

*Federal State Autonomous Educational Institution for Higher Education  
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA  
(RUDN University)*

*Institute of Environmental Engineering*

**COURSE SYLLABUS**

**FUNDAMENTALS OF BIODIVERSITY**

Higher Education Field

Recommended by the Didactic Council for the Education Field of  
(Linguistics)

Graduate's Degree – MASTER

**Moscow, 2022**

## 1. COURSE GOALS/ AIMS AND OBJECTIVES OF THE DISCIPLINE

The purpose of mastering the discipline "Biodiversity" is the formation of professional competencies (GPC-2, PC-5) in accordance with the state educational standard in the direction of 05.03.06, including:

- formation of basic knowledge of fundamental sections of biology;
- formation of system ideas about the structure of the organic world;
- formation of ideas about the main directions and mechanisms of the evolutionary process;
- formation of ideas about the ecological features of different groups of living organisms and their communities, basic environmental laws and environmental problems;
- development of skills in collecting and processing field data;
- possession of skills of identification and description of biological diversity;
- development of assessment skills using modern methods of quantitative information processing and analysis of the received materials;
- knowledge of the biological foundations of ecology and nature management.

To achieve this goal, the following tasks are solved in the process of teaching the course:

- ✓ formation of students' basic knowledge of fundamental sections of biology;
- ✓ formation of students' systemic ideas about the structure of the organic world;
- ✓ formation of students' ideas about the main directions and mechanisms of the evolutionary process;
- ✓ formation of students' ideas about the ecological characteristics of different groups of living organisms and their communities, the main environmental laws and environmental problems;
- ✓ development of students' skills in collecting and processing field materials;
- ✓ possession of skills of identification and description of biological diversity;
- ✓ development of students' skills in assessing modern methods of quantitative information processing and analysis of the received materials;
- ✓ formation of students' knowledge of the biological foundations of ecology and nature management;
- ✓ informing students about modern achievements in biology and diversicology.

## 2. REQUIREMENTS FOR THE LEARNING OUTCOMES THE DISCIPLINE

Mastering the discipline "Biodiversity" is aimed at developing the following competencies (parts of competencies) in students:

*Table 2.1. The list of competencies formed by students in the course of mastering the discipline (the results of mastering the discipline)*

Code	Competence	Competence indicators
GPC-2	Possession of basic knowledge of the fundamental sections of physics, chemistry and biology in the amount necessary for the development of physical, chemical and biological foundations in ecology and nature management; possession of methods of chemical analysis, knowledge of modern dynamic processes in nature and the technosphere, the state of the Earth's geospheres, ecology and evolution of the biosphere, global environmental problems, as well as methods for selecting and analyzing geological and biological samples; possession of the skills of identification and	Possess basic knowledge of the fundamental sections of physics, chemistry and biology in the amount necessary for the development of physical, chemical and biological foundations in ecology and nature management; possession of methods of chemical analysis, knowledge of modern dynamic processes in nature and the technosphere, the state of the Earth's geospheres, ecology and evolution of the biosphere, global environmental problems, as well as methods for selecting and analyzing geological and biological

	description of biological diversity, its assessment by modern methods of quantitative information processing	samples; possession of the skills of identification and description of biological diversity, its assessment by modern methods of quantitative information processing
SPC-6	Ability to organize activities for natural resource management, environmental protection and biodiversity conservation, environmental control and monitoring	Be able to organize activities for natural resource management, environmental protection and biodiversity conservation, environmental control and monitoring

### 3. THE PLACE OF DISCIPLINE IN THE STRUCTURE OF EP HE

The discipline "Fundamentals of Biodiversity" refers to the variable component of block B1 of the EP HE.

As part of the EP VO, students also master other disciplines and / or practices that contribute to the achievement of the planned results of mastering the discipline Fundamentals of Biodiversity.

*Table 3.1. The list of components of the EP HE that contribute to the achievement of the planned results of the development of the discipline*

Competence code	Name of competence	Previous disciplines/modules	Subsequent disciplines/modules
<b>GPC-2</b>	Possession of basic knowledge of the fundamental sections of physics, chemistry and biology in the amount necessary for the development of physical, chemical and biological foundations in ecology and nature management; possession of methods of chemical analysis, knowledge of modern dynamic processes in nature and the technosphere, the state of the Earth's geospheres, ecology and evolution of the biosphere, global environmental problems, as well as methods for selecting and analyzing geological and biological samples; possession of the skills of identification and description of biological diversity, its assessment by modern methods of quantitative information processing	Ecology	Modern problems of ecology and nature management
<b>SPC-6</b>	Ability to organize activities for natural resource management, environmental protection and biodiversity conservation, ecological	Ecology	Modern problems of ecology and nature management

#### 4. VOLUME OF DISCIPLINE AND TYPES OF EDUCATIONAL WORK

The total labor intensity of the discipline "Biodiversity" is 4 credit units.

