Educational and Professional Program of Secondary Education "Natural Studies"

No	Course Titles
1st year of study	
1.	Workshop on Latin
2.	Latin Language with Fundamentals of Biological Terminology
3.	Information and Communication Technologies (ICT) in Education
4.	Digital Learning Tools
5.	Geology and Basis of Geochemistry
6.	General Geology
7.	Historical Geology with Basis of Paleontology
8.	Meteorology and Climatology
9.	Seasonal Observations in Nature
10.	Agrometeorology
11.	Plant Systematics
12.	Phytocenology
13.	Plant Systematics with Fundamentals of Mycology
2nd year of study	
1.	Educational Technoloies
2.	Creative Pedagogical Technologies
3.	Intermedial Technologies
4.	Biophysics
5.	Radiobiology
6.	Soil Science
7.	Soil Science with Basis of Soil Geography
8.	Fundamentals of Agrochemistry
9.	Animal Systematics
10.	Animal Acology
11.	Ethology
3rd year of study	
1.	Techniques and Methods of School Chemical Experiment
2.	Methods of Solving Chemical Problems
3.	Ecological and Naturalistic Activities of School Students
4.	Bioethical Education of School Students
5.	Extracurricular and Out-of-School Activities in Natural Sciences
6.	Innovative Technologies in Teaching Natural Sciences
7.	Media Technologies in Teaching Natural Sciences
8.	STEM Technologies in Natural Science Education
9.	Fundamentals of Modern Electronics
4th year of study	
1.	Modern Natural Science Worldview (NSW)
2.	History of the Development of the NSPW
3.	Concepts of Modern Natural Science
4.	Astronomy
5.	Fascinating Physics

6.	Problem-Based Physics
7.	Biogeography
8.	Theory of Evolution
9.	Evolution of the Biosphere
10.	Environmental Monitoring
11.	Issues of Environmental Management
12.	Environmental Protection and Nature Conservation Management

1st year of study

WORKSHOP ON LATIN

Educational Program	Educational and Professional program "Secondary Education (Natural Studies)"
Specialty	014.15 Secondary Education (Natural Sciences)
Higher Education Level	First (Bachelor`s) level
Lecturer	Candidate of Pedagogical Sciences, Associate Professor Halyna Navolska
Course Language	Ukrainian
Department	Foreign Languages
Scope	3 ECTS credits
Year of study	1st year
Semester	1st semester
Form of Final Assessment	credit
Link to Syllabus	https://drive.google.com/file/d/14RldMqK9xYJFRUXRnoq6INsKduzfVs4a/view?usp=drive_link
Course description	The aim of the course is to provide students with a system of knowledge and skills necessary for their professional activities, in particular, general linguistic knowledge based on Latin. The course contributes to the development of communication skills, foster independent learning, and enhance the effective application of acquired knowledge at all stages of education. Important components of the course are mastering normative grammar, building a professional lexical minimum, and developing skills in reading, writing, grammatical analysis, and translation of professionally oriented texts. The course is focused on understanding and use of Greco-Latin term elements and professional Latin terminology in educational, scientific, and practical contexts.

LATIN LANGUAGE WITH FUNDAMENTALS OF BIOLOGICAL TERMINOLOGY

Educational Program	Educational and Professional program “Secondary Education (Natural Studies)”
Specialty	014.15 Secondary Education (Natural Sciences)
Higher Education Level	First (Bachelor`s) level
Lecturer	Candidate of Pedagogical Sciences, Associate Professor Halyna Navolska
Course Language	Ukrainian
Department	Foreign Languages
Scope	3 ECTS credits
Year of study	1st year
Semester	1st semester
Form of Final Assessment	credit
Link to Syllabus	https://drive.google.com/file/d/1VP6jJoiaZFRsi0BhpiD0hAhrXj_ctwEV/view?usp=drive_link
Course description	The course is aimed at developing students’ general linguistic competence through the study of Latin and its application in the field of biological sciences. It provides students with the essential knowledge of basic Latin grammar required for the accurate understanding and appropriate use of international biological terminology of Latin and Greek origin in academic, professional, and research contexts. The main learning objectives are to develop skills in reading, writing, and translation; to master the core vocabulary, normative grammar, syntax, and word formation patterns of the Latin language; to understand the linguistic principles underlying biological nomenclature; and to foster professional terminological competence relevant to the natural sciences.

INFORMATION AND COMMUNICATION TECHNOLOGIES IN EDUCATION

Educational Program	Educational and Professional program “Secondary Education (Natural Studies)”
Specialty	014.15 Secondary Education (Natural Sciences)
Higher Education Level	First (Bachelor`s) level
Lecturer	Candidate of Pedagogical Sciences, Associate Professor Volodymyr Rak
Course Language	Ukrainian
Department	Computer Technologies
Scope	3 ECTS credits
Year of study	1st year
Semester	2nd semester
Form of Final Assessment	credit
Link to Syllabus	https://drive.google.com/file/d/1ojAtO5KDPfXi7kN-ObrB771hrogKtROK/view?usp=drive_link
Course description	The course “Information and Communication Technologies in Education” is designed to develop and enhance the practical skills of future teachers of natural sciences in using ICT tools to improve the efficiency of the educational process in general secondary education institutions. The course enables students to acquire knowledge on the rational and effective use of modern information technologies, the creation and preparation of didactic materials for technical teaching aids, and the development of skills to apply them methodically and effectively in educational practice.

DIGITAL LEARNING TOOLS

Educational Program	Educational and Professional program “Secondary Education (Natural Studies)”
Specialty	014.15 Secondary Education (Natural Sciences)
Higher Education Level	First (Bachelor`s) level
Lecturer	Candidate of Pedagogical Sciences, Associate Professor Volodymyr Rak
Course Language	Ukrainian
Department	Computer Technologies
Scope	3 ECTS credits
Year of study	1st year
Semester	2nd semester
Form of Final Assessment	credit
Link to the syllabus	https://drive.google.com/file/d/1y_EroG2YpaUPupLw4hdVosnpts8QbjpP/view?usp=drive_link
Course description	The course “Digital Learning Tools” is designed to develop foundational digital competence in the use of modern information technologies within the educational process of general secondary education institutions. It aims to enhance the practical skills of future teachers of natural sciences in applying digital learning tools effectively. The course enables students to acquire competences in the efficient use of modern digital and virtual tools in professional teaching practice and to develop skills for their methodically sound and rational application in the instruction of natural sciences.

