Федеральное государственное автономное образовательное учреждение высшего образования
«Российский университет дружбы народов имени Патриса Лумумбы»

Institute of Environmental Engineering

COURSE SYLLABUS

Sustainable development / Устойчивое развитие

Recommended by the Didactic Council for the Education Field for the specialization:

05.03.06" Экология и природопользование"

The course instruction is implemented within the professional education programme of higher education:

Экология и природопользование

2023

Электронная версия документа

1. COURSE GOAL(s)

The course is designed to help students to formate a methodological basis for sustainable development, aimed at systematic change in traditional forms of nature management and people's lifestyle to ensure the sustainability of the biosphere and the development of society.

- ## 2. REQUIREMENTS FOR COURSE OUTCOMES

The course implementation is aimed at the development of the following competences:

Competence code	Competence descriptor	Competence formation indicators (within this course)
GC-6	Able to organize activities for natural resource management, environmental protection and biodiversity conservation, environmental control and monitoring	**GC-6.1** Know the basics of environmental monitoring, natural resource management and sustainable development
		GC-6.2 To be able to carry out a forecast of technogenic impact, analysis of particular and general problems of the use of natural conditions and resources
		Possess the skills of organizing field and office work, developing practical recommendations for environmental management

As a result of course studying, the student must:
Know:
- theoretical foundations of sustainable development and circular economy;
- mechanisms and principles of the circular economy;
- regulatory framework in the field of "green" economy and sustainable development;

Be able to:
- develop a strategy for the sustainable development in the region;
- calculate indices and indicators of sustainable development;
- analyze the rating of the region in the context of sustainable development;

Own :
- skills in working with indices and indicators;
- skills of working with different methods of sustainable development assessment .

3. COURSE IN HIGHER EDUCATION PROGRAMME STRUCTURE

Discipline ***Sustainable Development / Устойчивое развитие*** refers to the Optional Disciplines/Electives (block 3 of the curriculum).

Within the higher education programme students also master other disciplines (modules) and / or internships that contribute to the achievement of the expected learning outcomes as results of the course.

Table 3.1

List of Higher Education Program (me) components / disciplines that contribute to expected learning/training outcomes

Competence code	Competence descriptor	Previous courses/modules, internships*	Subsequent courses/modules, internships*

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		Environmental Culture: Genesis and Modern Issues	Environmental Ethics
GC-6	Able to determine and implement the priorities of their own activities and ways to improve it based on self-assessment	Environmental Culture: Genesis and Modern Issues Fundamentals of Environmental Science Applied Ecology Humanitarian Ecology	Environmental Ethics Research work in the term including projects / Industrial / pedagogical practice Research work on thesis State Exam degree Diploma

4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

The total workload of the discipline is **4** credit units.

Table 4.1. Types of academic activities during the period of the HE program(me) mastering

Types of academic activities		Total hours	Semestre(s)			
					7	
Contact academic hours						
Lectures		17			17	
Lab works						
Seminars (workshops/tutorials)		17			17	
Self-study		*22*			*22*	
Evaluation and assessment (exam; pass/fail grading)		*16*			*16*	
The total course workload	hours	**72**			**72**	
	credits	**2**			**2**	

5. COURSE CONTENT
Table 5.1. Course Modules and Contents

	Title of Course Modules	Content	Types of academic activities
1.	The history of the concept of "sustainable development" and the formation of its modern concept	Global problems of mankind	L, S
		Environmental ethics	
2	Global models and international agreements in the field of environment and development	Biodiversity	L, S
3	Scenarios for sustainable development	Features of the transition of the Russian Federation to SD	L, S
4	Fundamentals of the theory of system stability.	Resource capacity	L, S
5	The concept of SD. Socio-economic problems of sustainable development	SD definition, SD components, SD provisions	L, S
	Indices and indicators of sustainable development	HDI calculation	L, S
		Demographics	

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Title of Course Modules		Content	Types of academic activities
	The concept of accumulated OS damage	Reports on objects	L, S
	Technologies for elimination of accumulated OS damage	Calculation of elimination of accumulated damage	
	Ecosystem services. Approaches to economic evaluation	Calculation of forest ecosystem services	L, S
		City Capacity Calculation	
	Carbon footprint. Calculation methods at the level of a person, enterprise, city, country	Calculation of the US of a person, calculation of the company's RS	L, S

