

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

**Ternopil Volodymyr Hnatiuk
National Pedagogical University**

**EDUCATIONAL AND PROFESSIONAL PROGRAM
“SECONDARY EDUCATION (CHEMISTRY, BIOLOGY AND HUMAN
HEALTH)”**

**The first (Bachelor) level of higher education
in specialty 014 Secondary education (Chemistry)
the field of knowledge 01 Education / Pedagogy
Qualification: Bachelor of secondary education. Teacher of Chemistry,
Biology and Health Education**

**APPROVED BY THE ACADEMIC COUNCIL
The head of the academic council**

_____/V. Kravets /

(Protocol No. 13 of 26th June, 2018)

**The educational program is put into operation on September 01, 2018.
(order No. 178 from 26th June, 2018)**

Ternopil 2018
Profile of the educational and professional program in specialty 014
Secondary education (Chemistry)

1 - General information	
Full name of higher educational institution and structural unit	Ternopil Volodymyr Hnatiuk National Pedagogical University, Ternopil; Department of Chemistry and Biology
The degree of higher education and the name of the qualification in the language of the original	The first (Bachelor) level of higher education. Bachelor of secondary education. Teacher of Chemistry, Biology and Health Education.
The official name of the educational program	Bachelor's Educational and Professional Program in specialty 014 Secondary Education (Chemistry, Biology and Health Education)
Type of diploma and the volume of the educational program	The bachelor's degree, unitary, 240 credits ECTS, the term of study - 3 years and 10 months
Availability of accreditation	The validity of the certificate of accreditation – until July 1, 2025
Cycle/Level of the program	NQF (National Qualifications Framework) Ukraine – level 6, FQEHEA – first cycle, EQF-LLL – level 6
Prerequisites	Complete general secondary education on the basis of external independent testing (admission tests)
Teaching languages	Ukrainian
The duration of the educational program	until July 1, 2022
Internet address of the permanent description of the educational program	http://tnpu.edu.ua/about/public_inform/akredytatsiia%20ta%20litsenzuvannia/014_Serednja_osvita_Chemistry_bakalavr.pdf
2 - The purpose of the educational program	
To create an educational environment for the first (Bachelor) level higher education student for the formation of general and professional competences in the fields of chemistry,	

biology, pedagogy and psychology at the appropriate level, enabling them to gain access to employment and obtain the next level of higher education.

3 - Characteristics of the educational program

Subject area (field of knowledge, specialty)	<p>Chemistry, biology, interdisciplinary; Field of knowledge - 01 Education / Pedagogy; Specialty: 014 Secondary education (Chemistry); Subject specialties: 014.06 Secondary education (Chemistry), 014.05 Secondary education (Biology and Health Education). The training program consists of 2 cycles and state attestation:</p> <ul style="list-style-type: none"> • general training cycle (64,5 credits ECTS, 1935 hours); • professional training cycle (175,5 credits ECTS, 5265 hours); <ul style="list-style-type: none"> ○ normative educational disciplines (94,5 credits ECTS, 2835 hours); ○ selective academic disciplines (49,5 credits ECTS, 1485 hours); ○ practical training (27,5 credits ECTS, 825 hours).
Orientation of the program	<p>Educational-professional, has applied orientation. Provides preparation for the performance of the functional duties of subject teachers: chemistry, biology, class teachers in secondary general educational institutions, organizers of the chemistry workshops in institutions of additional education, a teacher of a vocational school of a lower degree, formation of readiness for self-education and professional self-improvement during life.</p>
The main focus of the educational program	<p>General secondary education in the field 01 Education / Pedagogy in specialty 014 Secondary education (Chemistry). Subject specialties: 014.06 Secondary education (Chemistry) and 014.05 Secondary education (Biology and Health Education) Teacher training for school subjects biology and chemistry. <i>Key words:</i> higher education, bachelor, teacher, chemistry, biology.</p>
Peculiarities of the program	<p>Interdisciplinary and multidisciplinary training of specialists in the field of knowledge 01 Education / Pedagogy. The program is based on well-known scientific results, taking into account the current state of chemical, biological and pedagogical sciences, requiring practical training on the basis of secondary schools. The program provides for the completion of two term papers</p>