GEOLOGY AND BASIS OF GEOCHEMISTRY

Educational Program	Educational and Professional program "Secondary Education (Natural Studies)"
Specialty	014.15 Secondary Education (Natural Sciences)
Higher Education Level	First (Bachelor`s) level
Lecturer	Candidate of Geographical Sciences, Associate Professor Bohdan Havryshok
Course Language	Ukrainian
Department	Computer Technologies
Scope	3 ECTS credits
Year of study	1st year
Semester	2nd semester
Form of Final Assessment	credit
Link to syllabus	https://drive.google.com/file/d/1zRdfKGuL3H-TV5j5BmZ6K3fp8-4yZXB6/view?usp=drive_link
Course description	The course is designed to provide students with a general understanding of the structure of the Earth's crust and the exogenous and endogenous processes occurring on the planet. The aim of the course "Geology with Fundamentals of Geochemistry" is to develop students' skills in solving professional tasks and practical interdisciplinary problems that arise in the course of professional activity and require the application of geological theories, principles, and methods. During the study of this discipline, students acquire the ability to understand geological terminology and the characteristics, processes, and composition of the Earth as a natural ecosystem. The knowledge gained will serve as a foundation for studying various physical, chemical, biological, and geographical components of natural science education and will broaden the worldview of future teachers of natural sciences.

GENERAL GEOLOGY

Educational Program	Educational and Professional program “Secondary Education (Natural Studies)”
Specialty	014.15 Secondary Education (Natural Sciences)
Higher Education Level	First (Bachelor`s) level
Lecturer	Candidate of Geographical Sciences, Associate Professor Bohdan Havryshok
Course Language	Ukrainian
Department	Computer Technologies
Scope	3 ECTS credits
Year of study	1st year
Semester	1ST semester
Form of Final Assessment	credit
Link to syllabus	https://drive.google.com/file/d/1i-7O4OQ4Fxi5rQ7flFm-axrrjfh_nS-q/view?usp=drive_link
Course description	The aim of the course “General Geology” is to provide students with knowledge and a general understanding of the Earth’s internal structure, the composition of the crust and lithosphere, the main processes of internal and external geodynamics, and methods for paleogeographic reconstruction of ancient ecosystems. Upon completion of the course, students will become familiar with the most common minerals in the Earth’s crust and their practical applications, as well as the main exogenous processes shaping the current land surface. They will acquire skills to identify and characterize common minerals, distinguish the most widespread igneous and sedimentary rocks, and understand their formation processes. The knowledge gained will serve as a foundation for studying physical, biological, geographical, and chemical disciplines and will broaden the worldview of future teachers of natural sciences.

HISTORICAL GEOLOGY WITH BASIS OF PALEONTOLOGY

Educational Program	Educational and Professional program “Secondary Education (Natural Studies)”
Specialty	014.15 Secondary Education (Natural Sciences)
Higher Education Level	First (Bachelor`s) level
Lecturer	Candidate of Geographical Sciences, Associate Professor Bohdan Havryshok
Course Language	Ukrainian
Department	Computer Technologies
Scope	3 ECTS credits
Year of study	1st year
Semester	1st semester
Form of Final Assessment	credit
Link to syllabus	https://drive.google.com/file/d/1POKpi2jOWg-8JmlDuUpZg71Tf6IaCVUM/view?usp=drive_link
Course description	The course “Historical Geology with Basics of Paleontology” aims to develop students’ ability to analyse the composition, structure, and evolution of the Earth’s crust, as well as to integrate field and laboratory geological observations with theoretical principles from observation to identification, synthesis, and modelling. During the course, students will study the material composition of the Earth’s crust, the main processes of internal and external geodynamics, and methods of paleogeographic reconstruction of past physical and geographical environments, along with the principal stages of the Earth’s geographical envelope development. They will gain an understanding of the evolution of platforms and geosynclinal regions throughout geological periods and learn to construct palaeotectonic schemes. The course teaches students to identify and describe the most common fossil organisms and reconstruct their living environments. The knowledge gained will form the basis for further study biological and chemical courses, as well as broaden the worldview of future teachers of natural sciences.

METEOROLOGY AND CLIMATOLOGY

Educational Program	Educational and Professional program “Secondary Education (Natural Studies)”
Specialty	014.15 Secondary Education (Natural Sciences)
Higher Education Level	First (Bachelor`s) level
Lecturer	Candidate of Geographical Sciences, Associate Professor Nataliia Taranova
Course Language	Ukrainian
Department	Computer Technologies
Scope	3 ECTS credits
Year of study	1st year
Semester	2nd semester
Form of Final Assessment	credit
Link to the syllabus	https://drive.google.com/file/d/1bhi0RuIeDGD8jE55xG4_oZiJViN1TGKs/view?usp=drive_link
Course description	The course “Meteorology and Climatology” provides 1st higher education level with a broad range of knowledge, not only in the field of meteorology, but also in climatology. Students study synoptic meteorology for effective weather forecasting, explore the conditions of formation and classification of various climatic types on Earth, and analyse climate fluctuations in both geological and historical contexts. Mastering the course forms an essential basis for understanding and predicting natural phenomena, assessing their impact on the modern climate, and identifying their interconnection with historical changes. The course contributes to the development of integrated analytical skills, enabling students not only to comprehend complex atmospheric processes but also to engage with contemporary issues of climate science and weather forecasting.

SEASONAL OBSERVATIONS IN NATURE

Educational Program	Educational and Professional program “Secondary Education (Natural Studies)”
Specialty	014.15 Secondary Education (Natural Sciences)
Higher Education Level	First (Bachelor`s) level
Lecturer	Candidate of Geographical Sciences, Associate Professor Nataliia Taranova
Course Language	Ukrainian
Department	Computer Technologies
Scope	3 ECTS credits
Year of study	1st year
Semester	2nd semester
Form of Final Assessment	credit
Link to Syllabus	https://drive.google.com/file/d/1tkLdxLbBH6asw5nBNkGCEeKSJyg4xEWK/view?usp=drive_link
Course description	The course “Seasonal Observations in Nature” aims to provide students with the methodology and methods for conducting seasonal observations in nature and using the obtained data for practical purposes. The course also covers the basics of meteorology and examines optical, acoustic, and electrical phenomena in the atmosphere, as well as their effects on living organisms and ecosystems. Students obtain practical skills in organising seasonal observations, particularly of weather conditions, and learn the fundamental principles of weather formation and forecasting. The course promotes a systematic approach to understanding natural processes and their impact on biological and ecological aspects of the environment. The acquired knowledge will enable students to apply their skills in research and environmental protection activities.

AGROMETEOROLOGY

Educational Program	Educational and Professional program “Secondary Education (Natural Studies)”
Specialty	014.15 Secondary Education (Natural Sciences)
Higher Education Level	First (Bachelor`s) level
Lecturer	Candidate of Geographical Sciences, Associate Professor Nataliia Taranova
Course Language	Ukrainian
Department	Computer Technologies
Scope	3 ECTS credits
Year of study	1st year
Semester	2nd semester
Form of Final Assessment	credit
Link to Syllabus	https://drive.google.com/file/d/1YrWODTG24yT9O0EZ9vydlXz_B8vSwc-d/view?usp=drive_link
Course description	The course “Agrometeorology” aims to develop students’ professional knowledge necessary for analysing climatic and weather conditions during the growth and development of plants in order to make objective conclusions and recommendations for regulating crop cultivation technologies to achieve maximum yields. The course covers the study of the Earth’s atmospheric thermal regime, the state of water in the atmosphere, the baric field, and wind, as well as their influence on living organisms and the condition of agrocenoses. In addition to meteorological knowledge, students gain an understanding of the regularities of weather patterns and forecasting, enabling them to apply this knowledge to optimize agricultural yields.