6. CLASSROOM EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

Table 6.1. Classroom equipment and technology support requirements

Classroom for Academic Activity Type	Classroom equipment	Specialized educational / laboratory equipment, software and materials for mastering the course (if necessary)
Lecture	Classroom, equipped with a set of specialized furniture; whiteboard; a set of devices includes portable multimedia projector, laptop, projection screen, stable wireless	No
Seminars	Classroom, equipped with a set of specialized furniture; whiteboard; a set of devices includes portable multimedia projector, laptop, projection screen, stable wireless	
Computer Lab	Computer Lab for conducting classes, group and individual consultations, current control and intermediate certification, equipped with personal computers (in the amount of 12), a board (screen) and technical devices of multimedia presentations.	No
For Self-Study	Classroom for self-study (can be used for seminars and consultations), equipped with a set of devices includes laptop, stable wireless.	No

7. RECOMMENDED SOURCES FOR COURSE STUDIES

a) **Main reading:**
1. Gorbunov S.S. Sustainable development: Materials for the lecture course / S.S.Gorbunov. - M., 2014. - ISBN 978-5-00077-072-6.
   URL: https://lib.rudn.ru/MegaPro/UserEntry?Action=Link_FindDoc&id=447493&idb=0
2. Sopilko N. Yu. Theoretical Foundations of the Economics of Sustainable Development [Text / electronic resource]: Textbook / N. Yu. Sopilko , A.F. Orlova, S.M. Lissitskaya. - Electronic text data. - M.: Publishing House of RUDN University, 2017. - 165 p.: ill. - ISBN 978-5-209-07861-6 : 219.48. Library of RUDN University.

Электронная версия документа

3. Kharlamova M.D. Modern Technologies of Waste Managment, Recycling and Environmental Protection [Текст/электронный ресурс] = Modern methods of waste management, recycling and environmental protection: Study Guide / M.D. Kharlamova, A.I. Kurbatova. - Electronic text data. - M. : Publishing House of RUDN University, 2017. - 98 p. : ill. - ISBN 978-5-209-07889-0Sustainable Development Goals https://www.undp.org/sustainable-development-goals
4. Alan Weisman The World Without Us 324 pages Published July 10th 2007 by Thomas Dunne Books

b) **Additional reading**

5. Muslim M.A., Prasojo E., Salomo R.V. Leadership and Collaborative Governance in Transition Era from Millennium Development Goals to Sustainable Development Goals: A Systematic Mapping Study // Bulletin of the Peoples' Friendship University of Russia. Series: State and municipal administration. 2022. T. 9. No 2. C. 172–188. https://doi.org/10.22363/2312-8313-2022-9-2-172-188
6. Nyaranga M.S., Hao Ch., Hongo D.O. The Role of Public Participation in Governance towards Achieving Sustainable Development. Part 1 // Bulletin of the Peoples' Friendship University of Russia. Series: State and municipal administration. 2021. T. 8. No 4. C. 395–404. DOI: 10.22363/2312-8313-2021-8-4-395-404
7. Gómez-Baggethun, E. and D.N. Barton 2013 Classifying and valuing ecosystem services for urban planning. 2013. Ecological Economics 86: 235—245
8. Morel J.L., C. Chenu, K. Lorenz. 2014. Ecosystem services provided by soils of urban, industrial, traffic, mining, and military areas (SUITMAs). Journal of Soil and Sediments (article in press)

Internet-based sources

1. ELS of RUDN University 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
    - EBS "Lan" http://e.lanbook.com/
    - EBS "Trinity Bridge"

2. Databases and search engines:
    - electronic fund of legal and normative-technical documentation http://docs.cntd.ru/
    - Yandex search engine https:// www .yandex.ru/
    - Google search engine https://www.google.ru/
    - abstract database SCOPUS http:// www .elsevierscience.ru/ products / scopus /

8. MID-TERM ASSESSMENT AND EVALUATION TOOLKIT

Evaluation materials and a point- rating system* for assessing the level of competence formation (part of competences) based on the results of mastering the discipline **Sustainable Development in the Context of Environmental Culture** are presented in the Appendix to this Work Program of the discipline.