4 - Eligibility of graduates for employment and further training

Eligibility for employment	<p><i>Classification of Economic Activities</i> (according to NACE 009:2010): 85.31 General secondary education; 85.32 Vocational education <i>Professional types of work</i> (according to State Classifier 003:2010): 2320 Teacher of general educational institution Teacher of vocational school of a lower degree 2331 Teacher of general educational institution 2359.2 Educator-organizer</p>
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	Organizer of extracurricular and out-of-school work with children
Further training	Possibility to study according to the program of the second (master's) level in the same specialty (which is consistent with the obtained bachelor's degree) or in another specialty.
5 - Teaching and evaluation	
Teaching and studying	<p><i>Basic approaches:</i> student-centered, activity, value; electronic, distance and self-study.</p> <p><i>Educational technologies:</i> problem-developing, interactive, informational-communicative, project, contextual education.</p>
Evaluation	Oral and written current and final evaluations, defense of practical training reports, term papers defense.
6 - Program competencies	
Integral competency	The ability to solve complex specific problems and practical problems in the secondary education, which involve the application of theories and methods of pedagogical and natural sciences, and is characterized by the complexity and variability of the pedagogical conditions of the organization of educational process in the basic secondary school.
General competencies	<p>GC1 Ability to realize their personal potential in social and political life of the country;</p> <p>GC2 Ability to intellectual development, learning and self-education throughout life;</p> <p>GC3 Ability to use general methods of scientific research and conduct research at the appropriate level;</p> <p>GC4 Ability to apply scientific knowledge when formulating and solving professional tasks;</p> <p>GC5 Ability to adapt to the dynamic present and future, to act in a new situation, willingness to use the gained experience to maintain their own health and health of others;</p> <p>GC6 Ability to communicate in the state language both orally and in writing.</p> <p>GC7 Ability to communicate in a foreign language and use the knowledge of a foreign language in professional activities.</p> <p>GC8 Ability to use information and communication technologies;</p> <p>GC9 Ability to work with colleagues and partners, work in a team;</p> <p>GC10 Ability to act on the basis of ethical considerations (motives);</p> <p>GC11 Valuation and Respect for Diversity and Multiculturalism;</p> <p>GC12 Ability to effectively use legislative acts and regulatory documents in personal life and professional activities.</p>

Professional competencies	<p>PC1 Ability to teach knowledge and methods of their obtaining, to form educational activity of pupils or students;</p> <p>PC2 Ability to operate with modern terminology, scientific concepts, laws, doctrines and theories in the field of chemistry and biology;</p> <p>PC3 Ability to reveal the general structure of the natural sciences to form a scientific outlook. Ability to characterize natural systems of different levels of organization on the basis of the interconnection of fundamental laws of nature and society;</p> <p>PC4 Ability to operate with the methods of observation, description, identification, classification of chemical and biological objects;</p> <p>PC5 Ability to use theoretical knowledge and practical skills in chemistry and biology for the study of chemical, biochemical and ecological processes;</p> <p>PC6 Ability to analyze the various states of matter and theory used for their description;</p> <p>PC7 Ability to analyze the characteristic properties of elements and their compounds, to characterize the relationship between the structure and properties of chemicals;</p> <p>PC8 Ability to characterize the main types of chemical reactions and their main thermodynamic and kinetic characteristics;</p> <p>PC9 Ability to analyze the nature and properties of functional groups, the relationship between the basic properties and properties of individual atoms and molecules, including macromolecules, polymers, etc .;</p> <p>PC10 Ability to apply procedures and methods used in chemical analysis to determine the qualitative and quantitative composition of substances</p> <p>PC11 Ability to apply the acquired knowledge and understanding in chemistry and biology to solve qualitative and quantitative problems of a similar nature;</p> <p>PC12 Ability to conduct standard laboratory procedures and use tools in synthetic and analytical work for organic and inorganic systems;</p> <p>PC13 Ability to interpret chemical and biological data obtained as a result of laboratory observations and measurements, in terms of their significance and to associate them with the corresponding theory;</p> <p>PC14 Ability to transfer the system of scientific chemical and biological knowledge into the plane of the school subject of chemistry and biology at school;</p> <p>PC15 Ability to apply the acquired knowledge in the subject area, modern educational technologies for formation of the key and substantive concepts of chemistry and biology in the students of the secondary school;</p> <p>PC16 Ability to choose methods and means of teaching chemistry and biology aimed at developing students' abilities, taking into account their individual and age characteristics.</p> <p>PC17 Ability to integrate content, forms and methods of teaching chemistry and biology for the development of students' holistic natural and scientific world.</p>
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	PC18 Ability to safely carry out research activities on chemistry and biology in laboratory and in natural conditions.
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7 - Program outcomes of studying