PLANT SYSTEMATICS

Educational Program	Educational and Professional program “Secondary Education (Natural Studies)”
Specialty	014.15 Secondary Education (Natural Sciences)
Higher Education Level	First (Bachelor`s) level
Lecturer	Assistant Lecturer Ruslan Yavorinskyi
Course Language	Ukrainian
Department	Botany and Zoology
Scope	3 ECTS credits
Year of study	1st year
Semester	2nd semester
Form of Final Assessment	credit
Link to Syllabus	https://drive.google.com/file/d/1owFDWdMfxwL4uJM8-edXWRVJ0EWRg6l9/view?usp=drive_link
Course description	The course “Plant Systematics” aims to familiarize students with the main taxonomic units of modern plant systematics and their hierarchical organization; the systematic position, morphological structure, life cycles, distribution, significance, and phylogeny of algae, lichens, higher spore-bearing, and seed-bearing archegoniate plants; the principles of classification, key diagnostic features, and economic importance of major families, genera, and species of monocotyledonous and dicotyledonous plants (Angiosperms). Students will learn to classify plants, schematically represent the life cycles of major representatives of different taxa, and distinguish key species of higher plants based on morphological characteristics, herbarium specimens, and collections.

PHYTOCENOLOGY

Educational Program	Educational and Professional program “Secondary Education (Natural Studies)”
Specialty	014.15 Secondary Education (Natural Sciences)
Higher Education Level	First (Bachelor`s) level
Lecturer	Assistant Lecturer Ruslan Yavorinskyi
Course Language	Ukrainian
Department	Botany and Zoology
Scope	3 ECTS credits
Year of study	1st year
Semester	2nd semester
Form of Final Assessment	credit
Link to Syllabus	https://drive.google.com/file/d/1_Jf7tT08FpAzYaydQU0uaL1j9xhcjT2j/view?usp=drive_link
Course description	The course “Phytocenology” aims to familiarize students with the patterns of composition, morphological-ecological and functional structure, and developmental dynamics of plant communities (phytocoenoses) under the influence of both natural and anthropogenic factors. It covers the distribution, classification, and ecological principles of phytocoenoses, including agro-phytocoenoses, as well as the structural features and interrelations of community components with each other and the surrounding environment. Students will learn to identify the main population characteristics, determine the age structure of cenopopulations and their development strategies, analyze causal relationships in phytocoenotic variability, assess the reasons for daily, seasonal, and age-related changes in communities, and evaluate the impact of ecological factors on plants within phytocoenoses.

PLANT SYSTEMATICS WITH FUNDAMENTALS OF MYCOLOGY

Educational Program	Educational and Professional program “Secondary Education (Natural Studies)”
Specialty	014.15 Secondary Education (Natural Sciences)
Higher Education Level	First (Bachelor`s) level
Lecturer	Assistant Lecturer Ruslan Yavorinskyi
Course Language	Ukrainian
Department	Botany and Zoology
Scope	3 ECTS credits
Year of study	1st year
Semester	2nd semester
Form of Final Assessment	credit
Link to Syllabus	https://drive.google.com/file/d/1vq1b7P0gIcDGWmxlmR_drwFLwXy5nRx_/view?usp=drive_link
Course description	The course “Plant Systematics with Fundamentals of Mycology” aims to introduce students to students with the main taxonomic units of modern plant and fungal systematics and their hierarchical organization. The course covers the systematic position, morphological structure, life cycles, distribution, ecological and economic significance, and phylogeny of algae, lichens, higher spore-bearing plants, and seed-bearing archegonial plants. Students will study the classification principles, key diagnostic characteristics, and practical importance of the major families, genera, and species of monocotyledons and dicotyledons (Angiosperms/Flowering Plants). The course also addresses the rationale for assigning fungi to a separate kingdom, their systematic position, classification, life cycles, ecological and economic roles, and phylogeny.

2nd year of study

EDUCATIONAL TECHNOLOGIES

Educational Program	Educational and Professional program "Secondary Education (Natural Studies)"
Specialty	014.15 Secondary Education (Natural Sciences)
Higher Education Level	First (Bachelor`s) level
Lecturer	Doctor of Pedagogical Sciences, Professor Nataliia Lupak
Course Language	Ukrainian
Department	Department of Pedagogy and Methods of Primary and Preschool Education
Scope	3 ECTS credits
Year of study	2nd year
Semester	4th semester
Form of Final Assessment	credit
Link to Syllabus	https://drive.google.com/file/d/1HGw3a9YsjuqVBEjxhuwTQnhUwG9Z7SN0/view?usp=drive_link
Course description	The course "Educational Technologies" is designed to familiarize students with contemporary trends in the technologisation of education, study the theoretical and methodological foundations of educational technologies, and develop the ability to apply them effectively in practice. The course aims to equip future teachers of natural sciences with professionally oriented skills and competencies in mastering teaching techniques and modern educational technologies to implement a technological approach in pedagogical practice. Students also learn how to design successful educational strategies and self-development programs. The course fosters the understanding and practical application of contemporary educational technologies based on the principles of humanistic pedagogical interaction and promotes the development of a proactive attitude toward studying and implementing innovative technologies that ensure active participation in society's cultural and educational processes.

CREATIVE PEDAGOGICAL TECHNOLOGIES

Educational Program	Educational and Professional program “Secondary Education (Natural Studies)”
Specialty	014.15 Secondary Education (Natural Sciences)
Higher Education Level	First (Bachelor`s) level
Lecturer	Doctor of Pedagogical Sciences, Professor Nataliia Lupak
Course Language	Ukrainian
Department	Department of Pedagogy and Methods of Primary and Preschool Education
Scope	3 ECTS credits
Year of study	2nd year
Semester	4th semester
Form of Final Assessment	credit
Link to Syllabus	https://drive.google.com/file/d/1A4zT4ccEucuL9wmuDNMXwqj0iqK2MLzk/view?usp=drive_link
Course description	The course “Creative Pedagogical Technologies” is designed to introduce students to contemporary trends in the technologization of education, study the theoretical and methodological foundations of pedagogical technologies, and develop the ability to apply them creatively in practice. The course aims to provide future teachers of natural sciences with professionally oriented skills and competencies in mastering teaching techniques, modern pedagogical technologies, particularly creative methods and design thinking, for implementing a technological approach in educational practice. Students will also learn to design effective educational strategies and programs for creative self-development. The course fosters the development of divergent (creative) thinking, the understanding and application of creative pedagogical technologies, and their testing based on the principles of humanistic pedagogical interaction.

