

BUNIN YELETS STATE UNIVERSITY

"APPROVED"

Director of the Institute of Psychology
And Pedagogy _____/T.D.Krasova/



THE WORK PROGRAMME OF THE DISCIPLINE B1.C.06.04 Natural Science

Direction of training: 44.03.01 Pedagogical Education

Profile: Primary education

Qualification (degree): bachelor

Mode of study: full-time

Institute of Psychology and Pedagogy

Department: of Chemical and Biological Discipline and Pharmacology

| | full-time | full-time and part-time form | correspondence course |
|--------------|-----------|------------------------------|-----------------------|
| Study course | 2,3 | | |
| Term | 4.5 | | |

| | | | |
|------------------------------|----------------------------------|--|--|
| Lectures | 34 | | |
| laboratory work | | | |
| Seminars | 68 | | |
| including practical training | | | |
| Form of control | Credit test Credit with grade | | |
| Control | | | |
| Independent work | 78 | | |

Total number of academic hours: 180

Labor intensity: 5 credits.

Developer of the work programme:

Candidate of Pedagogical Sciences, Associate Professor

Morgacheva N.V.

I. ORGANIZATIONAL AND METHODOLOGICAL SECTION

The purpose of studying the discipline: to form an understanding of natural science as a science that provides the foundation and great opportunities for the development of many branches of scientific knowledge.

Objectives of studying the discipline:

- acquisition of the necessary natural science knowledge, on the basis of which the skills necessary for deep mastery of the content of the natural science course are formed;
- mastering the skills to apply acquired knowledge to explain the phenomena of the surrounding world, to perceive information of natural scientific and professionally significant content;
- development of intellectual, creative abilities and critical thinking in the course of conducting simple research, analyzing phenomena, perceiving and interpreting scientific information

The place of the discipline in the structure of the BPEP: implemented within the framework of the basic (compulsory) part of block B 1. Disciplines (modules)

Planned learning outcomes for the course:

| Code of competence | Indicators of competence achievement | Planned learning outcomes for the discipline |
|--------------------|--|---|
| GPC-8 | To know: <ul style="list-style-type: none">- special, including subject and methodological scientific knowledge;- the basics of pedagogical activity of a subject teacher (according to the profile of the educational program); | Knows: <ul style="list-style-type: none">- biological terminology and symbolism, the system of the plant kingdom and the animal kingdom, the basic patterns of structure, functioning and development of geographic shells in unity and interaction with the surrounding space-time. |
| | To be able to: <ul style="list-style-type: none">- use modern technologies and methods for organizing class and extracurricular activities;- use traditional and modern forms and methods of educational work, including in the subject area; | Is able to: <ul style="list-style-type: none">- identify distinctive features of families and the belonging of plants to various taxonomic units;- apply comparative morphological and evolutionary approaches to characterize the main taxa of plants and animals;- analyze cause- |

| | | |
|--------------|---|--|
| | | causal relationships between global processes and phenomena in the geographical environment; |
| | <p>To possess:</p> <ul style="list-style-type: none"> - skills in organizing various types and forms of classes, taking into account the specifics of the subject area; - actions of organizing various types of extracurricular activities: play, educational and research, artistic and productive, cultural and leisure. | <p>Possesses:</p> <ul style="list-style-type: none"> - skills in organizing various types and forms of classes, taking into account the specifics of the subject area; |
| PCS-2 | <p>To know:</p> <ul style="list-style-type: none"> - patterns, principles and levels of formation and implementation of educational content according to primary school disciplines; - the structure, composition and didactic units of content of school subjects primary school disciplines ; | <p>Knows:</p> <ul style="list-style-type: none"> - patterns, principles and levels of formation and implementation of educational content according to natural science; - the structure, composition and didactic units of content of school subjects primary school disciplines ; |
| | <p>To be able to:</p> <ul style="list-style-type: none"> - carry out the selection of educational content for implementation in various forms of training primary school disciplines in accordance with the didactic goals, age characteristics of students and the requirements of the Federal State Educational Standard of General Education; | <p>Is able to:</p> <ul style="list-style-type: none"> - carry out the selection of educational content for implementation in various forms of training primary school disciplines in accordance with the didactic goals, age characteristics of students and the requirements of the Federal State Educational Standard of General Education; |
| | <p>To possess:</p> <ul style="list-style-type: none"> - subject content of primary school disciplines; - skills in selecting variable content taking into account the relationship between class and extracurricular forms of teaching primary school subjects. | <p>Possesses:</p> <ul style="list-style-type: none"> - subject content of primary school disciplines; - skills in selecting variable content taking into account the relationship between class and extracurricular forms of teaching primary school subjects. |

