PRIVATE HIGHER EDUCATIONAL INSTITUTION
"INTERNATIONAL ACADEMY OF ECOLOGY AND MEDICINE"

"APPROVED"
The Chairman of Admission Committee
_____ Ivan SAVYTSKYI
05/04/2023

PROGRAM
of complex entrance exam in Biology and English for foreigners and people without citizenship,

who enter the "International Academy of Ecology and Medicine"
in 2023 and select English as language of study

Specialty:	222 "Medicine"
Educational qualification:	master of medicine
Professional qualification:	doctor

Specialty:	221 "Dentistry"
Educational qualification:	master of dentistry
Professional qualification:	dentist

Ratified by Admission
Committee Meeting
Protocol № 2
04/04/2023

Approved on the Meeting of the
Academic Counsil
Protocol №8
05/04/2023

Kyiv-2023

EXPLANATORY NOTE

The purpose of the complex entrance examination is to assess the knowledge of foreigners in three subjects: 1) Biology; 2) English.

Complex entrance examination takes place in written form during 2.5 astronomical hours without a break. When writing a complex entrance exam, the entrant must answer one question in each subject. The results of the answer for each subject are evaluated by a scale from 1 to 5 points. For each subject, the entrant must receive at least 3 points. If the respondent's answer is rated one or two points in one subject, then such an applicant has not entered the Private Higher Educational Institution "International Academy of Ecology and Medicine".

The content of the program material for a complex entrance exam consists of three parts that correspond to the names of the subjects: 1) Biology; 2) English.

Each part of the program material contains criteria for evaluating the answers of applicants.

PROGRAM MATERIAL CONTENT
EDUCATIONAL SUBJECT: BIOLOGY

Applicant must **KNOW:**

- main signs of living, level of life organization, organisms elemental composition;
- inorganic and organic compounds of organisms, metabolism and energy transformation;
- structure and function of cells, cell division;
- the structure and function of viruses, prions, viroids, bacteria;
- structure and processes of plant life, the variety of plants;
- structure and function of fungi, lichens;
- the structure and function of animals, the variety of animals.
- the structure and functions of the human body;
- reproduction of organisms, individual development of organisms, basis of selection;
- historical development of the organic world;
- the basic laws of heredity and variability;

Applicant **MUST BE ABLE:**

- to characterize the basic biological concepts, laws and theories, biological phenomena and processes;
- to compare the processes of life at different levels of the organization (molecular, cellular, organismic, population-species, ecosystem, biosphere) and to identify the relationships between them;
- to establish causal, functional, structural connections in wildlife, to classify objects;
- to apply biological knowledges to analyze situations that arise in different spheres of life;
- to carry out calculations using the mathematical apparatus;
- to substantiate the conclusions.

MAIN SECTIONS INTRODUCTION.
GENERAL BIOLOGY

Biology is a science about living nature. The main signs of the living. Levels of life organization: molecular, cellular, organism, population-specific, ecosystem, biosphere.

1. MOLECULAR LEVEL OF LIFE ORGANIZATION.

Elemental composition of organisms. Classification of chemical elements according their content in organisms.

Inorganic compounds of organisms. The role of water, salts and other inorganic compounds in the body.

Organic compounds of organisms. Structure, properties and functions of organic compounds.

Carbohydrates: monosaccharides, oligosaccharides, polysaccharides. Lipids. Features of the structure, basic properties and functions in organisms. Proteins: structural features. Amino acids, peptides and polypeptides. Enzymes, their structure and properties.

Nucleic acids. Structure, properties and functions of DNA. The concept of the gene. RNA and their types.

Division of cells. The mitotic division of cells into eukaryotes, its phases. Meiotic cell division, its phase.

Metabolism and energy conversion. Metabolism. Assimilation and dissimilation. Biosynthesis of proteins and its stages. Genetic code and its properties. Transcription. Genes (structural and regulatory). Exons and introns.

Photosynthesis. The main processes occurring in the light and dark phases of photosynthesis.

2. CELLULAR LEVEL OF LIFE ORGANIZATION.

Organization of cells. Modern Cell Theory.

Membranes, their structure, properties and basic functions. Plasma membrane. Transport of substances through membranes. Cytoplasm and its components.