INTERMEDIAL TECHNOLOGIES

Educational Program	Educational and Professional program “Secondary Education (Natural Studies)”
Specialty	014.15 Secondary Education (Natural Sciences)
Higher Education Level	First (Bachelor`s) level
Lecturer	Doctor of Pedagogical Sciences, Professor Nataliia Lupak
Course Language	Ukrainian
Department	Department of Pedagogy and Methods of Primary and Preschool Education
Scope	3 ECTS credits
Year of study	2nd year
Semester	4th semester
Form of Final Assessment	credit
Link to Syllabus	https://drive.google.com/file/d/1FoTPu7VsDMJTNbZj-1TW7LphSVg_bSZp/view?usp=drive_link
Course description	The course “Intermedial Technologies” is designed to develop students’ communicative competence and the ability to apply an integrative approach in professional pedagogical activity. It combines different methods of acquiring and reproducing knowledge, both scientific (about nature, humans, and society) and artistic (representing reality through sensory images), through the activation of various media forms and formats in a highly interdisciplinary context. The course fosters the development of worldview orientations within an expanded (integrated: multi-artistic, multi-media) learning environment and enhances communicative competence, particularly the ability to interact in dialogue with other participants in pedagogical, artistic, and media discourses; with artistic information (digital and/or non-digital); with artistic images; and with one’s own inner world.

BIOPHYSICS

Educational Program	Educational and Professional program “Secondary Education (Natural Studies)”
Specialty	014.15 Secondary Education (Natural Sciences)
Higher Education Level	First (Bachelor`s) level
Lecturer	Candidate of Biological Sciences, Professor Oksana Bodnar
Course Language	Ukrainian
Department	General Biology and Methods of Teaching Natural Sciences
Scope	3 ECTS credits
Year of study	2nd year
Semester	3rd semester
Form of Final Assessment	Credit
Link to Syllabus	https://drive.google.com/file/d/1zqI7lDLJkifZobpiqQnCRLZf1sjN8fHU/view?usp=drive_link
Course description	The course is designed to develop in students a comprehensive system of knowledge, skills, and abilities necessary for their professional activity, including the ability to perceive biological systems of varying complexity as subject to mathematical and physical laws. It aims to cultivate the competence to quantitatively describe complex biological phenomena based on experiments and/or biophysical research methods. An essential component of the course is the development of students’ ability to apply theoretical knowledge and use physical methods and instruments in practice; to understand the fundamental physical laws and their application to biological systems; to conduct experiments aimed at identifying the role of biophysical phenomena in regulating life processes of organisms at different levels of organization; and to analyze the influence of external physical factors on biophysical processes occurring in living systems.

RADIOBIOLOGY

Educational Program	Educational and Professional program “Secondary Education (Natural Studies)”
Specialty	014.15 Secondary Education (Natural Sciences)
Higher Education Level	First (Bachelor`s) level
Lecturer	Candidate of Biological Sciences, Associate Professor Iryna Chen
Course Language	Ukrainian
Department	General Biology and Methods of Teaching Natural Sciences
Scope	3 ECTS credits
Year of study	2nd year
Semester	3rd semester
Form of Final Assessment	credit
Link to Syllabus	https://drive.google.com/file/d/1LBOO0EoT-VbBN0_zedIHUgHjN29Vmmrx/view?usp=drive_link
Course description	The course aims to provide students with knowledge of the regularities of the effects of ionizing radiation on living organisms and to develop the ability to apply this knowledge in addressing issues of radiation safety and protection. It covers the types of ionizing radiation and the mechanisms of their biological effects on plants, animals, and humans; the use of dosimetry and radiometry methods to assess environmental radiation levels and ensure compliance with radiation hygiene standards; and the application of ionizing radiation in various fields of human activity. The course also focuses on radiation protection, the fundamentals of radiation hygiene, and the development of students’ ability to apply theoretical knowledge in practice, including conducting educational and outreach activities among school students to promote public awareness of radiation safety.

SOIL SCIENCE

Educational Program	Educational and Professional program “Secondary Education (Natural Studies)”
Specialty	014.15 Secondary Education (Natural Sciences)
Higher Education Level	First (Bachelor`s) level
Lecturer	Candidate of Biological Sciences, Associate Professor Olexander Kononchuk
Course Language	Ukrainian
Department	Botany and Zoology
Scope	3 ECTS credits
Year of study	2nd year
Semester	3rd semester
Form of Final Assessment	credit
Link to Syllabus	https://drive.google.com/file/d/1LM2cL4rq5JYIg8oP4qvblGij3VqUuu-J/view?usp=drive_link
Course description	The course “Soil Science” is designed to provide first-cycle (Bachelor’s) students with a scientific understanding of soil science by studying the genesis and evolution of soils, their properties and regimes, classification, as well as their use and protection at a level necessary for teaching in basic secondary education. The main objectives of the course are to develop the ability of future teachers of natural sciences to operate with modern terminology, scientific concepts, laws, and principles of soil science; to conduct research on the main properties of soils and propose measures for their effective use and conservation; and to apply the acquired competencies within the framework of natural science education.

SOIL SCIENCE WITH BASIS OF SOIL GEOGRAPHY

Educational Program	Educational and Professional program "Secondary Education (Natural Studies)"
Specialty	014.15 Secondary Education (Natural Sciences)
Higher Education Level	First (Bachelor`s) level
Lecturer	Candidate of Biological Sciences, Associate Professor Olexander Kononchuk
Course Language	Ukrainian
Department	Botany and Zoology
Scope	3 ECTS credits
Year of study	2nd year
Semester	3rd semester
Form of Final Assessment	credit
Link to Syllabus	https://drive.google.com/file/d/1MimoprG_foS-i4zNC68mh1v7nINeewhr/view?usp=drive_link
Course description	The course "Soil Science with Fundamentals of Soil Geography" is designed to provide first-cycle (Bachelor's level) students with a basis of scientific knowledge in soil science and soil geography. It focuses on the genesis and evolution of soils, their properties, classification, distribution, utilization, and protection, at a level sufficient for professional application in general secondary education. The main objectives of the course are to develop the ability to use modern scientific terminology, concepts, laws, and principles of soil science; to acquire skills in researching the main properties of soils; to analyse the patterns of their spatial distribution; and to characterize the soil cover of various regions of the Earth, with particular emphasis on the agricultural soil zones of Ukraine.

FUNDAMENTALS OF AGROCHEMISTRY

Educational program	Educational and professional program “Secondary education (Natural Sciences)”
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor’s) level
Lecturer	Candidate of Biological Sciences, Associate Professor Oksana Matsiuk
Language of instruction	Ukrainian
Department	Botany and Zoology
Course volume	3 Credits ECTS
Year of study	2nd year
Semester	3rd semester
Form of Final Assessment	credit
Link to the Syllabus	https://drive.google.com/file/d/1h0TUUn9X8sJymxC_fWTs1h_hPxsX8-7F/view?usp=drive_link
Course Description	The course provides students with a modern understanding of the essence of physical, physicochemical, and biochemical processes and interactions within the “soil-plant-fertilizer” system, aimed at increasing crop productivity, improving yields, and maintaining high technological quality of agricultural products without harming soils or the environment. The objectives of the course include providing students with knowledge about soil as a natural environment for plant life; the influence of external environmental conditions on plant nutrition; chemical reclamation as a means of improving soil fertility; the main macro- and micronutrient fertilizers, organic, bacterial, and modern organo-mineral fertilizers; systems and features of fertilizing major agricultural crops under organic farming conditions; and environmental protection during fertilizer application.