II . CONTENT AND SCOPE OF THE DISCIPLINE

indicating the number of hours allocated for contact work of students

with a teacher (by type of class) and for independent work

Full-time education

| № | Name of sections and topics | Total | Classroom lessons | | | Indep. work |
|-----|---|---------------|-------------------|-----------|----------|-------------|
| | | | Lec. | Sem. | Lab.work | |
| 1. | Section 1. Anatomy and morphology of plants. | 72 | 18 | 36 | | 36 |
| 2. | Topic 1. Morphology and ultrastructure of plant cells | 8 | 2 | 4 | | 2 |
| 3. | Topic 2. Plant tissues | 8 | 2 | 4 | | 2 |
| 4. | Topic 3. Vegetative organs of plants | 8 | 2 | 4 | | 2 |
| 5. | Topic 4. Generative organs of plants | 8 | 2 | 4 | | 2 |
| 6. | Topic 5. Fungi and lower plants | 8 | 2 | 4 | | 2 |
| 7. | Topic 6. Higher spore plants | 8 | 2 | 4 | | 2 |
| 8. | Topic 7. Higher seed plants | 8 | 2 | 4 | | 2 |
| 9. | Topic 8. Geography and ecology of plants | 8 | 2 | 4 | | 2 |
| 10. | Topic 9. The most important groups of plants in relation to environmental factors | 8 | 2 | 4 | | 2 |
| 11. | <i>Reporting form</i> | <i>credit</i> | | | | |
| 12. | <i>Total for 4th semester</i> | <i>72</i> | <i>18</i> | <i>36</i> | | <i>18</i> |
| 13. | | | | | | |
| 14. | Section 2. Classification of | | 16 | 32 | | 32 |

| | | | | | | |
|---------|--|------------------------------|-----------|-----------|--|-----------|
| | animals | | | | | |
| 15. | Topic 1. Rhizopodia and flagellates . Ciliated ciliates. | | 2 | 4 | | 4 |
| 16. | Topic 2. Flat, round and annelids. | | 2 | 4 | | 4 |
| 17. | Topic 3. Mollusks | | 2 | 4 | | 4 |
| 18. | Topic 4. Arthropods | | 2 | 4 | | 4 |
| 19. | Topic 5. Fish class. Amphibian class | | 2 | 4 | | 4 |
| 20. | Topic 6. Class Reptiles | | 2 | 4 | | 4 |
| 21. | Topic 7. Class Birds. | | 2 | 4 | | 4 |
| 22. | Topic 8. Class Mammals | | 2 | 4 | | 4 |
| 23. | Section 3. The structure of the universe. | | | | | 28 |
| 2 4. | Topic 1. The Universe and the Earth | 7 | | | | 7 |
| 25. | Topic 2. Geographical map and area plan | 7 | | | | 7 |
| 26. | Topic 3. General laws and physical processes on Earth. | 7 | | | | 7 |
| 27. | Topic 4. The Earth's outer shell. Hydrosphere. Atmosphere. Biosphere | 7 | | | | 7 |
| 28 | | | | | | 28 |
| 29 | <i>Reporting form</i> | <i>Credit with grade</i> | | | | |
| 30 | <i>Total for 5th semester</i> | <i>108</i> | <i>16</i> | <i>32</i> | | <i>60</i> |
| 31 | <i>Total for 4.5 semester</i> | 180 | 34 | 68 | | 78 |

Full-time and part-time education (not implemented)

Part-time education (not implemented)

III. EVALUATION MATERIALS FOR CONDUCTING CURRENT AND INTERIM CERTIFICATION OF STUDENTS IN THE DISCIPLINE

Current certification is carried out in the form of a test (in traditional or test form) and an essay.

**Standard version of the test
Option 1.**

In traditional form:

1. Specify the differences in plant and animal cells
2. Definition of the concept "root". Morphological nature of roots in the root system. Metamorphoses of roots, their structure and functions. Give examples.
3. General plan of the structure of the seed. Structure and functions of seed components (give drawings). Morphological types of seeds in monocotyledonous and dicotyledonous plants. Provide schematic drawings of a longitudinal section of seeds of different types in specific plants of these classes.