DEVELOPER:

Senior Lecturer of the EE
Department   **Kapralova D.O.**
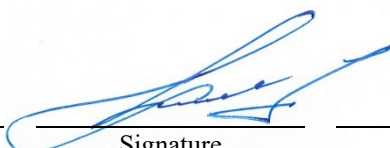
Электронная версия документа

Position	Signature	Name, Surname

HEAD OF DEPARTMENT:

Director of EE Department		**Kucher D.E.**
Position	Signature	Name, Surname

HEAD OF PROGRAMME:

Position	Signature	Name, Surname

Электронная версия документа

Department _____

APPROVED
Department meeting protocol No_____,
Dated _____
day, month, year
Head of Educational Department
_____(name and surname)
signature

ASSESSMENT TOOLKIT

for the course

Sustainable Development in the Context of Environmental Culture
course title

05.04.06 "Ecology and nature management"
field of studies / speciality code and title

44.04.02 Психолого-педагогическое образование
Environmental Pedagogy / Экологическая педагогика (англ.)
higher education programme profile/specialisation title

Master
graduate's qualification (degree)

Электронная версия документа

Passport to Assessment Toolkit for Course Sustainable Development in the Context of Environmental Culture

Field of Studies / Speciality 05.03.06 " Экология и природопользование"

code   title

Экология и природопользование

Competences (competences in part) under assessment	Course module under assessment	Course topic under assessment	Tools to assess higher education programme mastering level								Points for topic	Points for module
			Class work				Self-studies					
			Lection (questions)	Test	Seminar	Report	Homework	Research essay/ Library research paper	Calculation and graphic work	Exam/Pass-fail assessment		
	Module 1: The history of the concept of "sustainable development" and the formation of its modern concept	Topic 1: Global problems of mankind	3		2						2	2
		Topic 2: Environmental ethics	1		1						2	2
	Module 2: Global models and international agreements in the field of environment and development	Topic 1:Biodiversity	1		1		1	1			4	4
	Module 3: Scenarios for sustainable development	Topic 1: Features of the transition of the Russian Federation to SD	1		1						2	2

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Module	Topic									
Module 4. Fundamentals of the theory of system stability.	Topic 1 Resource capacity	1	1				5		7	7
Module 5/ The concept of SD. Socio-economic problems of sustainable development	SD definition,	1	1						2	2
	SD components,									
	SD provisions									
Module 6. Indices and indicators of sustainable development	HDI calculation	1	1			1			3	10
	Demographics	1	1				5		7	
Module 7. The concept of accumulated OS damage Technologies for elimination of accumulated OS damage	Reports on objects			10					10	18
	Calculation of elimination of accumulated damage	1	1		1		5		8	
Module 8. Ecosystem services. Approaches to economic evaluation	Calculation of forest ecosystem services	1	1			2	5		9	16
	City Capacity Calculation	1	1				5		7	
Module 9 Carbon footprint. Calculation methods at the level of a person, enterprise, city, country	Calculation of the footprint of a person, calculation of the company's EF	1	1						2	2

Sustainable Development in the Context of Environmental

An approximate list of test questions for the discipline "Sustainable Development":

1. UN approach to sustainable development.
2. The main signs of highlighting global problems. Modern global problems.
3. Reports of the Club of Rome.
4. Strategy for sustainable development. Principles of sustainable economic development.
5. New ideas as a necessary condition for sustainable development.
6. Technologies for sustainable development
7. Modern ideas about the innovative development of the economy.
8. Multidimensional approach to innovation.
9. Criteria for selecting indicators of sustainable development.
10. Classification of approaches to the development of indicators of sustainable development.
11. Systems of indicators.
12. System "Millennium Development Goals" of the UN.
13. Indicators of the economy based on knowledge.
14. Systems of indicators of environmentally sustainable development.
15. Integrated indicators of environmentally sustainable development.
16. Human development index for Russian regions.
17. Green HDI and state of the environment index.
18. Criticism of the idea of sustainable development.
19. The concept of ecosystem services
20. The concept of "ecological footprint" and its calculation.
21. The concept of "assessment of the life cycle"
22. Kyoto Protocol, quotas
23. The concept of "accumulated damage to the OS"
24. Environmental ethics
25. The demographic problem is at the heart of the global problems of mankind. The aging of civilizations. demographic capacity.
26. Biodiversity, adventivization, naturalization
27. Resource availability