	<p>POS1 Formation of the humanistic outlook, spiritual and value orientations of national and world culture; observance of moral and ethical principles of a person, tolerance to various ethnic cultures and religions; understanding of the laws of the development of art and the diversity of forms of aesthetic attitude of a person to the world;</p> <p>POS2 Readiness to participate in the functioning of democratic institutions, understanding and analyzing state-political, national-cultural, socio-economic and personally significant processes, realizing their potential through their own worldview, showing civil responsibility and patriotism;</p> <p>POS3 Ability to logically correct, reasoned and understandably conduct business communication, public speeches, presentations, business correspondence, persuasively to argue their position, possessing state and foreign languages, adhere to professional etiquette;</p> <p>POS4 Ability to organize and regulate life and health care activities aimed at preserving their physical, social, mental and spiritual health and environment, to bear personal responsibility for everything living on Earth, to treat the environment with care;</p> <p>POS5 Understanding of the modern system of organization of nature and methodology of natural sciences, structure and basic functional features to maintain the constancy of composition, structure, functioning and development of natural (inanimate and living) systems, the human body in connection with its environment.</p> <p>POS6 Ability to characterize natural systems of different levels of organization using the methods of modern natural sciences, physics, chemistry, biology, explain their role to ensure sustainable development of nature and society, use knowledge for their protection, reproduction and balanced development. formation of a healthy lifestyle of a person.</p> <p>POS7 Knowledge and understanding of terminology, basic laws, concepts, theories and the general structure of chemical and biological disciplines.</p> <p>POS8 Possession of methods of observation, description, identification, classification of chemical and biological objects;</p>
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POS9 Ability to apply theoretical knowledge and practical methods of related branches (physics, mathematics, informatics, etc.) at the operational level for the development of understanding of the integrative connections between fundamental sciences, the formation of a holistic natural and scientific picture of the world.

POS10 Knowledge and understanding of the properties of chemical elements and their compounds, main types of chemical reactions, methods of obtaining inorganic and organic substances, genetic links between them.

POS11 Possession of methods of chemical and physical-chemical analysis, synthesis of chemical substances, including laboratory and industrial methods for obtaining important chemical compounds.

POS12 Ability to apply the principles of thermodynamics, quantum mechanics, patterns of interaction of matter and radiation for description the structure and properties of atoms, molecules and substances.

POS13 Ability to perform standard laboratory procedures, use equipment for synthesis and analysis of organic and inorganic compounds and materials, to determine the chemical, physical-chemical, physical, mechanical and structural properties of simple and complex substances

POS14 Ability to work with numerical data, to carry out mathematical and statistical processing of the results of chemical and biological experiments, to correctly perform calculations using applied computer programs (Excel, Statistica, etc.).

POS15 Ability to safely use chemical and biological materials, taking into account their chemical and physical properties, including any risks associated with their use, observance of safe working conditions and protection of the environment.

POS16 Skills to work independently or in a team, the ability to get results within a limited time, taking into account professional integrity and eliminating plagiarism. Ability to be fluent in a foreign language, including special terminology, to find information.

POS17 Ability to analyze the state regulatory documents for planning and designing the main types of educational activities of students, creating an equal and equitable educational environment.

POS18 Ability to transfer the system of scientific chemical and biological knowledge into the plane of the school subject of chemistry and biology at school;

POS19 Ability to apply modern educational technologies, it is possible to broadcast the system of scientific natural sciences in the plane of educational subjects of chemistry and biology taking into account age and individual characteristics of students.

POS20 Possession of information and communication technologies and their ability to apply them in the study of chemical and biological disciplines for the formation of key and subject competences in students.

POS21 Ability to organize the cooperation of students, to control and

	<p>objectively evaluate their educational achievements, to work effectively in the educational staff of the educational institution, other professional associations and to critically evaluate the professional skills of college teachers.</p> <p>POS22 Ability to form a holistic natural and scientific picture of the world in students through interdisciplinary connections with physics, biology, geography, in accordance with the requirements of the state standard in the educational field “Natural History” in the basic secondary school.</p> <p>POS23 The need and ability to study throughout life and to improve independently the professional competencies acquired during training.</p>
8 - Resource support of the program	
Personnel support	<p>Project group: 2 Doctors of Biological Sciences (1 - chemical, 1 - biological), 2 Candidates of Sciences, Associate Professors (1 - biological, 1 - pedagogical).</p> <p>Guarantor of the educational program: V. Khomenchuk - Candidate of biological Sciences, Associate Professor.</p> <p>The program involves scientific and pedagogical staff with academic degrees and academic degrees. In order to raise the professional level, all scientific and pedagogical workers undergo an internship once in five years, including overseas.</p>
Material and technical support	<p>Profile teaching laboratories, offices, integrated training laboratories, scientific research laboratories of departments, scientific and methodological center of natural sciences, agrobiological laboratory, greenhouse, herbarium, zoological and geological museums, experimental educational and production sites in secondary schools and Ternopil regional center of ecological- the naturalistic creativity of the student youth (according to the treaties).</p>
Information and studying and methodological support	<p>Availability of sufficient quantity of educational and methodical literature, periodicals, electronic educational-methodical complexes of educational disciplines (on the platform of Moodle).</p>
9 - Academic mobility	
National Credit Mobility	<p>Carried out by individual contracts of participants in the educational process.</p>
International Credit Mobility	<p>Natural and Humanitarian University in Siedlce (Agreement of 17/04/2013 - 17/04/2018);</p> <p>Victor Franklin Higher Pedagogical School in Carinthia, Austria (Agreement 06.02.2009 - 01.07. 2020);</p> <p>Yana Dlugosha Academy in Częstochowa, Poland (Agreement 10.10.2016 - unlimited).</p>

