the Faculty received new laboratory equipment worth approximately four million BAM, which significantly improved the conditions for further educational and scientific-research work at this institution.

The laboratories of the Faculty of Technology are:

1. Laboratory for biochemistry and organic chemistry
2. Laboratory for general and inorganic chemistry
3. Laboratory for analytical and physical chemistry
4. Chemical Engineering Laboratory

5. Laboratory for biology and microbiology
6. Laboratory for chemical technologies
7. Laboratory for environmental protection and corrosion tests
8. Laboratory for Electrochemical Engineering

The laboratories of the Center for Food Technology are:

1. Laboratory for instrumental tests
2. Laboratory for analytical tests
3. Laboratory for rheological tests
4. Semi-industrial plant for grain and flour processing
5. Semi-industrial plant for meat processing
6. Semi-industrial plant for thermal processing of food

Below is the list of some of the more important laboratory equipment available to the Faculty and the Center:

1. HPLC SYSTEM WITH UV-VIS SPECTROPHOTOMETRIC DETECTOR AND SPECTROFLUOROMETRIC DETECTOR
2. UV/VIS SPECTROPHOTOMETER
3. GAS CHROMATOGRAPHY with FID and ECD detector
4. GAS CHROMATOGRAPH SYSTEM WITH MASS SELECTIVE DETECTOR, AUTO INJECTION MODULE
5. CAPILLARY ELECTROPHORESIS
6. FTIR FOURIER TRANSFORM INFRARED SPECTROPHOTOMETER for food analyses
7. MULTITYPE ICP EMISSION SPECTROMETER SPECTRO GENESIS EOP (SOP)
8. AUTOMATIC LABORATORY REACTOR SYSTEM
9. GAS ABSORPTION COLUMN
10. HEAT EXCHANGER
11. SPRAY DRIER
12. LIQUID-LIQUID EXTRACTION UNIT
13. FLOOR STANDING CYCLIC CORROSION TEST CHAMBER
14. LASER LIGHT-SCATTERING PARTICLE SIZE ANALYZER, etc

5.3. INFORMATION ABOUT THE LIBRARY

The Faculty's library occupies an area of 50 m², which consists of a uniform exhibition and reading area with 8 reading places.

It is equipped with 4 computers with Internet access intended for users, as well as one computer for the librarian, a printer and a scanner.

The library has 4795 library items. The library also archives graduation theses, master's theses, master's theses, doctoral dissertations, as well as projects that the faculty works on for business entities, the Ministry of Science and Technology, etc.

The current number of theses is 631; master's theses 88; master theses 15; 47 doctoral dissertations and 558 projects.

Since 2009, the Faculty of Technology, with the support of the Ministry of Science and Technology of the Republic of Srpska, edits and publishes the journal titled "Journal of Engineering &

Process Management". The journal publishes works in the fields of chemical engineering and technology, food engineering, materials, environmental protection and other related and multidisciplinary fields, whose authors are from the country and abroad. The journal publishes the following categorized papers: research papers, announcements, review papers, expert papers and presentations from scientific meetings, provided that they have not been printed in other journals or conference proceedings. Over 100 works have been published so far.

The Faculty of Technology Zvornik regularly receives the following scientific journals:

- a) "Hemijska industrija" - Journal of Chemical Engineers of Serbia (subscription)
- b) "Zaštita materijala" - Engineering Society for Corrosion Belgrade (exchange)
- c) "Processing and Application of Ceramics" - Faculty of Technology, Novi Sad (exchange)
- d) "Savremene tehnologije" - Faculty of Technology, Leskovac
- e) "Glasnik hemičara, tehnologa i ekologa Republike Srpske" - Faculty of Technology, Banja Luka (exchange).

The journal issued by the Faculty of Technology in Zvornik ("Journal of Engineering & Processing Management") is regularly exchanged with the institutions listed from b) to e).

The Faculty of Technology Zvornik is a signatory to the Agreement number: 0202-2080-10/15 dated 14.10.2015. with the National and University Library of the Republic of Srpska, VIBRS Center, on full membership of the Faculty in the library and information system COBISS.RS. Currently, the full membership of all faculties of the University of East Sarajevo in the library and information system COBISS is underway.

