EPP Secondary Education (Biology and Human Health, Chemistry, Nutrition Science) based on Junior Specialist Degree

No	Course Titles
3rd year of study	
1	Molecular Biology
2	Fundamentals of Environmental Chemistry
3.	Molecular Mechanisms of Vital Functions
4.	Nature Conservation
5.	Biodiversity Conservation
6.	Symbiotic Relationship in Plants
7.	Innovative Technologies for Teaching Biology
8.	Media Education Technologies in Biology Teaching
9.	STEM Technologies in Natural Science Education

3rd year of study

MOLECULAR BIOLOGY

Educational program	Educational and professional Program "Secondary education (Biology and Human Health, Chemistry, Nutrition Science)"
Specialty	014.05 Secondary education (Biology and Human Health)
Higher education level	First (Bachelor's) level
Lecturer	Doctor of Biological Sciences, Professor Oksana Stoliar
Course Language	Ukrainian
Department	Chemistry and Methods of Its Teaching
Scope	3 ECTS credits
Year of Study	3rd year
Semester	5th semester
Form of final assessment	Credit
Link to syllabus	
Course description	The course "Molecular Biology" examines the molecular basis of processes occurring in various cellular compartments and, in their interconnection, ensure all manifestations of life and their regulation in response to external and internal signals. The aim of the course is to provide specialists with fundamental knowledge of the molecular mechanisms of DNA, RNA, and protein matrix synthesis; the principles of the structural organization of supramolecular complexes of these biopolymers (chromatin, biomembranes) that perform biological functions, and the regulation of processes in the cell, the protein cycle as a component of the cell cycle by external and internal stimuli. The course covers ethical issues arising from research in molecular biology.

FUNDAMENTALS OF ECOLOGICAL CHEMISTRY

Educational program	Educational and professional Program "Secondary education (Biology and Human Health, Chemistry, Nutrition Science)"
Specialty	014.05 Secondary Education (Biology and Human Health)
Level of higher education	First (Bachelor's) level
Lecturer	Doctor of Biological Sciences Professor Volodymyr Kurant
Course Language	Ukrainian
Department	Chemistry and Methods of Its Teaching
Scope	3 ECTS credits
Year of Study	3rd year
Semester	5th semester
Form Final assessment	Credit
Link to syllabus	
Course description	The course "Fundamentals of Environmental Chemistry" is designed to provide students with knowledge about the state of environmental pollution and types of pollution using concepts of the physical and chemical properties of substances, possible ways of spreading and transforming pollutants in the atmosphere, hydrosphere, and soil, as well as the ability to use the knowledge gained to solve problems of assessing and predicting the state of the environment. The main objective of the course is to familiarize students with modern ideas about environmental problems and the specifics of monitoring the environment (atmosphere, hydrosphere, soil cover).

MOLECULAR MECHANISMS OF VITAL FUNCTIONS

Educational Program	Educational and professional Program “Secondary education (Biology and Human Health, Chemistry, Nutrition Science)”
Specialty	014.05 Secondary education (Biology and Human Health)
Higher education level	First (Bachelor’s) level
Lecturer	Doctor of Biological Sciences, Professor Oksana Borisivna Stolyar
Course Language	Ukrainian
Department	Chemistry and Methods of Teaching Chemistry
Scope	3 ECTS credits
Year of Study	3rd year
Semester	5th semester
Form of final assessment	Test
Link to syllabus	
Course description	The course is based on fundamental knowledge of the chemical organization of biomacromolecules and the principles of enzyme catalysis, biological oxidation, and bioenergetics, that are provided by studying “Bioorganic Chemistry” and/or “Biological Chemistry.” The aim of the course is to provide a detailed understanding of key universal events occurring in the cell, including the mechanisms of DNA replication, transcription, and translation in prokaryotes and eukaryotes, expanding knowledge of chemical damage and DNA processing (epigenetics), post-transcriptional modifications of eukaryotic RNA and the protein cycle, as well as the regulation of vital functions through the functioning of biomembranes and signaling. As a result of studying the course, a comprehensive picture of the molecular basis of life is provided and understanding molecular basis the unique specificity, efficiency, and ecological compatibility of life processes.

NATURE CONSERVATION

Educational Program	Educational and professional Program "Secondary education (Biology and Human Health, Chemistry, Nutrition Science)"
Specialty	014.05 Secondary Education (Biology and Human Health)
Level of higher education	First (Bachelor's) level
Lecturer	Candidate of Pedagogical Sciences, Associate Professor Nataliia Moskaliuk
Course Language	Ukrainian
Department	Botany and Zoology
Scope	3 ECTS credits
Year of Study	3rd year
Semester	5th semester
Form of final assessment	test
Link to syllabus	
Course description	The course "Nature Conservation" is designed to provide students with the knowledge, skills, and abilities necessary for professional activity aimed at understanding global environmental problems, identifying environmental facts and their impact on humans and the environment. To provide higher education students with knowledge of nature conservation and rational nature management, including a set of theoretical ecological knowledge; a fundamental modern materialistic understanding of the levels of organization of living nature; basic ecological concepts and patterns; factors and their impact on the life of organisms, problems of environmental pollution. The subject of the discipline is the study of the main aspects of environmental pollution, protection of the atmosphere, hydrosphere, lithosphere, flora, fauna, energy resources and protected areas, the impact of humans on the environment and its consequences.