Studying of foreign applicants for higher education	Not available
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2. List of components of the educational and professional program and their logical consistency

2.1. List of components of educational and professional program

Code, No	Components of the educational and professional program (educational disciplines, course projects (work), practice, qualification work)	Credits	Assessment
<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
Objective components of educational program			
OC1	History of Ukraine and national culture	5	Exam
OC2	Philosophy	3	Exam
OC3	Ukrainian Language (for Professional Usage)	3	Credit, Exam
OC4	Foreign Language	7	Credit, Exam
OC5	Higher mathematics	5	Credit
OC6	Physics	4	Exam
OC7	Ecology	3	Exam
OC8	Physical-Chemical Methods of Research	4	Exam
OC9	Structure of Matter	3	Credit
OC10	Bioorganic Chemistry	6	Exam
OC11	High molecular compounds	3	Credit
OC12	Fundamentals of Chemical Technology	9	Credit, Exam
OC13	General Chemistry	6	Exam
OC14	Inorganic Chemistry	10	Credit, Exam
OC15	Organic Chemistry	17	Credit, Exam
OC16	Physical and Colloidal Chemistry	10	Exam
OC17	Analytical Chemistry	9	Exam
OC18	Chemistry of Complex Compounds	3	Credit
OC19	Inorganic and Organic Synthesis	6	Credit, Exam
OC20	Pedagogy	7	Credit, Exam
OC21	Educational Technologies	3	Credit
OC22	Psychology	5	Credit, Exam
OC23	Life Safety and Fundamentals of Occupational Safety	3	Credit
OC24	Methods of Chemistry and Biology	8	Credit, Exam

	Teaching		
OC25	Methods of Solving Problems in Chemistry	3	Credit
OC26	Modern Information Technologies	2,5	Credit
OC27	Information and Technical Means of Training	2	Credit
OC28	Term Paper	2	Credit
OC29	Educational Practice	18,5	Credit
OC30	Occupational Practice	9	Credit
OC31	Comprehensive Qualifying State Examination	2	Exam
Total		181	
Selective components of educational program			
SC1.1	Law/Religious Studies	2	Credit
SC1.2	Economics / Logics	2	Credit
SC1.3	Ethics and Aesthetics / Sociology	2	Credit
SC1.4	Latin	1,5	Credit
SC1.5	Political Studies	2	Credit
SC1.6	Chemistry of Heterocyclic Compounds	3,5	Credit
SC1.7	Mathematical Methods in Chemistry	2	Credit
SC1.8	Chemistry of the Environment	2	Credit
SC1.9	Botany	6	Exam, Credit
SC1.10	Zoology	6	Credit, Exam
SC1.11	Human Anatomy	3	Credit
SC1.12	Genetics with the Basics of Selection	2	Exam
SC1.13	Human and Animal Physiology	3	Exam
SC1.14	Fundamentals of Agriculture	3	Credit
SC1.15	Cytology and Histology	3	Credit
SC1.16	Development Physiology and Health Studies	3,5	Credit
SC1.17	Plant Physiology	3	Exam
SC1.18	Microbiology with the Basics of Virology	2	Credit
SC1.19	Saving Nature Technologies	3	Credit
SC1.20	Geology	3	Credit
SC1.21	Evolutionary Theory	1,5	Credit
Total		59	
GENERAL		240	

3. Form of certification of higher education applicants

State certification of applicants for higher education is carried out in the form of a Comprehensive Qualifying State Examination.

Comprehensive Qualifying State Examination is aimed at establishing educational and professional qualifications and includes tasks for checking the results of training in psychological and pedagogical disciplines, Chemistry, Biology and Human Health and the Methods of their Training in the basic secondary school and in the vocational education of a lower degree.

The State Certification is completed by the issuance of a document of a standard sample of awarding a Bachelor's degree with a qualification: Bachelor of secondary education. Teacher of Chemistry, Biology and Human Health.