The Faculty has published 36 books and textbooks used as part of required or additional reading in the teaching process:

1. Prof.dr Jovan Sejmenović, Osnovi ekonomije, Tehnološki fakultet Zvornik, 1996 (Želnid-Beograd), 160 str. ISBN 86-7307-020-1
2. Dragan Tošković, Fizička hemija, Tehnološki fakultet Zvornik, 1999 (Grafika-Šabac), 571 str. ISBN –nema
3. Prof.dr Jovan Đuković, doc dr Branko Đukić, doc dr Dragica Lazić, mr Miliwoje Marsenić, Tehnologija vode, Tehnološki fakultet Zvornik, 2000 (Mrlješ-Beograd), 288 str. ISBN 86-82271-55-9
4. Dr Aleksandar Š.Tolić, Fenomeni prenosa, Tehnološki fakultet Zvornik, 2000 (Krug-Ruma), 173 str, ISBN –nema
5. M.Todorović, N.Ristić, A.Jokić, Reakcioni mehanizmi u organskoj hemiji, Tehnološki fakultet Zvornik, 2001 (Grafopapir-Šabac), 252 str. ISBN –nema
6. Časlav Jevremović, Sistematika mineralurgije, Tehnološki fakultet Zvornik, 2001 (Dijamant-Beograd), 118 str. ISBN-86-902209-1-7
7. Živan Živković, Miladin Gligorić, Upravljanje kvalitetom, 2.izdanje, Tehnološki fakultet Zvornik, 2002 (Bakar-Bor), 427 str. ISBN –nema
8. Milovan B. Jotanović, Osnove hemijskog inženjerstva, Tehnološki fakultet Zvornik, 2003 (Grafopapir-Šabac), 269 str. ISBN -99938-666-1-H
9. Dr Miladin Gligorić, mr Goran Tadić, Zbirka zadataka iz opšte hemije, Tehnološki fakultet Zvornik, 2004 (Eurografika-Zvornik), ISBN 99938-666-2-8
10. Dragan Tošković, Ljubica Vasiljević, Dragica Lazić, Eksperimentalna fizička hemija, Tehnološki fakultet Zvornik, 2005 (Grafika-Šabac), 205 str. ISBN 99938-666-4-4

11. Živan Živković, Miladin Gligorić, Rajko Ubiparip, Šefik Muhić, Upravljanje kvalitetom, 3.izdanje, Tehnološki fakultet Zvornik, 2005 (Bakar-Bor), 427 str. ISBN –nema
12. Dr Branko Pejović, Zbirka zadataka iz inženjerskog crtanja, Tehnološki fakultet Zvornik, 2005 (Borojević-Beograd) 283 str. ISBN 99938-666-5-2
13. Dr Miro Sudar, Tehnološke operacije I (Mehaničko procesno inženjerstvo), Tehnološki fakultet Zvornik, 341 str.
14. Dr Mitar Perušić, Menadžment projektom, Tehnološki fakultet Zvornik, 2006 (Eurografika-Zvornik), 254 str. ISBN 99938-666-6-0
15. Dragica Lazić, Jelena Panavin–Škundrić, Ljubica Vasiljević, Materijalni i energetski bilans neorganskih baza i soli, Tehnološki fakultet Zvornik, 2007 (Mrlješ-Beograd), 350 str. ISBN 978-99938-666-9-5
16. Milovan B.Jotanović, Uparavanje i kristalizacija, Tehnološki fakultet Zvornik, 2008 (Eurografika-Zvornik), 157 str. ISBN 978-99955-625-0-2
17. Dr Mitar Perušić, Fizičko-hemijski aspekti luženja i kalcinacije aluminijum-hidroksida, Tehnološki fakultet Zvornik, 2008 (Eurografika-Zvornik), 152 str. ISBN 978-99955-625-1-9
18. Dr Dragan V.Tošković, dr Miloš B.Rajković, dr Dušan D.Stanojević, dr Milorad Tomić, Valorizacija galijuma iz dekomponovane Bayer-ove lužine, Tehnološki fakultet Zvornik, 2009 (Foto Futura-Beograd), 91 str, ISBN 978-99955-625-4-0
19. Milovan B.Jotanović, Sušenje disperznih sistema, Tehnološki fakultet Zvornik, 2009 (Eurografika, Zvornik), 280 str, ISBN 987-99955-625-3-3
20. Prof.dr Miladin Gligorić, prof.dr Vaso Novaković, prof.dr Branko Đukić, dr Milenko Savić, mr Ranko Grujić, Aleksandar Došić, dipl.inž.tehn., Priprema vode za piće, Tehnološki fakultet Zvornik, 2010 (Eurografika-Zvornik), 346 str, ISBN 987-99955-625-7
21. Dragica Lazić, Jelena Panavin-Škundrić, Slavica Sladojević, Ljubica Vasiljević, Materijalni i energetski bilans neorganskih kiselina, Tehnološki fakultet Zvornik, 2010 (Joksimović-Beograd), 363 str. ISBN 978-99955-625-6-4