Table 4. Types of educational work by periods of mastering EP HE for full-time education

Types of academic activities	Total hours	Semesters			
		1	2	3	4
<b>Contact academic hours</b>	10	10			
<b>Including:</b>					
<b>Lectures</b>	10				
<b>Seminars</b>					
<b>Lab work</b>					
<b>Evaluation and assessment</b>	16	16			
<b>Self-study (ies), academic hours (total)</b>	128	128			
<b>Course workload, hour.</b>	144	144			
<b>Course workload, credit units</b>	4	4			

#### 5. CONTENT OF THE DISCIPLINE

Table 5. The content of the discipline (module) by type of educational work for full-time education

Course Modules/Units	Content of the Course Modules/Units	Type of educational work
<b>Module 1.</b> History, basic terms and concepts	The concept of "biological diversity" and the history of its occurrence. Basic terms and concepts related to "biological diversity". International agreements and programs.	Lectures, Laboratory work, Independent work
<b>Module 2.</b> Diversity of life forms of living organisms	Life forms of animals and plants in the assessment of biological diversity. The concept of "life form". Systems of plant life forms by K. Raunkier and I.G. Serebryakova. Other approaches to the isolation of life forms in plants. functional types. Life forms in animals.	Lectures, Laboratory work, Independent work
<b>Module 3.</b> Genetic Diversity. Population approach to biodiversity assessment	Basic concepts: genotype, population, polymorphism, gene pool, panmixia, variety, breed, strain, race, species. Indicators of genetic diversity. The main types of intrapopulation polymorphism. Large and small populations. Factors of change in the gene pool of the population. Hardy-Weinberg law, the law of homologous series of heredity.	Lectures, Laboratory work, Independent work
<b>Module 4.</b> Species diversity, biodiversity of Russia	Species diversity of systematic groups, regions and natural zones of the Earth. Biodiversity hotspots. Species diversity of Russia by natural zones and systematic groups. The role of protected areas in biodiversity conservation.	Lectures, Laboratory work, Independent work

<b>Module 5.</b> Structural diversity of ecosystems. Diversity of ecosystems and landscapes	Diversity of ecosystems and landscapes. Assessment of landscape diversity. Structural diversity of plant communities and its assessment. Floristic completeness. Methods for assessing the species and structural diversity of plant communities. Structural diversity of biocenoses.	Lectures, Laboratory work, Independent work
<b>Module 6.</b> Alien Species and Biological Invasions. Factors affecting biological diversity	Alien species and biological invasions. Impact of introduction and unintentional introduction on biodiversity change. The concepts of "alien species", "common species", "aggressive introducers". Black books.	Lectures, Laboratory work, Independent work
<b>Module 7.</b> Biological diversity in urban areas	Biodiversity in urban areas and industrial areas. Impact of the urban environment on ecosystems. Transformation of soils, water ecosystems, vegetation cover and animal population. Flora and vegetation of cities. The role of aboriginal and adventive components in the formation of urban floras. Opportunities for the conservation of biological diversity in urban environments.	Lectures, Laboratory work, Independent work
<b>Module 8.</b> Measurement and assessment of biological diversity. Biodiversity Models	The main parameters of biological diversity are species richness, abundance, species composition. Models of biological diversity: geometric, logarithmic and normal distribution. Indices of biological diversity.	Lectures, Laboratory work, Independent work
<b>Module 9.</b> Monitoring of biological diversity	Methods for collecting and analyzing geobotanical and demographic data. Indicators of biological diversity. The use of biochemical, morphological, population and ecosystem methods in monitoring biological diversity. Cartographic method in the study of biodiversity: mapping of species and coenotic diversity.	Lectures, Laboratory work, Independent work
<b>Module 10.</b> Biodiversity Conservation Strategy	General understanding of national and international measures for the conservation of biological diversity. Main regulatory documents. General idea of measures for the conservation of biological diversity in Russia. Main regulatory documents.	