ANIMAL SYSTEMATICS

Educational program	Educational and professional programme “Secondary education (Natural Sciences)”
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor’s) level
Lecturer	Candidate of Agricultural Sciences, Associate Professor Halyna Holinei, Candidate of Biological Sciences, Associate Professor Liubov Shevchyk
Language of instruction	Ukrainian
Department	Botany and Zoology
Course volume	3 Credits ECTS
Year of study	2nd year
Semester	4th semester
Form of Final Assessment	credit
Link to the Syllabus	https://drive.google.com/file/d/17G26Mdzw0uzvHUH2iIqst8ys6FonWdqw/view?usp=drive_link
Course Description	The course „Animal Systematics” is designed to acquaint students pursuing the first (bachelor’s) level of higher education with the modern systematics of unicellular and multicellular animals, to ensure mastery of methods for analysing taxonomic characteristics, to develop the ability to describe taxa, and to improve skills in identifying animals. The discipline involves studying the modern system of organization of the animal kingdom, the diversity of animal life, the principles of animal classification and zoological nomenclature, as well as developing the ability to recognize representatives of various systematic groups of animals and their adaptations to the environment. It also aims to foster the ability to apply acquired competencies in professional activities within the educational process of general secondary education institutions.

ANIMAL ECOLOGY

Educational program	Educational and professional program “Secondary education (Natural Sciences)”
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor’s) level
Lecturer	Candidate of Biological Sciences, Associate Professor Mariana Prokopiak
Language of instruction	Ukrainian
Department	Botany and Zoology
Course volume	3 Credits ECTS
Year of study	2nd year
Semester	4th semester
Form of Final Assessment	credit
Link to the Syllabus	https://drive.google.com/file/d/1BdUFlvvs3ZRiIIxqgEgBRVZYwMdw2MIG/view?usp=drive_link
Course Description	Gaining a comprehensive understanding of the patterns of development and existence of animals on Earth based on knowledge of the characteristics of intra- and inter-population relationships and the functioning of biogeocenoses; developing knowledge about the regularities of interaction between invertebrate and vertebrate animals and environmental factors, as well as the development of adaptive responses under changing conditions; understanding the role of animals within biogeocenoses. Shaping a body of knowledge about modern methods used in the study of animal ecology; identifying limiting factors that influence the life activities of animals from various taxonomic groups; developing an understanding of the ecological characteristics of different animal species and their adaptations to diverse environmental conditions. Promoting the development of ecological thinking in matters related to the conservation and protection of animal biodiversity. Developing the ability to determine the place of animals within consortia of different levels of organization.

ETHOLOGY

Educational program	Educational and professional program “Secondary education (Natural Sciences)”
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor’s) level
Lecturer	Candidate of Biological Sciences, PhD in Biology, Associate Professor Liubov Shevchyk
Language of instruction	Ukrainian
Department	Botany and Zoology
Course volume	3 Credits ECTS
Year of study	2nd year
Semester	4th semester
Form of Final Assessment	credit
Link to the Syllabus	https://drive.google.com/file/d/1QFW63WblDrtMLtdNz1I6edec1tqtRTM9/view?usp=drive_link
Course Description	The course „Ethology” is designed to acquaint students of the first (bachelor’s) level of higher education with a comprehensive body of modern knowledge about animal behavior, to foster an understanding of the fundamental concepts and principles of behavior classification, and to recognize the integrity and interdependence of behavioral manifestations. The main objectives of the course include: observing and identifying natural expressions of various forms of animal behavior; selecting and applying key methods for studying animal behavior to solve practical tasks; understanding and addressing the problems and challenges animals face in adapting to life alongside humans; adhering to the principles of humane treatment of animals; and applying the acquired competencies in professional activities within institutions of general secondary education.

3rd year of study

TECHNIQUES AND METHODS OF SCHOOL CHEMICHAL EXPERIMENT

Educational program	Educational and professional program “Secondary education (Natural Sciences)”
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor’s) level
Lecturer	Candidate of Pedagogical Sciences, PhD in Education, Associate Professor Mykola Hladiuk
Language of instruction	Ukrainian
Department	Chemistry and Methods of Its Teaching
Course volume	3 Credits ECTS
Year of study	3rd year
Semester	6th semester
Form of Final Assessment	credit
Link to the Syllabus	https://drive.google.com/file/d/1IF0iNNPvHp1XqcMXf2ZNhh Vk7oQdZcxd/view?usp=drive_link
Educational programme	The course „Techniques and Methods of School Chemichal Experiment” is aimed at equipping future teachers with the skills to conduct demonstration chemistry experiments, as well as laboratory and practical activities provided for by the chemistry curriculum of general secondary education institutions. It focuses on updating knowledge about the types and forms of school chemistry experiments and the requirements for their implementation; ensuring confident mastery of rational methods and procedures for conducting chemical experiments in laboratory settings; developing the ability to integrate educational experiments into the structure of lessons; shaping the skill to evaluate students’ performance during chemistry experiments; and improving the ability to work with methodological literature.

METHODS OF SOLVING CHEMICHAL PROBLEMS

Educational program	Educational and professional program “Secondary education (Natural Sciences)”
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor’s) level
Lecturer	Candidate of Pedagogical Sciences, PhD in Education, Associate Professor Mykola Hladiuk
Language of instruction	Ukrainian
Department	Chemistry and Methods of Its Teaching
Course volume	3 Credits ECTS
Year of study	3rd year
Semester	6th semester
Form of Final Assessment	credit
Link to the Syllabus	
Course Description	The course „Methods of Solving Chemical Problems” is aimed at developing future teachers’ competencies in addressing practical tasks. Specifically, it focuses on mastering the skills of performing calculations using chemical and mathematical formulas, balancing and applying chemical equations, and transferring these abilities to the solution of combined and complex problems. The course emphasizes updating knowledge of the classification of chemical problems; ensuring confident mastery of rational methods and algorithms for solving typical problems; acquiring effective teaching methods for guiding students in solving calculation-based chemistry problems according to the chemistry curriculum for various grades and educational profiles; and improving the ability to work with methodological literature.