Organelles. Unicellular organelles: Endoplasmic Reticulum, Golgy apparatus, lysosomes, vacuoles. Double membrane organelles: mitochondria, plastids and their types (peculiarities of their structure and functions). Non-membrane organelles: ribosomes, polyribosomes, cell center, organelle movements. Nucleus, its structure and functions.

Chromosomes, their structure and chemical composition. Human kariotype.

Division of cells. The mitotic cell division, its phases. Meiotic cell division, its phases.

Metabolism and energy conversion. Assimilation and dissimilation.

Protein synthesis and its stages. Genetic code and its properties. Transcription. Genes. Exons and introns.

Photosynthesis. The main processes occurring in the light and dark phases of photosynthesis. The value of photosynthesis.

3. UNCELLULAR FORMS OF LIFE.

Viruses, prions. Viruses, their chemical composition, structure and reproduction. The mechanism of viruses penetration into the organism .Role of viruses in nature and human life.

4. ORGANIZMIC LEVEL OF LIFE ORGANIZATION.

Bacteria. General characteristics of prokaryotes (bacteria, cyanobacteria). Pathogenic bacteria and diseases caused by them. Prevention of bacterial diseases.

Plants. General characteristics of Plant kingdom. Classification of plants.

The structure of plant organism. Features of unicellular and multicellular plants organization. Tissues of multicellular plants.

Vegetative organs of plants. Root and its features. The structure of the root. Types of the root. The root system and its types (rod, blubber).

Sprout and its functions. Structure of sprout.

Stem and its functions. Inner structure of a stem.

Leaf, its structure and functions.

The bud is the germ of the stem. The structure of the bud.

Generative organs of Angiospermae: (flower, seed, fruit).

Flower is an organ of sexual reproduction of plants. The structure and functions of the flower. Inflorescences, their biological significance.

Seed and Fruit. Structure and function. Seed and fruit development.

Life processes, reproduction and development of plants.

Nutrition of plants (mineral nutrition, air supply - photosynthesis). Breathing of plants. Transpiration.

Forms of reproduction of plants: sexual and asexual. Spores. Fertilization.

Variety of plants.

Green algae: unicellular (chlorella, chlamydomonade) and multicellular (spirogir, hara, ulva, ulotrix).

Brown algae (laminaria, fucus).

Red algae (phyllophora, porphyry, coral).

Diatomaceous algae (navelula, pinotratia).

Vascular spore plants (Lycopodiales, Equisetales, Pteropsida)

Phylum Gymnospermae (ginkgo, berry thistle, thuja, pine, spruce, larch, jumper, cedar, velvichia, stalk).

Angiospermae. Classification of angiospermae. Monocotyledones and Dicotyledones Classes.

Fungi. Lichenes.

General characteristics of the Fungi kingdom. A variety of fungi.

Lichenes - symbiotic organisms. A variety of Lichenes.

Animals. General characteristics of Animal kingdom. Principles of animal classification. Animal tissues.

Unicellular animals. General characteristics. Features of the structure and processes of life.

Freshwater (amoeba proteus, euglena green, infuzoria-shoe) their role in nature and human life.

Symbiotic unicellular animals: parasites (dysentery amoeba, trypanosomes, malaria plasmodiae).

Multicellular animals. Characteristic features of multicellular animals, their difference from unicellular.

Phylum Coelenterata or Cnidaria. General characteristics of the type.

Phylum Flatworms. General characteristics of the type. Class Fluck (liver fluck), features, distribution, structure and processes of life. Class Cestodeae (Taenia soliun and Taenia saginata), peculiarities of distribution, structure and processes of life.

Phylum Roundworms (nematodes). General characteristics of the type. Round worms - parasites of plants, animals and humans (Ascaris, Enterobius, Trichinella), diseases that they are caused.

Phylum Carnivorous worms. General characteristics of the type.

Phylum Mollusca. General characteristics and variety of the type.

Phylum Arthropoda. General characteristics of the type. Variety of arthropods.

Class Crustaceae. General characteristics, features of external and internal structure.

Class Arachnida. General characteristics, features of external and internal structure.

Class Insecta. General characteristics. Variety of insects.

Phylum Chordata. General characteristics, habitats. A variety of Chordatae.