## 5. SECTIONS OF DISCIPLINES AND TYPES OF CLASSES

For full-time education

<b>№</b>	<b>Course Modules/Units</b>	<b>Lectures</b>	<b>Laboratory work</b>	<b>Independent work</b>	<b>General</b>
1.	History, basic terms and concepts	1	2	1	4
2.	Diversity of life forms of living organisms	1	4	–	5
3.	genetic diversity. Population approach to biodiversity assessment	2	2	–	4
4.	Species diversity, biodiversity of Russia	2	4	1	7
5.	Structural diversity of ecosystems. Diversity of ecosystems and landscapes	2	4	–	6
6.	Alien species and biological invasions. Factors affecting biological diversity	2	2	1	5
7.	Biological diversity in urban areas	2	4	–	6
8.	Measurement and assessment of biological diversity. Biodiversity Models	2	4	1	7
9.	Biodiversity Monitoring	1	4	1	6
10.	Biodiversity Conservation Strategy	1	2	1	4

### **Laboratory workshop**

<b>No.</b>	<b>Name of laboratory work</b>	<b>Labor-intensity (hours)</b>
<b>1</b>	History, basic terms and concepts. The main systematic groups of organisms, characteristics of their morphological and ecological diversity.	2
<b>2</b>	Diversity of life forms of living organisms. The system of K. Raunkier and I.G. Serebryakova.	2
<b>3</b>	Diversity of animal life forms. ZhF system D.N. Kashkarova	2
<b>4</b>	Assessment of the species diversity of Russian animals in protected areas.	4
<b>5</b>	Assessment of the species diversity of Russian plants in protected areas.	8
<b>6</b>	Structural diversity of ecosystems. Diversity of ecosystems and landscapes.	2
<b>7</b>	Alien species and biological invasions. Factors affecting biological diversity.	2
<b>8</b>	Measurement and assessment of biological diversity. Models of biological diversity.	4
<b>9</b>	Monitoring of biological diversity.	4
<b>10</b>	Biodiversity Conservation Strategy. Interactive game	2

### **Self-studies, academic hours**

For full-time education

No.	No. of the Course Modules/Units	Name of the type of Self-study	Labor-intensity (hours)
1	1–3	Registration of laboratory work, study of literature	2
2	4–7	Analysis of literature on biodiversity issues	2
3	8-10	Study of textbooks in biodiversity assessment	2

## 6. LOGISTICS AND TECHNICAL SUPPORT OF THE DISCIPLINE

*Table 6. Logistics of discipline*

Classroom type	Classroom equipment	Specialized educational / laboratory equipment, software and materials for mastering the discipline (if necessary)
Lecture	An auditorium for lecture-type classes, equipped with a set of specialized furniture; board (screen) and technical means of multimedia presentations.	
Laboratory	An auditorium for laboratory work, individual consultations, current control and intermediate certification, equipped with a set of specialized furniture and equipment.	Computer programs, videos, interactive games, handouts on the flora and fauna of Russia. Exposition of the Darwin State Museum and Zoo.
For independent work of students	An auditorium for independent work of students (can be used for seminars and consultations), equipped with a set of specialized furniture and computers with access to the EIOS.	

## 7. TRAINING/LEARNING TOOLKIT AND INFORMATION SUPPORT OF THE DISCIPLINE

### Main reading (sources):

1. Ivanov E.S., Cherdakova A.S., Markov V.A., Lupanov E.A. Biodiversity and nature conservation. – M.: Yurayt, 2019. – 247 p.

### Additional (optional) reading (sources)

1. Brodsky A.K. Biodiversity. – M.: Academy, 2012. – 208 p. Electronic resource: [http://www.academia-moscow.ru/ftp\\_share/\\_books/fragments/fragment\\_16776.pdf](http://www.academia-moscow.ru/ftp_share/_books/fragments/fragment_16776.pdf)
2. Kabelchuk B.V., Lysenko I.O., Emelyanov A.V., Gusev A.A. Biodiversity: a course of lectures. - Stavropol: Publishing House of the Stavropol GAU "AGRUS", 2013. - 156 p. Electronic resource: <http://www.stgau.ru>
3. Brodsky A.K. An introduction to biodiversity: an illustrated guide. - Publishing House of St. Petersburg State University, 2002. - 138 p.
4. Geography and monitoring of biodiversity. M., Publishing house of NUMC, 2002. - 432 p.