22. Milorad Tomić, Miomir Pavlović, Jovo Mandić, Borislav Malinović, Zbirka zadataka iz elektrohemijškog inženjerstva, Tehnološki fakultet Zvornik, 2010 (Grafomark-Laktaši), 101 str. ISBN 978-99955-625-7-1
23. Prof.dr Miro Sudar, Tehnološke operacije III (Difuziono procesno inženjerstvo), Tehnološki fakultet Zvornik 2010 (Grafam-Brčko), 400 str. ISBN 9938-666-3-6
24. Slavica Grujić, Radoslav Grujić, Razvoj novih prehrambenih proizvoda, Tehnološki fakultet Zvornik, 2011 (Grafomark-Laktaši), 361 str. ISBN 978-99955-625-9-5
25. Zoran Petrović, Pero Dugić, Vojislav Aleksić, Fizičko hemijska ispitivanja u procesima organske industrije, Tehnološki fakultet Zvornik, 2011 (Grafomark-Laktaši), 570 str. ISBN 978-99955-81-02-2
26. Branko Pejović, Zbirka zadataka iz osnova mašinstva, Tehnološki fakultet Zvornik, 2011 (Borojević-Beograd), 226 str. ISBN 978-99955-625-8-8
27. Prof.dr Branko Đukić, prof.dr Miladin Gligorić, mr Slavko Smiljanić, Priprema vode za industriju i energetiku, Tehnološki fakultet Zvornik, 2011 (Eurografika-Zvornik), 428 str. ISBN 978-99955-81-03-9
28. Miomir G.Pavlović, Dušan Stanojević, Sreten Mladenović, Korozija i zaštita materijala, Tehnološki fakultet Zvornik, 2012 (Grafika-Loznica), 476 str. ISBN 978-99955-81-04-6

29. Milovan Jotanović, Goran Tadić, Osnove hemijskog inženjerstva, 2.izdanje, 2012 (Grafika-Loznica), 341 str. ISBN 978-99955-81-06-0
30. Branko Pejović, Mitar Perušić, Inženjerska termodinamika, zbirka zadataka, 2012 (Eurografika-Zvornik), 334 str. ISBN 978-99955-81-07-7
31. Milorad Tomić, Miomir Pavlović, Borislav Malinović, Zbirka zadataka iz korozije i zaštite, 2013 (SaTCIP-Vrnjačka Banja), 108 str. ISBN 978-99955-81-10-7
32. Vladan Mičić, Vojislav Aleksić, Vladimir Damjanović, Mogućnosti proizvodnje bioetanola kao alternativnog goriva, 2013 (Grafikus-Zvornik)
33. Radoslav Grujić, Željka Marjanović Balaban, Midhat Jašić, Azijada Beganlić, Emilija Spaseska Akeksovska, Vitamini i minerali u ishrani ljudi, 2014 427 str. ISBN 978-99955-81-14-5
34. Mitar Perušić, Radislav Filipović, Osnove prenosa toplote, 2014, 160 str., ISBN 978-99955-81-15-2
35. Vladan Mičić, Zoran Petrović, Pero Dugić, Biomasa i biogas kao alternativno gorivo, 2015, str.167 ISBN 978-99955-81-16-9.
36. Prof.dr Milovan Jotanović, Prof.dr Vladan Mičić, Hemijsko reakcijsko inženjerstvo, 2016, str.293