The subphylum Vertebrata. General characteristics. Class Cartilage Fish (Chondrichthyes). Features of the structure, processes of life. A variety of cartilaginous fishes (sharks and tinker).

Class Bone Fish. Features of external and internal structure, processes of life.

Class Amphibia. General characteristics. Features of the structure and processes of life in connection with the exit to land.

Class Reptilia. Features of external and internal structure, processes of life.

Class Birds. Features of external and internal structure, processes of life.

Class Mammalia. General characteristics. Features of external and internal structure. Diversity of mammals.

Human. The position of a human in the organic world.

Human body tissues (epithelial, muscular, nervous, internal tissues: connective, blood, skeletal) their structure and functions.

Musculoskeletal system. Chemical composition, structure, growth and connection of bones.

Muscle tissue. Structure and function of skeletal muscles.

Structure and functions of the blood. The structure and functions of erythrocytes, leukocytes and platelets.

Blood groups. Immunity, types of immunity.

Functions and structure of the circulatory and lymphatic systems. Blood circulation. The structure of the heart.

Blood vessels, their structure and functions. Blood circulation.

Functions and structure of the respiratory organs.

Nutrition and digestion. Structure and functions of the digestive system. Digestive glands. Vitamins, their properties.

Functions and structure of the kidneys.

Structure and functions of the skin.

Nervous regulation. Reflex. Reflex arc.

Nervous system: central and peripheral. Structure and functions of the spinal cord and brain.

Sensory systems of their significance. Structure and functions of the organs of vision. The structure and functions of the hearing organs. The structure and functions of the equilibrium system.

Higher human nervous activity. Unconditional and conditioned reflexes.

Reproduction of organisms. Forms of reproduction of organisms (asexual, sexual). Methods of asexual type of reproduction of unicellular organisms (division, schizogony, budding, spore formation) and multicellular organisms (vegetative reproduction, spore formation).

Sexual reproduction. Processes of formation of germ cells. Fertility and its forms

Individual development of organisms. Ontogenesis. Periods of individual development of organisms.

Heredity and variability. Genetics. Methods of genetic research.

Basic concepts of genetics: genes (structural and regulatory), gene allele, gene locus, dominant and recessive states of signs, homozygotes, heterozygotes, genotype, phenotype, gene pool, heredity, variability, pure line.

Patterns of heredity. Patterns of heredity, established by G. Mendel and their statistical nature. Autosomal linkage. Chromosomal theory of heredity. Sex linked inheritance. Interaction of genes and their types.

Patterns of variability. Modification variability.

Hereditary variability and its types: combinative and mutational. Types of mutations. Mutagenic factors.

Selection. Tasks and methods of selection.

Biotechnology, genetic and cellular engineering. Genetically modified and bizarre organisms.

5. SUPRAORGANISMAL LEVELS OF LIFE ORGANIZATION.

Environmental factors: abiotic, biotic, anthropogenic. Population-specific level of organization of life. Kind. Population.

Ecosystems, their composition and diversity. Producers, Consumers, Reducers. Power Chains. Trophy level.

Biosphere. Noosphere. Circulation of substances and energy flows in the biosphere as the necessary conditions for its existence.

6. HISTORICAL DEVELOPMENT OF THE ORGANIC WORLD.

The main ideas of evolutionary doctrine by Charles Darwin.

Synthetic theory of evolution. Microevolution. Natural selection. Species formation. Macroevolution.

EVALUATION CRITERIA

of the entrant answers in Biology

Grade "5" is given for the answer, which is full and consistently reveals the content of the question in Biology. The biological theories, hypotheses and laws are clearly and correctly formulated, scientific concepts and terms are defined and used. The conclusions and examples are given, which successfully illustrate the understanding of the material.

Grade "4" is given for the answer, which is full, but there are 1 or 2 inaccuracies or minor mistakes;

Grade "3" is given for the answer, which is limited only to the statement of the main things, does not cover it fully or contains significant errors;

Grade "2" is given for the answer, which does not fully cover the issue, does not apply modern biological terminology, with 3 or more errors.

Grade "1" is given for the answer, in which the number of errors exceeds the grade "2" criterion.

Classification of errors and inaccuracies in the Biology answer

Significant errors:

1. Wrong formulation of biological theories, hypotheses, laws and concepts.
2. Wrong examples to justify the theoretical positions.
3. The answer does not correspond to the question.
4. Lack of knowledge of structure and processes of living organisms life.