BIODIVERSITY CONSERVATION

Educational Program	Educational and professional Program “Secondary education (Biology and Human Health, Chemistry, Nutrition Science)”
Specialty	014.05 Secondary Education (Biology and Human Health)
Level of higher education	First (Bachelor’s) level
Lecturer	Candidate of Biological Sciences Oksana Maiorova,
Course Language	Ukrainian
Department	Botany and Zoology
Scope	3 ECTS credits
Year of Study	3rd year
Semester	5th semester
Form of final assessment	test
Link to the syllabus	
Course description	The course “Biodiversity Conservation” covers the structure and levels of biodiversity, its role in nature, and practical human activities. The aim of the course is to provide students with knowledge of the basic concepts in the study of biodiversity and practical skills in the field of its conservation; to form worldview ideas and, above all, a systematic approach to the study of biodiversity as a wide range of disciplines in the sciences of the biosphere. The task of the course is to reveal the causes of the decline in biological diversity at the present stage of the biosphere’s development and to consider the main strategies and specific measures for the conservation and restoration of biodiversity. Particular attention is paid to mastering methods of analysis and assessment of diversity at the genetic, species, population, and ecosystem levels, including for environmental monitoring.

SYMBIOTIC RELATIONSHIP IN PLANTS

Educational Program	Educational and professional Program “Secondary education (Biology and Human Health, Chemistry, Nutrition Science)”
Specialty	014 Secondary Education
Level of higher education	First (Bachelor’s) level
Lecturer	Candidate of Biological Sciences, Associate Professor Mariana Prokopiak
Course Language	Ukrainian
Department	Botany and Zoology
Scope	3 ECTS credits
Year of Study	3rd year
Semester	5th semester
Final assessment form	test
Link to syllabus	
Course description	Developing ideas about the structure of plant-microbial communities in the root zone of plants and the processes underlying plant-microbial interactions; studying the role of endophytes in providing plants with macro- and microelements and producing biologically active substances. Study of the dependence of the composition of the phyllosphere and phylloplan microbiota on biotic and abiotic factors; mechanisms of influence of rhizosphere microorganisms on plant growth, mechanisms of relationship between leguminous plants and nodule bacteria. Forming ideas about nodule nitrogen fixation and using the possibilities of legume-rhizobial symbiosis in agriculture. Studying the interaction of diazotrophs with plants as one of the main mechanisms of regulating the nitrogen cycle in the biosphere and their distribution in the soil. Researching the nitrogen-fixing potential of non-leguminous plants.

INNOVATIVE TECHNOLOGIES FOR TEACHING BIOLOGY

Educational program	Educational and professional Program “Secondary education (Biology and Human Health, Chemistry, Nutrition Science)”
Specialty	014.05 Secondary Education (Biology and Human Health)
Level of higher education	First (Bachelor’s) level
Lecturer	Candidate of Pedagogical Sciences, Associate Professor Nataliia Mishchuk
Course Language	Ukrainian
Department	General Biology and Methods of Teaching Natural Sciences
Scope	3 ECTS credits
Year of Study	3rd year
Semester	5th semester
Form of final assessment	test
Link to syllabus	
Course description	Studying an innovative set of methods and techniques, teaching aids, and ways of organizing educational activities in biology; mastery of modern forms of innovative technologies (integrated learning, group learning activities, information and communication technologies, interactive technologies for situational modeling and discussion questions, project technologies), etc.; creation of subject-oriented and educational-informational environments that enable the use of multimedia, digital tools, mobile applications, electronic textbooks, etc.; awareness and adherence to the principles of safety in the digital space, critical assessment of the reliability and credibility of information sources, their impact on consciousness and personal development, legal and ethical aspects related to the use of digital technologies.

MEDIA EDUCATION TECHNOLOGIES IN BIOLOGY TEACHING

Educational program	Educational and professional Program “Secondary education (Biology and Human Health, Chemistry, Nutrition Science)”
Specialty	014.05 Secondary Education (Biology and Human Health)
Level of higher education	First (Bachelor’s) level
Lecturer	Candidate of Pedagogical Sciences, Associate Professor Nataliia Mishchuk
Language of instruction	Ukrainian
Department	General Biology and Methods of Teaching Natural Sciences
Scope	3 ECTS credits
Year of Study	3rd year
Semester	5th semester
Form of final assessment	Credit
Link to syllabus	
Course description	Biology teachers must have skills in working with information and communication technologies, master methods of teaching the subject using mass media, and ensure the development of critical and analytical thinking in students to carry out professional activities in the modern educational media space. The use of media education technologies in professional activities, such as methodological and organizational tools of the educational process using periodicals, radio, television, and cinema, which ensure the collection, processing, accumulation, storage, and transmission of information, makes it possible to develop professional competence; develop the ability to work with different types of media texts, evaluate the quality and reliability of the information received, resist manipulative influence, develop constructive media behavior.

STEM TECHNOLOGIES IN NATURAL SCIENCE EDUCATION

Educational Program	Educational and professional Program “Secondary education (Biology and Human Health, Chemistry, Nutrition Science)”
Specialty	014.05 Secondary Education (Biology and Human Health)
Level of Higher Education	First (Bachelor’s) level
Lecturer	Candidate of Biological Sciences, Associate Professor Andrii Herts
Course Language	Ukrainian
Department	General Biology and Methods of Teaching Natural Sciences
Scope	3 ECTS credits
Year of Study	3rd year
Semester	5th semester
Form of final assessment	Credit
Link to syllabus	
Course description	The course is aimed at developing students’ competencies in the use of STEM technologies in the professional activities of a biology teacher. The main goal is to increase students’ motivation to study biological sciences and their readiness to successfully apply STEM solutions in the educational process and their professional activities. Upon completion of the course, students will be able to model a STEM-oriented educational learning environment; apply modern technologies for conducting practical classes, which will allow students to effectively use STEM tools and resources in their teaching activities; integrate STEM-dominant organizational forms into the educational process; use network tools for collaboration and project management; organize cooperation with educational organizations, STEM centers, and STEM laboratories; use cloud-based learning and research environments to expand learning and research opportunities.