In test form:

1. Which component is unique to a plant cell?
 1. microsome
 2. mitochondrion
 3. plastid
 4. ribosome
2. What is contained in a vacuole?
 1. cytosol
 2. sugar
 3. emulsion
 4. cell juice
3. The energy station of a cell is called
 1. cell juice
 2. nucleus
 3. mitochondria
 4. Golgi complex
4. What color are the plastids in the cells of the skin of an onion scale
 1. yellow
 2. orange
 3. colorless

4. green.
5. The main root is
 1. grows from a shoot.
 2. is formed on the main and adventitious roots.
 3. develops from the embryonic root of a seed and plays the role of the central axis of the underground part of a plant.
 4. small roots on the upper part of a plant

Option 2.

In traditional form:

1. Describe the life cycle of the beef tapeworm (liver fluke).
2. What explains the variegated coloring and bizarre shape of coral fish?
3. The body temperature of birds is higher than that of mammals. What advantages does this give to birds, and what disadvantages does it entail?

In the test form:

1. Which protozoa lack a cell membrane?
 - a) all protozoa
 - b) rhizopods
 - c) parasitic protozoa
2. Protozoa can consume:
 - a) only solid organic particles, capable of phagocytosis
 - b) solid particles and dissolved organic matter
 - c) only dissolved organic matter
3. The number of nuclei in protozoan cells:
 - a) only one nucleus
 - b) some have no nuclei
 - c) no more than 2 nuclei
4. Does the contractile vacuole in protozoa provide?
 - a) regulation of osmotic pressure
 - b) excretion of metabolic products
 - c) respiration
 - d) performs all three functions
5. How does an amoeba reproduce?
 - a) only asexually
 - b) asexually and sexually
 - c) only sexually

Approximate topics of essays

1. Botany as a section of biology, history of origin.
2. Plant anatomy, histology.
3. History of origin of plant physiology.
4. Structure of birds, review of several examples.
5. Coral polyps. Structure. Development of the skeleton. Reef formation.

6. Sponges, structure and development
7. Salinity of the waters of the World Ocean.
8. Tides.
9. Endogenous and exogenous relief-forming processes.
10. Karst relief.

Interim assessment of students is carried out in the form of a test, an exam using the following assessment materials: a list of questions for the test, a list of questions for the test with a grade.

Questions for the test (4th semester, full-time education)

1. Plant cell, its structural features and basic metabolic processes.
2. Plant tissues, their classification. Diversity of cells that make up plant tissues.
3. Morphological structure of higher plants.
4. Root, its structure and functions. Types of root systems. Root modifications.
5. Stem, its structure and functions. Types of shoots and their modifications.
6. Processes occurring in the leaf: photosynthesis, respiration, transpiration.
7. Flower structure and functions. Processes occurring in the flower.
8. Fruit structure and classification. Structural features of monocot and dicot seeds.
9. Inflorescences and their biological significance.
10. General information about plant reproduction. Methods of reproduction: sexual, asexual, vegetative
11. Algae: structure, nutrition, reproduction and importance in human life. The main divisions of algae and their representatives.
12. Fungi: structure, nutrition, reproduction and importance in human life. The main classes of fungi and their representatives. Lichens: body structure, importance in nature.
13. Division Bryophytes. General characteristics, classification, ecology, role in nature and use by humans.
14. Division Pteridophytes. General characteristics, classification, structure and life cycle. The importance of ferns.
15. Division Gymnosperms and their general characteristics. The development cycle of Gymnosperms using Scots pine as an example.
16. Division Angiosperms. Ecological and biological features that distinguish them from other plants.
17. Class Dicotyledonous plants and its general characteristics, main families.
18. Class Monocotyledonous plants and its general characteristics, main families.
19. Influence of environmental factors on the distribution and development of plants.
20. Phytoncidal activity of plants and bioindication potential.

Questions for the test with a grade (5th semester, full-time education)

1. Zoology as a science. History of the development of science
2. Features of the structure of an animal cell
3. Rhizopoda. Life cycle, ecology and structure
4. Flagellates. Life cycle, ecology and structure
5. Ciliates. Life cycle, ecology and structure
6. Flatworms. Life cycle, ecology and structure
7. Roundworms. Life cycle, ecology and structure
8. Annelids. Life cycle, ecology and structure
9. Gastropods. Life cycle, ecology and structure
10. Bivalves Life cycle, ecology and structure
11. Cephalopods Life cycle, ecology and structure
12. General characteristics of the phylum Arthropoda
13. Crustaceans. Life cycle, ecology and structure
14. Insects. Life cycle, ecology and structure
15. Spiders and scorpions. Life cycle, ecology and structure
16. Ticks. Life cycle, ecology and structure
17. Chordata animals. General characteristics
18. Cartilaginous Fish. Life cycle, ecology and structure
19. Bony fish Life cycle, ecology and structure
20. Anurans Amphibians. Life cycle, ecology and structure
21. Caudate Amphibians. Life cycle, ecology and structure
22. Class Reptiles. Life cycle, ecology and structure. Lizards and snakes.
23. Class Reptiles. Life cycle, ecology and structure Crocodiles
24. Class Reptiles. Life cycle, ecology and structure Turtles
25. Class Birds. Life cycle, ecology and structure
26. Class Mammalia. Life cycle, ecology and structure