ECOLOGICAL AND NATURALISTIC ACTIVITIES OF SCHOOL STUDENTS

Educational program	Educational and professional program “Secondary education (Natural Sciences)”
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor’s) level
Lecturer	Candidate of Pedagogical Sciences, Associate Professor Halyna Zhyrska
Language of instruction	Ukrainian
Department	General Biology and Methods of Teaching of Natural Sciences
Course volume	3 Credits ECTS
Year of study	3rd year
Semester	5th semester
Form of Final Assessment	credit
Link to the Syllabus	https://drive.google.com/file/d/1CCvNbMb-vv0jQrMLWdU0sTxuIk7sActX/view?usp=drive_link
Course Description	The academic course is aimed at developing future teachers’ competencies in organizing ecological and naturalistic activities to implement the objectives of supplementary natural science education, both in general secondary education institutions and in extracurricular educational settings. Studying this course involves mastering methods for developing skills in organizing various types of ecological and naturalistic activities, including cognitive, scientific-research, project-based, play-based, ecological and educational, local history, and career-orientation activities. Participation in this course is expected to foster students’ creative abilities and moral qualities, encourage self-education, and promote engagement in nature conservation.

BIOETHICAL EDUCATION OF SCHOOL STUDENTS

Educational program	Educational and professional program “Secondary education (Natural Sciences)”
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor’s) level
Lecturer	Doctor of Pedagogical Sciences, Full Professor, Alla Stepaniuk
Language of instruction	Ukrainian
Department	General Biology and Methods of Teaching of Natural Sciences
Course volume	3 Credits ECTS
Year of study	3rd year
Semester	5th semester
Form of Final Assessment	credit
Link to the Syllabus	https://drive.google.com/file/d/1VXwlRDMVnbQ4Q9SbTQIq mDGJI6dbzQSf/view?usp=drive_link
Course Description	The course is aimed at developing future teachers’ competencies in organizing the education of school students based on the principles of bioethics. The purpose of the course is to cultivate students’ conscious moral attitude toward all living beings and a respectful, reverent attitude toward human life; and to develop the ability to apply bioethical knowledge in future pedagogical activities to foster a bio- and ecocentric mindset in school students. Studying this coure involves mastering the conceptual foundations of bioethics and the methodology for using specific psychological and pedagogical methods of biotic education to form value-based attitudes and moral qualities in students of first (bachelor’s) level of higher education.

EXTRACURRICULAR AND OUT-OF-SCHOOL IN NATURAL SCIENCES

Educational program	Educational and professional program “Secondary education (Natural Sciences)”
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor’s) level
Lecturer	Candidate of Pedagogical Sciences, PhD in Education, Associate Professor Halyna Zhyrska
Language of instruction	Ukrainian
Department	General Biology and Methods of Teaching of Natural Sciences
Course volume	3 Credits ECTS
Year of study	3rd year
Semester	5th semester
Form of Final Assessment	credit
Link to the Syllabus	https://drive.google.com/file/d/1qMllTyxuv-eZm6DpWUbnStDTUwkIlnbx/view?usp=drive_link
Course Description	The course is designed to develop future teachers’ competencies in organizing various forms of mass, group, and individual extracurricular and out-of-school activities in the natural sciences. It aims to train them to work with gifted students in both general secondary education and extracurricular institutions, fostering their scientific and creative potential and supporting professional orientation. The course involves mastering methods for preparing and conducting modern large-scale extracurricular events, organizing science clubs, engaging students in nationwide environmental campaigns and actions, modeling natural objects and systems, and developing projects with an integrated focus.

INNOVATIVE TECHNOLOGIES IN TEACHING NATURAL SCIENCES

Educational program	Educational and professional program "Secondary education (Natural Sciences)"
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor's) level
Lecturer	Candidate of Pedagogical Sciences, PhD in Education, Associate Professor Nataliia Mishchuk
Language of instruction	Ukrainian
Department	General Biology and Methods of Teaching of Natural Sciences
Course volume	3 Credits ECTS
Year of study	3rd year
Semester	6th semester
Form of Final Assessment	credit
Link to the Syllabus	
Course Description	Familiarization with an innovative set of methods and methodological techniques, teaching tools, and ways of organizing learning activities in the natural sciences; mastery of modern innovative technologies, including integrated learning, group-based learning activities, information and communication technologies, interactive situational modeling and discussion-based methods, and project-based technologies; setting subject-oriented and educational-information environments that enable the use of multimedia, digital tools, mobile applications, electronic textbooks, and more; understanding and adherence to digital safety principles, critical evaluation of the reliability and credibility of information sources, awareness of their influence on consciousness and personal development, and consideration of legal and ethical aspects related to the use of digital technologies.

MEDIA EDUCATION TECHNOLOGIES IN TEACHING NATURAL SCIENCES

Educational program	Educational and professional program “Secondary education (Natural Sciences)”
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor’s) level
Lecturer	Candidate of Pedagogical Sciences, PhD in Education, Associate Professor Nataliia Mishchuk
Language of instruction	Ukrainian
Department	General Biology and Methods of Teaching of Natural Sciences
Course volume	3 Credits ECTS
Year of study	3rd year
Semester	6th semester
Form of Final Assessment	credit
Link to the Syllabus	
Course Description	To carry out professional activities in the modern educational media environment, a teacher in the natural sciences field must master subject teaching methods using mass media and be able to foster the development of students’ critical and analytical thinking. This course is aimed at developing professional competence in the use of media education technologies in professional practice: methodological and organizational tools for the educational process using periodicals, radio, television, cinema, as well as software and hardware tools and devices that enable the collection, processing, accumulation, storage, and transmission of information; the development of skills to work with various types of media texts, evaluate the quality and reliability of obtained information, resist manipulative influences, and develop constructive media behavior.

STEM TECHNOLOGIES IN NATURAL SCIENCE EDUCATION

Educational program	Educational and professional program “Secondary education (Natural Sciences)”
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor’s) level
Lecturer	Candidate of Biological Sciences, PhD in Biology, Associate Professor Andrii Herts
Language of instruction	Ukrainian
Department	General Biology and Methods of Teaching of Natural Sciences
Course volume	3 Credits ECTS
Year of study	3rd year
Semester	6th semester
Form of Final Assessment	credit
Link to the Syllabus	https://drive.google.com/file/d/1kUyOlZEXN5jySWRpNbDKb6BLxyt4ohpB/view?usp=drive_link
Course Description	The course is aimed at developing students’ competencies in the use of STEM technologies in natural science education, increasing students’ motivation to study natural sciences, and preparing them to apply STEM technologies in their professional activities. Students will be able to: model a STEM-oriented educational environment; apply modern technologies to conduct practical lessons using STEM tools and resources; integrate STEM-dominant organizational forms into the educational process; use online tools for collaboration and conducting projects and research in virtual environments; organize cooperation with educational institutions, STEM centers, and STEM laboratories to exchange knowledge and resources in the STEM field; utilize cloud-based learning and research environments to expand learning and research opportunities.