Insignificant errors:

1. Inaccurate or partly incomplete explanation of biological theories, hypotheses, laws and concepts.
2. There are no examples that illustrate and justify the answer to the question.

If the answer of the entrant in Biology is estimated 1 or 2 points, then such an entrant is not enrolled to studying at the PHEI “International Academy of Ecology and Medicine”.

EDUCATIONAL SUBJECT: ENGLISH

The material in the English language program is chosen to meet the goals and objectives that determine the general and professionally oriented levels of the formation of the communicative competence of foreigners and people without citizenship.

In the course of carrying out a task in English, the entrant should set out in writing the content of the given topic, maintaining the logic of the presentation of the material, using the active vocabulary of the given topic, correct spelling, stylistic and grammatical norms of the English language.

Communicative Competence Content

The applicant should be ready to answer in written form to one of the following questions:

1. Autobiography.
2. About myself.
3. My family.
4. Description of a person's appearance.
5. My friend.
6. My native country.
7. The weather in my country.
8. The capital city of my country.
9. Interesting places in my country.
10. Excursion around my native city.
11. Holidays in my country.
12. Customs and traditions in my country.
13. My favorite holiday.
14. Gifts. How do I choose gifts?
15. Travelling. Why do people travel?
16. The journey of my dream.
17. What do I know about Ukraine?
18. My hometown.
19. Famous people of my native country.
20. Famous writers of my native country.
21. My school years.
22. Seasons and Weather.
23. Sports.Popular kinds of sports.
24. My favourite sport.
25. My favourite sportsman.
26. The films 1 like to watch.
27. My favourite actor (actress).
28. The music that I love.
29. My favourite book.
30. The Internet in Modern Life.
31. Television in Modern Life.
32. Professions. My future profession.
33. Why have I chosen Medicine?
34. My plans for the future.
35. My hobby.
36. Free time and leisure activities.
37. My house.
38. The house of my dream.
39. What does it mean "to be happy"?
40. The happiest day of my life.

41. The brightest memories of my childhood.
42. My lifestyle.
43. Socializing with friends.
44. Problems of a modern world.
45. Life in the countryside: advantages and disadvantages.
46. Life in the city: advantages and disadvantages.
47. Ecology and environment.
48. Healthy diet and proper nutrition.
49. Healthy way of life.
50. The most valuable things in my life.
51. The profession of a doctor: advantages and disadvantages.
52. My working day.
53. Eating out.
54. My weekends.
55. The way I celebrate my birthday.
56. The most popular means of transport.
57. My summer holidays.
58. My meals during the day.
59. What cannot be bought with money?
60. We are not doing enough to protect our world.

EVALUATION CRITERIA

of the entrant answers in English

Grade "5" is given for the answer of the applicant who fully revealss one of the suggested topics. The statement is constructed logically and indicates the proper level of English language proficiency. In his/her answer the entrant uses an active vocabulary corresponding to the topic, demonstrates a thorough knowledge of grammar. It is possible to have a few non-rough errors that do not impede the understanding.

Grade "4" is given for the applicant who reveals one of the proposed topics in a sufficient volume, has an active vocabulary on the topic, demonstrates the broad vocabulary and knowledge of the grammatical material at the proper level. Minor mistakes are allowed in the terminology or style; and one or two grammatical errors or a few minor ones.

Grade "3" is given to the entrant who reveals one of the suggested topics partially. In the answer, an active vocabulary is used that corresponds to the proposed topic, but with tautology and demonstrates a limited vocabulary and imperfect knowledge of grammar. 3-5 spelling mistakes, 3-5 lexical or grammatical mistakes may occur in the answer.

Grade "2" is given for the answer of the applicant who reveals inadequate scope of one of the proposed topics. Poor active vocabulary and grammar on the proposed topic are demonstrated with many significant spelling mistakes.

Grade "1" The entrant does not reveal the proposed topic, demonstrates the complete lack of knowledge of the active vocabulary, a low level of grammar with a large number of mistakes of various types.

If the answer of the entrant in Chemistry is estimated 1 or 2 points, then such an entrant is not enrolled to studying at the PHEI “International Academy of Ecology and Medicine”.