5. Conservation and restoration of biodiversity. M.: Publishing house of NUMC, 2002. -286 p.
6. Richard B. Primak. Fundamentals of biodiversity conservation./Trans. from English - M.: Publishing House of the National Medical Center, 2002. -256 p.
7. Yurtsev B.A. Ecological and geographical structure of biological diversity and the strategy of its accounting and protection // Biological diversity: approaches to study and conservation. St. Petersburg, 1992, p. 7-21
8. Biodiversity monitoring. M., 1997
9. Whittaker R. Communities and Ecosystems. M.: Progress, 1980 - 327 p.
10. Biological diversity of forest ecosystems. M., 1995. - 356 p.

### **Internet-(based) sources**

1. Electronic libraries with access for RUDN students  
Databases and search engines  
Learning toolkits for self- studies in the RUDN LMS TUIS  
<http://elibrary.ru/>
2. Website of the World Wide Fund for Nature: [www.wwf.ru](http://www.wwf.ru) .
3. Systematized catalog of information resources of the National Strategy and Action Plan for the Conservation of Biodiversity of Russia (Electronic resource). – Access mode: <http://www.sci.aha.ru/biodiv/>
4. Electronic journal BioDat "Nature of Russia" at: <http://www.biodat.ru/doc/lib/index.htm>
5. Fundamental electronic library "Flora and fauna" (plants, animals, fungi and algae, theory of evolution and taxonomy). Access mode: <http://herba.msu.ru/shipunov/school/sch-ru.htm> many textbooks and good popular science books, Red Books in PDF or DjVu format
6. Free electronic biological library. Access mode: <http://zoomet.ru/> - a good selection of books on zoology and paleontology; books on botany and plant guides in the "Habitat" section
7. Information and reference and search systems
8. Official website of the RUDN library: <http://lib.rudn.ru/>
9. Official website of the scientific library of Moscow State University: <http://www.nbmgu.ru/http://elibrary.ru/>
10. Web-Atlas: "Environment and health of the population of Russia" with access mode <http://www.sci.aha.ru/ATL/ra00.htm> . Chapter 2. The nature of Russia and the natural factors of life support for the population.
  - RUDN ELS and third-party ELS, to which university students have access on the basis of concluded agreements:
  - RUDN Electronic Library System - RUDN EBS <http://lib.rudn.ru/MegaPro/Web>
  - ELS "University Library Online" <http://www.biblioclub.ru>
  - EBS Yurayt <http://www.biblio-online.ru>
  - ELS "Student Consultant" [www.studentlibrary.ru](http://www.studentlibrary.ru)
  - EBS "Lan" <http://e.lanbook.com/>
  - EBS "Troitsky Bridge"
11. Databases and search engines:
12. - electronic fund of legal and normative-technical documentation <http://docs.cntd.ru/>
13. - Yandex search engine <https://www.yandex.ru/>
14. - Google search engine <https://www.google.ru/>
15. - abstract database SCOPUS <http://www.elsevierscience.ru/products/scopus/>

### **Educational and methodological materials for independent work of students in the development of the discipline/module:**

1. A course of lectures on the discipline "Biodiversity".



## 2. Laboratory workshop on the discipline "Biodiversity"

All educational and methodological materials for independent work of students are placed in accordance with the current procedure on the page of the discipline in TUIS.

## **8. ASSESSMENT AND EVALUATION TOOLKIT AND SCORE-RATING SYSTEM FOR ASSESSING THE LEVEL OF FORMATION OF COMPETENCES IN THE DISCIPLINE**

Evaluation materials and a point-rating system for assessing the level of competencies (parts of competencies) based on the results of mastering the discipline "Biodiversity" are presented in the Appendix to this Work Program of the discipline.

\* - OM and BRS are formed on the basis of the requirements of the relevant local normative act of RUDN University (regulations / procedure).