FUNDAMENTALS OF MODERN ELECTRONICS

Educational program	Educational and professional program “Secondary education (Natural Sciences)”
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor’s) level
Lecturer	Assistant Lecturer Pavlo Chopyk
Language of instruction	Ukrainian
Department	Physics and Methods of Its Teaching
Course volume	3 Credits ECTS
Year of study	3rd year
Semester	6th semester
Form of Final Assessment	credit
Link to the Syllabus	
Course Description	The course „Fundamentals of Modern Electronics” is aimed at mastering the basic theoretical and practical knowledge in electronics, familiarizing students with the structure, main physical principles of operation, and practical applications of semiconductor devices and electronic instruments built on their basis. The course also introduces students to elements of modern digital electronics, including the fundamental concepts and circuits underlying the functioning of digital radio, television, and computer systems. Studying the trends in their development contributes to the expansion and deepening of knowledge regarding the achievements of modern science and technology, shaping a scientific worldview, and the development of professional competencies of future natural science teachers.

4th year of study

MODERN NATURAL SCIENCE WORLDVIEW (NSW)

Educational program	Educational and professional program "Secondary education (Natural Sciences)"
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor's) level
Lecturer	Doctor of Pedagogical Sciences, Full Professor, Alla Stepaniuk
Language of instruction	Ukrainian
Department	General Biology and Methods of Teaching of Natural Sciences
Course volume	3 credits ECTS
Year of study	4th year
Semester	8th semester
Form of Final Assessment	credit
Link to the Syllabus	https://tnpu.edu.ua/navchannya/sylabusy/bakalavr/him-bio/014.15/27912_%D0%9E%D0%9A.9_Suchasna_pryrod-nauk_kartyna_svitu.pdf
Course Description	This is a generalizing course aimed at shaping the creative personality of a future teacher of natural science subjects, fostering holistic, systematic, and divergent thinking, and taking into account alternative approaches to solving research tasks under the changing and uncertain conditions of today. Studying this course contributes to the development of: a noospheric worldview and an understanding of the essence of scientific and technological progress as an integral component of professional training; the ability to analyze natural and social phenomena and processes as manifestations of the progressive evolution of the Universe; the development of readiness to present historical and scientific knowledge in the process of teaching subjects in the natural science educational field (natural sciences, physics, chemistry, biology).

HISTORY OF THE DEVELOPMENT OF NSW

Educational program	Educational and professional program “Secondary education (Natural Sciences)”
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor’s) level
Lecturer	Doctor of Pedagogical Sciences, Full Professor, Alla Stepaniuk
Language of instruction	Ukrainian
Department	General Biology and Methods of Teaching of Natural Sciences
Course volume	3 credits ECTS
Year of study	4th year
Semester	8th semester
Form of Final Assessment	credit
Link to the Syllabus	
Course Description	This is a generalizing course aimed at shaping the scientific worldview of a future teacher of natural science subjects (natural sciences, physics, chemistry, biology) as a general cultural phenomenon through the integration of existing knowledge about the development of the physical, chemical, and biological worldviews. The course involves the systematization of knowledge at the level of theories, laws, concepts, and facts, which contributes to enhancing the effectiveness of knowledge and its explanatory power. The educational material is studied through the lens of the “humanization of knowledge,” emphasizing its cultural and human context. This approach allows students to embark on an engaging journey through past generations and to become familiar with the environments in which scientific knowledge was created throughout its historical development.

CONCEPTS OF MODERN NATURAL SCIENCE

Educational program	Educational and professional program “Secondary education (Natural Sciences)”
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor’s) level
Lecturer	Candidate of Pedagogical Sciences, PhD in Education, Associate Professor Nataliia Mishchuk
Language of instruction	Ukrainian
Department	General Biology and Methods of Teaching of Natural Sciences
Course volume	3 credits ECTS
Year of study	4th year
Semester	8th semester
Form of Final Assessment	credit
Link to the Syllabus	
Course Description	The subject of the course is the system of scientific knowledge about the history and current state of natural scientific cognition, worldview and methodological concepts that are being formed in our era. The aim of the course is to contribute to shaping the future teachers of natural sciences’ conscious understanding of a wide range of natural science and humanitarian ideas, the logical comprehension of fundamental laws and their connections with natural science, ideas about the most important schools and directions in the development of modern natural science, familiarization with the most important and general concepts in the fields of physics, chemistry, and biology; and the development of a holistic understanding of the natural-scientific picture of the world.

ASTRONOMY

Educational program	Educational and professional program “Secondary education (Natural Sciences)”
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor’s) level
Lecturer	Candidate of Technical Sciences, PhD, Associate Professor Serhii Mokhun
Language of instruction	Ukrainian
Department	Physics and Methods of Its Teaching
Course volume	3 credits ECTS
Year of study	4th year
Semester	7th semester
Form of Final Assessment	credit
Link to the Syllabus	https://tnpu.edu.ua/navchannya/sylabusy/bakalavr/him-bio/014.15/27912_%D0%9E%D0%9A.12_Astronomiia.pdf
Course Description	The course „Astronomy” is aimed at: the development of personality through the formation of a scientific worldview and style of thinking; the development of research skills, creative abilities, and creative thinking; deepening, systematizing, and generalizing knowledge about astronomical phenomena; and preliminary training of future teachers of natural sciences for professional activities in general secondary education institutions. As a result of studying this course, the student will know the basic concepts, laws, and methods used in astronomy; the structure of astronomy as a science and general ways of investigating and studying the Universe; and the main properties of the macroworld. The student will also be able to use basic astronomical instruments, solve practical and research astronomical tasks, and utilize virtual environments to explain astronomical phenomena.

FASCINATING PHYSICS

Educational program	Educational and professional program “Secondary education (Natural Sciences)”
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor’s) level
Lecturer	Candidate of Technical Sciences, PhD, Associate Professor Pavlo Basistyi
Language of instruction	Ukrainian
Department	Physics and Methods of Its Teaching
Course volume	3 credits ECTS
Year of study	4th year
Semester	7th semester
Form of Final Assessment	credit
Link to the Syllabus	https://drive.google.com/file/d/1Pum3NKqIRZ3PWOTWPomcHD7Pdgl-UgDp/view?usp=drive_link
Course Description	The course aims at developing the ability to find explanations for both original and widely observed natural phenomena, unexpected results of qualitative physical demonstrations, and quantitative laboratory experiments, including appealing ones such as “physical toys,” “physical tricks,” optical and acoustic illusions that have purely physical origins. It also focuses on mastering the skills of independently conducting research experiments and performing theoretical analysis of their results. Students will acquire knowledge of the basic concepts and laws of physics; learn to use mathematical tools to describe physical phenomena and regularities; represent corresponding physical situations graphically through drawings and charts; analyze the obtained results; and independently investigate certain physical phenomena and patterns.