I V. LIST OF REFERENCES REQUIRED FOR MASTERING THE DISCIPLINE

4.1. Main literature

1. Smirnova, M. S. Natural Science : Textbook and Workshop for Universities / M. S. Smirnova, M. V. Voronenko, T. M. Smirnova. — 3rd ed., revised and enlarged. — Moscow: Yurait Publishing House , 2024. — 342 p. — (Higher Education). — ISBN 978-5-534-16670-5. — Text : electronic // Yurait Educational Platform [website]. — URL: <https://urait.ru/bcode/536147>

4.2. Additional literature

1. Tulyakova , O.V. Biology : textbook : [16+] / O.V. Tulyakova . – Izd. 2nd, erased. - Moscow ; Berlin : Direct -Media, 2019. - 450 p. : illustration , scheme, table. – Access mode: by subscription. – URL: <http://biblioclub.ru/index.php?page=book&id=576759> – Bibliogr .: s. 431. – ISBN 978-5-4499-0114-9. – DOI 10.23681/576759. – Text : electronic.
2. Shubina, Yu. E. Biology : practical: [16+] / Yu. E. Shubina; Lipetsk State Pedagogical University named after P. P. Semenov-Tyan-Shansky. – Lipetsk : Lipetsk State Pedagogical University named after P. P. Semenov-Tyan-Shansky, 2017. – 83 p.: ill . –

Access mode: by subscription. – URL:
<https://biblioclub.ru/index.php?page=book&id=576892> – Bibliography in the book. – ISBN 978-5-88526-902-5. – Text : electronic.

V . LIST OF RESOURCES OF THE INFORMATION AND TELECOMMUNICATION NETWORK "INTERNET" REQUIRED FOR MASTERING THE DISCIPLINE

| No. | Link to information resource | Name of the development in electronic form | Availability |
|-----|---|--|--------------|
| 1. | https://infourok.ru/ | Infourok : educational internet project of Russia. Includes: presentations, tests, video lessons and other materials on subjects of the school curriculum. | Free access |
| 2. | http://edu.ru/ | Russian Education: Federal Portal. Includes links to portals and websites of educational institutions; state educational standards; regulatory documents; catalog of excursions and educational programs. | Free access |
| 3 . | http://window.edu.ru/ | The information system "Single Window for Access to Educational Resources" provides free access to the catalog of educational Internet resources and full-text electronic educational and methodological library for general and professional education | Free access |
| 4. | https://www.gumer.info/ | Gumer Library : Provides free access to 5000 books and articles on the humanities | Free access |
| 5. | http://fcior.edu.ru/ | The Federal Center for Information and Educational Resources (FCIER) provides access to electronic educational resources and services for all levels and stages of education. | Free access |

VI . MODERN PROFESSIONAL DATABASES AND INFORMATION REFERENCE SYSTEMS

| | | | |
|----|---|--|---|
| 1. | http://www.biblioclub.ru | Electronic library system (EBS) University Library Online | Registration via any university computer. In the future, unlimited individual access is provided from any point where there is access to the Internet. |
| 2. | www.elibrary.ru | Russian information portal in the field of science, technology, medicine and education | Free access |
| 3. | www.consultant.ru | Russian computer reference and legal system | Free access |
| 4. | http://fgosvo.ru/ | Portal of Federal State Educational Standards of Higher Education | Free access |
| 5. | https://fgos.ru/ | Federal state educational standards (for all levels of education) | Free access |

VII . LICENSED AND FREELY DISTRIBUTABLE SOFTWARE

The following licensed and freely distributed software is used in the implementation of the academic discipline:

- Microsoft Windows;
- Microsoft Office;
- LibreOffice And etc.

VIII . EQUIPMENT AND TECHNICAL TEACHING AIDS NECESSARY FOR THE IMPLEMENTATION OF THE EDUCATIONAL PROCESS IN THE DISCIPLINE

Classes are held in classrooms equipped with specialized furniture, including stationary or portable technical teaching aids (projector, screen, computer/laptop).

Independent work is carried out in rooms equipped with computers with the ability to connect to the Internet and provide access to the electronic information and educational environment of the university.