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*Institute of Environmental Engineering*

**ASSESSMENT AND EVALUATION TOOLKIT  
FOR ACADEMIC DISCIPLINE  
FUNDAMENTALS OF BIODIVERSITY**

**Graduate's Degree – MASTER**

**Moscow, 2022**

# 1. PASSPORT OF THE ASSESSMENT AND EVALUATION TOOLKIT

**Discipline:** Fundamentals of Biodiversity

Code of controlled competence or its part	Competences under evaluation and assessment tools	Controlled discipline topic	Assessment tools					TOPIC SCORE	SECTION SCORE
			Current control				Offset		
			Work in the classroom	Testing	Performing laboratory work	Report			
GPC-2 SPC-6	<b>Module 1</b> Introduction	Topic 1. Subject and object position in the system of sciences. History of development	1	1	2			4	<b>8</b>
		Topic 2. Basic concepts	1	1	2			4	
GPC-2 SPC-6	<b>Module 2.</b> Measurement and assessment of biological diversity	Topic 1. Levels and classification of biodiversity	1	1	5			7	<b>21</b>
		Topic 2. Alpha, beta, gamma and epsilon diversity	1	1	5			7	
		Topic 3. Main parameters of biological diversity - species richness, abundance, species composition	1	1	5			7	
GPC-2 PC-6	<b>Module 3.</b> Diversity of life forms of living organisms	Topic 1. Systems of life forms of plants K. Raunkier and I.G. Serebryakova	1	1	5			7	<b>14</b>

		Topic 2. Other approaches to the identification of life forms in plants. functional types. Life forms in animals	1	1	5			7	
GPC-2 SPC-6	<b>Module 4.</b> Anthropogenic impact on biological diversity	Topic 1. Biological diversity in urban areas	1	1		5		7	<b>14</b>
		Topic 2. Alien species and biological invasions	1	1		5		7	
GPC-2 SPC-6	<b>Module 5.</b> Biodiversity Conservation Strategy	Topic 1. Structural diversity of ecosystems and landscapes	1	1		5		7	<b>14</b>
		Topic 1. Structural diversity of ecosystems and landscapes	1	1		5		7	
<b>TOTAL: 100 points</b>			<b>11</b>	<b>11</b>	<b>29</b>	<b>20</b>	<b>29</b>	<b>71</b>	<b>71</b>

## VALUATION FUND

by discipline includes:

- Description of BRS and rating scale;
- List of competencies;
- a set of questions to prepare for the final certification;
- a set of tasks for the control work.

Point-rating system of assessment and characteristics of the assessment scale

Topic	Form of control of the level of development of the course syllabus			Topic scores
	Mid-Term Assessment and Evaluation Toolkit (test)	Performing laboratory work	Exam	
History, basic terms and concepts	2	4	4	10
Diversity of life forms of living organisms	2	8	4	14
genetic diversity. Population approach to biodiversity assessment	2	4	3	9
Species diversity, biodiversity of Russia	2	10	4	16
Structural diversity of ecosystems. Diversity of ecosystems and landscapes	2	8	2	12
Alien species and biological invasions. Factors affecting biological diversity	1	4	2	7
Biological diversity in urban areas	1	4	2	7
Measurement and assessment of biological diversity. Biodiversity Models	1	8	2	11
Biodiversity Monitoring	1	4	2	7
Biodiversity Conservation Strategy	1	4	2	7
History, basic terms and concepts	<b>15</b>	<b>58</b>	<b>27</b>	<b>100</b>
<b>TOTAL</b>		<b>100</b>		

The delivery of all laboratory work is a prerequisite for admission to the final certification in the discipline. The final assessment of laboratory work is carried out at the end of the discipline.

\*The final certification is considered successfully passed if the student has scored at least half of the required points. Without the final certification, a positive mark for the discipline is not given.

The maximum number of credits when studying a course is 3. At the same time, the following ratio is established between the number of points and the number of credits:

## Assessment & Grading System

Total points	Final grade	Number of credits
96–100	5	2
86–95	5 (B)	2
71–85	4 (C)	2
61–70	3+ (D)	1
51–60	3 (E)	1
21–51	2 (FX)	0
<21	2 (F)	0

### Marking criteria

The decoding of grades is also accepted according to the specified document:

- A: "Excellent" - the theoretical content of the course was mastered completely, without gaps, the necessary practical skills for working with the mastered material were formed, all the training tasks provided for by the training program were completed, the quality of their implementation was estimated by a number of points close to the maximum.
- B: "Very good" - the theoretical content of the course is mastered completely, without gaps, the necessary practical skills for working with the mastered material are basically formed, all the training tasks provided for by the training program are completed, the quality of most of them is estimated by a number of points close to the maximum.
- C: "Good" - the theoretical content of the course is mastered completely, without gaps, some practical skills in working with the mastered material are not sufficiently formed, all the training tasks provided for by the training program are completed, the quality of none of them is rated with a minimum number of points, some types of tasks are completed with mistakes.
- D: "Satisfactory" - the theoretical content of the course has been partially mastered. but the gaps are not significant, the necessary practical skills for working with the mastered material are basically formed, most of the training tasks provided for by the training program have been completed, some of the completed tasks may contain errors.
- E: "Mediocre" - the theoretical content of the course is partially mastered, some practical work skills are not formed, many training tasks provided for by the training program are not completed, or the quality of some of them is estimated by a number of points close to the minimum.
- FX: "Conditionally unsatisfactory" - the theoretical content of the course has been partially mastered, the necessary practical skills have not been formed, most of the training tasks provided for by the training program have not been completed, or the quality of their performance has been assessed with a number of points close to the minimum; with additional independent work on the course material, it is possible to improve the quality of the implementation of educational tasks.
- F: "Definitely unsatisfactory" - the theoretical content of the course has not been mastered, the necessary practical skills have not been formed, all the completed training tasks contain gross errors, additional independent work on the course material will not lead to any significant improvement in the quality of the training tasks.

### *List of competencies and stages of their formation*

No	Competencies	Stages of
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		<b>formationя</b>
GPC-2	Possession of basic knowledge of the fundamental sections of physics, chemistry and biology in the amount necessary for the development of physical, chemical and biological foundations in ecology and nature management; possession of methods of chemical analysis, knowledge of modern dynamic processes in nature and the technosphere, the state of the Earth's geospheres, ecology and evolution of the biosphere, global environmental problems, as well as methods for selecting and analyzing geological and biological samples; possession of the skills of identification and description of biological diversity, its assessment by modern methods of quantitative information processing	Topic 1–10
SPC-6	Able to organize activities for natural resource management, environmental protection and biodiversity conservation, environmental control and monitoring	Topic 1–10

***Description of indicators and criteria for assessing competencies at various stages of their formation, description of assessment scales***

<b>Topic, professional competencies</b>	<b>Evaluation criteria</b>	<b>Evaluation scale</b>
<b>Topic 1–10</b>	<p>The ability to independently characterize the fundamentals of biodiversity theory.</p> <p>The ability to independently identify and describe the main forms and levels of biodiversity, to evaluate them.</p> <p>Ability to independently use methods for determining biodiversity.</p> <p>Ability to independently describe the main ways of monitoring biodiversity.</p> <p>Ability to characterize the main ways of biodiversity conservation and evaluate their effectiveness.</p>	<p>The ability to independently characterize the fundamentals of biodiversity theory.</p> <p>The ability to independently identify and describe the main forms and levels of biodiversity, to evaluate them.</p> <p>Ability to independently use methods for determining biodiversity.</p> <p>Ability to independently describe the main ways of monitoring biodiversity.</p> <p>Ability to characterize the main ways of biodiversity conservation and evaluate their effectiveness.</p>

Standard control tasks or other materials necessary to assess knowledge, skills and (or) experience of activity that characterize the stages of the formation of competencies in the process of mastering the educational program.

**Questions to prepare for certification**

1. What is Biodiversity? Who first used this term?
2. What levels of biodiversity do you know?
3. What factors contribute to the increase and decrease in species diversity?