PROBLEM-BASED PHYSICS

Educational program	Educational and professional program “Secondary education (Natural Sciences)”
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor’s) level
Lecturer	Candidate of Technical Sciences, PhD, Associate Professor Serhii Mokhun
Language of instruction	Ukrainian
Department	Physics and Methods of Its Teaching
Course volume	3 credits ECTS
Year of study	4th year
Semester	7th semester
Form of Final Assessment	credit
Link to the Syllabus	https://drive.google.com/file/d/1OFMe5nwiXFFQxEakMiuVfnmjhyHm4rOS/view?usp=drive_linka
Course Description	The course „Problems-Based Physics” is aimed at developing students’ physical thinking, enriching it with physical concepts, and fostering skills in the practical application of knowledge. Solving problems serves as a method for verifying and systematizing knowledge, allows for efficient review, broadens and deepens understanding, contributes to worldview formation, and introduces students to the achievements of science and technology. The course promotes the development of a scientific worldview through the means of physical science and the corresponding style of thinking; the development of experimental skills and research abilities, creative capacities, and the ability for creative thinking; as well as the deepening, systematization, and generalization of knowledge about physical phenomena.

BIOGEOGRAPHY

Educational program	Educational and professional program “Secondary education (Natural Sciences)”
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor’s) level
Lecturer	Candidate of Biological Sciences, PhD in Biology, Associate Professor Liubov Shevchyk
Language of instruction	Ukrainian
Department	Botany and Zoology
Course volume	3 credits ECTS
Year of study	4th year
Semester	7th semester
Form of Final Assessment	credit
Link to the Syllabus	
Course Description	The course is aimed at familiarizing students with the concepts of the integrity of living nature and the unity of all life on Earth, the patterns of formation and distribution of communities of living organisms (biocenoses) on land and in the ocean, and the biogeographical zoning of the land. It promotes understanding of the regularities of cause-and-effect relationships in the distribution of living organisms depending on natural environmental conditions and the stages of biocenosis development. Students will learn to: search, analyze, critically evaluate, and interpret information from various sources; characterize species distribution ranges and the climatic conditions of their existence; identify major biogeographical regions of the land; map species ranges, main floristic, faunistic, and biophilotic kingdoms; conduct field biogeographical research; identify plant and animal species; interpret research results; and formulate well-reasoned conclusions.

THEORY OF EVOLUTION

Educational program	Educational and professional program “Secondary education (Natural Sciences)”
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor’s) level
Lecturer	Candidate of Agricultural Sciences, PhD in Agriculture, Associate Professor Halyna Holinei
Language of instruction	Ukrainian
Department	Botany and Zoology
Course volume	3 credits ECTS
Year of study	4th year
Semester	7th semester
Form of Final Assessment	credit
Link to the Syllabus	
Course Description	The “Theory of Evolution” course is aimed at mastering the general laws and driving forces of the historical development of life, the principles of organization and functioning of living matter, and the development of the concept of the unity of all living things on Earth. In particular, the main objectives of the course are: to acquire theoretical knowledge about the features and regularities of the evolutionary process; to develop an understanding of modern trends and directions of research in evolutionary theory; and to form skills in applying methodological approaches to the evolutionary analysis of biological systems. The course contributes to the development of professional competence of future teachers in studying issues of evolutionary theory in educational institutions.

EVOLUTION OF THE BIOSPHERE

Educational program	Educational and professional program “Secondary education (Natural Sciences)”
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor’s) level
Lecturer	Candidate of Biological Sciences, PhD in Biology, Associate Professor Liubov Shevchyk
Language of instruction	Ukrainian
Department	Botany and Zoology
Course volume	3 credits ECTS
Year of study	4th year
Semester	7th semester
Form of Final Assessment	credit
Link to the Syllabus	
Course Description	The course is aimed at mastering the theoretical foundations of the origin of life and the general evolution of life, ensuring an understanding of the features and regularities of the evolutionary process, the geochronology of life on Earth, and the development of life during the Cryptozoic and Phanerozoic eras. Students will learn to search for, analyze, critically evaluate, and interpret information from various sources; operate with the main concepts, important laws, regularities, and principles of the development of life on Earth; identify and characterize the main events in the history of life’s development; identify, determine the systematic position, and describe species of plants and animals from different epochs of life’s evolution; and determine the adaptations of living organisms to geological and climatic changes during different periods of the Earth’s history.

ECOLOGICAL MONITORING

Educational program	Educational and professional program “Secondary education (Natural Sciences)”
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor’s) level
Lecturer	Candidate of Biological Sciences, PhD in Biology, Associate Professor Halyna Humeniuk
Language of instruction	Ukrainian
Department	General Biology and Methods of Teaching of Natural Sciences
Course volume	3 credits ECTS
Year of study	4th year
Semester	8th semester
Form of Final Assessment	credit
Link to the Syllabus	
Course Description	The course involves studying the subject and specific features of environmental monitoring, which consist of the systematic collection, analysis, and evaluation of information about the state of the environment, its components, and their interaction with humans, with the aim of ensuring an adequate level of environmental safety and preserving natural resources for future generations. Students will acquire competencies in: identifying and assessing the state of the environment and its changes over time; determining the causes and consequences of environmental problems; evaluating the effectiveness of measures aimed at preventing or reducing negative environmental impacts; and providing scientific support for the development and implementation of environmental policies and legislation.

ISSUES OF ENVIRONMENTAL MANAGEMENT

Educational program	Educational and professional program “Secondary education (Natural Sciences)”
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor’s) level
Lecturer	Candidate of Biological Sciences, PhD in Biology, Associate Professor Halyna Humeniuk
Language of instruction	Ukrainian
Department	General Biology and Methods of Teaching of Natural Sciences
Course volume	3 credits ECTS
Year of study	4th year
Semester	8th semester
Form of Final Assessment	credit
Link to the Syllabus	
Course Description	The course is designed to familiarize students with the main problems and challenges of environmental management, as well as to provide them with knowledge and practical skills for the rational use of natural resources in order to ensure sustainable development. The main objectives of the course are as follows: to introduce the concept of „environmental management” and its role in society; to study the current state of natural resources and the problems associated with their use; to understand the principles of sustainable development and the challenges it faces; to analyze the most significant environmental management issues, such as air, water, and soil pollution, loss of biodiversity, climate change, and others; to study methods and tools for the rational use of natural resources and the reduction of their negative impact on the environment; and to develop skills for planning and implementing projects in the field of sustainable environmental management.

ENVIRONMENTAL PROTECTION AND NATURE CONSERVATION MANAGEMENT

Educational program	Educational and professional program “Secondary education (Natural Sciences)”
Speciality	014.15 Secondary education (Natural Sciences)
Level of higher education	First (Bachelor’s) level
Lecturer	Candidate of Pedagogical Sciences, PhD in Education, Associate Professor Nataliia Moskaliuk
Language of instruction	Ukrainian
Department	Botany and Zoology
Course volume	3 credits ECTS
Year of study	4th year
Semester	8th semester
Form of Final Assessment	credit
Link to the Syllabus	
Course Description	The course „Environmental Protection and Nature Conservation Management” is aimed at providing higher education students with knowledge of the eco-political, theoretical, and practical foundations of managing environmental protection and nature conservation activities in Ukraine and worldwide. The course trains students in legal, scientific, and institutional frameworks of nature conservation, while developing skills in the protection and management of natural reserve fund sites and territories. Learners will study the characteristics of ecological networks and the principles of their creation and expansion, which will contribute to the development of professional competence among future natural science educators.