4. What factors contribute to the increase and decrease in genetic diversity?
5. What factors contribute to the increase and decrease in ecosystem diversity?
6. How are biodiversity and ecosystem resilience related.
7. Give examples of the decrease in species diversity due to anthropogenic activities.
8. Modern ideas about the number of species in the main kingdoms, departments (types) and classes of living beings.
9. What geographic factors determine the distribution of biological diversity? How.
10. Community age and biodiversity.
11. Changes in biological diversity during succession.
12. What is alpha, beta, gamma and epsilon diversity.
13. How to determine in the field the main parameters of biological diversity - species richness, abundance, species composition?
14. What is a "life form"?
15. What approaches do you know for isolating life forms in plants?
16. Biological diversity in urban areas and industrial areas.
17. . Flora and vegetation of cities. The role of aboriginal and adventive components in the formation of urban floras. Opportunities for the conservation of biological diversity in urban environments.
18. Alien species and biological invasions. Impact of introduction and unintentional introduction on biodiversity change. The concepts of "alien species", "common species", "aggressive introducers".
19. Give examples of alien plant species characteristic of Central Russia. What factors contributed to the spread of these species?
20. Give examples of alien species of vertebrates typical for Central Russia. What factors contributed to the spread of the species?
21. Give examples of alien species of plants, vertebrates and invertebrates, fungi, microorganisms, typical for Central Russia. What factors contributed to the spread of the species?
22. Give examples of alien species and invertebrates characteristic of Central Russia. What factors contributed to the spread of the species?
23. Give examples of alien species of fungi and microorganisms characteristic of Central Russia. What factors contributed to the spread of the species?
24. Try to formulate what properties successful invasive species should have. Support your opinion with examples.
25. Differences in the cenotic significance of species.
26. What population strategies of species do you know? Which group of species is more numerous?
27. What is a cenopopulation?
28. Periodization of ontogeny and diagnoses of plant age conditions.
29. What types of populations are usually distinguished by the ratio of age groups.
30. Monitoring of populations. Population viability analysis.
31. Is it possible to assess the successional state of a plant community based on the characteristics of populations of dominant species? How?
32. The role of the soil seed bank in maintaining biological diversity.
33. Structural diversity of plant communities and its assessment.
34. What is floristic fullness. Can you give an example of an absolutely complete phytocenosis?
35. Methods for assessing the species and structural diversity of plant communities. Structural diversity of biocenoses.
36. Diversity of ecosystems and landscapes. Assessment of landscape diversity.
37. Methods for collecting and analyzing geobotanical and demographic data.
38. Use of biochemical, morphological, population and ecosystem methods in the monitoring of biological diversity.



39. Cartographic method in the study of biodiversity: mapping of species and cenotic diversity.
40. General understanding of national and international measures for the conservation of biological diversity. Main regulatory documents.

### **Examples of final assessment questions**

1. The concept of "biological diversity" and the history of its occurrence.
2. Levels of biodiversity.
3. Biodiversity and sustainability of ecosystems. Mechanisms for maintaining diversity.
4. Causes of biodiversity change (direct human impact, climate change, habitat destruction, pollution, invasive species, diseases, Species diversity.
5. Modern ideas about the number of species in the main kingdoms, divisions (types) and classes of living beings.
6. Factors that determine the diversity of ecosystems.
7. Geographical aspects of the distribution of biological diversity. Biodiversity and climate.
8. Levels and classification of biodiversity. Alpha, beta, gamma and epsilon diversity. The main parameters of biological diversity are species richness, abundance, species composition.
9. Life forms of animals and plants in the assessment of biological diversity. The concept of "life form".
10. Systems of plant life forms K. Raunkier and I.G. Serebryakova. Other approaches to the isolation of life forms in plants. functional types. Life forms in animals.
11. Biological diversity in urban areas and industrial areas. Impact of the urban environment on ecosystems.
12. . Flora and vegetation of cities. The role of aboriginal and adventive components in the formation of urban floras. Opportunities for the conservation of biological diversity in urban environments.
13. Alien species and biological invasions. Impact of introduction and unintentional introduction on biodiversity change. The concepts of "alien species", "common species", "aggressive introducers".
14. Differences in the cenotic significance of species.
15. Population strategies of species.
16. Cenopopulations. Periodization of ontogeny and diagnoses of plant age conditions. Types of populations according to the ratio of age groups.
17. Monitoring of populations. Population viability analysis. Evaluation of the successional state of the plant community according to the characteristics of the populations of dominant species.
18. The role of the soil seed bank in maintaining biological diversity.
19. Structural diversity of plant communities and its assessment. Floristic completeness. Methods for assessing the species and structural diversity of plant communities. Structural diversity of biocenoses.
20. Diversity of ecosystems and landscapes. Assessment of landscape diversity.
21. Methods for collecting and analyzing geobotanical and demographic data. Indicators of biological diversity.
22. Use of biochemical, morphological, population and ecosystem methods in the monitoring of biological diversity. Cartographic method in the study of biodiversity: mapping of species and coenotic diversity.
23. General understanding of national and international measures for the conservation of biological diversity. Main regulatory documents.

**Methodological materials that define the procedures for assessing knowledge, skills, performance skills that characterize the stages of competency formation).**

The assessment of knowledge, skills and abilities is carried out using the components of the FOS presented in paragraphs. 12.1–12.4, in accordance with the sequence of acquisition of competencies indicated in Table. clause 12.3.

Test tasks in the "Mentor" program are inserted into the GIA and TEIS

The program was compiled in accordance with the requirements of OS HE RUDN University/FGOS HE.