Example of test questions

1. Sustainability:
- Economic attitude to the environment and natural ecosystems (nature management), which allows you to keep them within the economic capacity.
- A process that meets the needs of the present, but does not deprive future generations of the opportunity to meet their needs.
- Development of the main way and methods of adaptation to global changes
2. The goal of the sustainable development strategy is:
- Regulation of the number of living organisms
- Regulation of the rate of nature management
- Development of the main way and methods of adaptation to global changes
3. The buffer capacity of an ecosystem is understood as
- The amount of pollutants that the ecosystem can "accept" and which will not lead to negative consequences
- The ratio between the magnitude of the deviation of the system from the normal state and the magnitude of the impact
- Impact on the environment, which does not affect its quality

4. The Silent Spring book influenced:
- prohibition of DDT
- creation of the concept of sustainable development
- Creation of the Ramsar Convention

The interpretation of grades to the course

- **A: "Excellent"** - the theoretical content of the course has been mastered completely, without gaps, the necessary practical skills for working with the mastered material have been formed, all the training tasks provided for by the training program have been completed, the quality of their implementation has been 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 has been mastered completely, without gaps, some practical skills in working with the mastered material have not been sufficiently formed, all the training tasks provided for by the training program have been completed, the quality of none of them has been assessed with a minimum number of points, some types of tasks have been 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 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.

Academic ethics, respect for copyright.

At the first lesson, students are informed about the need to comply with the norms of academic ethics and copyrights in the course of training. When preparing a report with a presentation, when using citations and borrowed illustrations, it is necessary to indicate the source of the borrowing.

The prepared report should be presented at one of the classes in agreement with the teacher. The use of PowerPoint presentations is mandatory. Estimated presentation time is up to 10 minutes. The structure of the report and additional requirements for the quality of materials are determined by the chosen topic

Tentative list of assessment tools

п/п	Assessment tool	Brief features	Assessment tool representation in the kit
		Class work	
1	Survey/Quiz	A tool of control, organised as a special conversation between a teacher and students on topics related to the course under study, and designed to clarify the amount of students' knowledge in a particular section, topic, problem, etc.	Questions on the course topics /modules
2	Test	A system of standardised tasks that allows the teacher to automate the procedure for measuring the student's level of knowledge and skills	Tests bank
3.	Colloquium	A tool for monitoring the acquisition and mastering of educational material on a topic, section or sections of a discipline, organised as a training session in the form of an interview among the teacher and students.	Questions on the course topics /modules
4	Control work	A tool of control organised as a classroom lesson, at which students need to independently demonstrate the acquisition and mastering of the educational material of the course topic, section, or sections.	Questions on the course topics /modules
5	Lab work	The system of practice tasks aimed at the students' practical skills formation	Practice tasks bank
6.	Round table, discussion, polemic, dispute, debate, (class work)	Evaluation tools that allow the teacher to engage students in the process of discussing controversial issues, problems and assess their ability to argue their own point of view.	List of themes for round tables, discussions, polemics, disputes, debates.
7	Business game and/or role play	Joint activities of a student group under the teacher's control to solve educational and professionally oriented tasks through the simulation of a real-world problem; this activity allows the teacher to assess the students' ability to analyse and solve typical professional challenges.	Topic (problem), concept, roles and expected results for each game
8.	Essay	A tool that allows the teacher to assess the student's ability to express in writing the essence of the under study, to independently analyse this issue using the concepts and analytical tools of the relevant discipline, to draw conclusions that summarise his/her position on the issue under consideration.	Themes for essays
9.	Presentation (defence) of project/report/ Library research paper /briefs *	A tool for monitoring the students' ability to present the work results to the audience.	Themes for projects/reports/ Library research paper/ briefs

10	Pass/Fail assessment	A tool for checking the quality of students' performance of laboratory work, acquisition and mastering of the practice training and seminar educational material, successful completion of the advanced field internship and pre-graduate internship and fulfillment of all training assignments in the course of these internships in accordance with the approved programme.	Tasks examples
11	Exam	The evaluation of the student's work during the semester (year, the entire period of study, etc.); it is designed to identify the level, soundness and systematic nature of theoretical and practical knowledge gained by the student, formation of independent work skills, development of creative thinking, ability to synthesise the acquired knowledge and apply it to solve practice tasks.	Examples of tasks/questions/exam question cards
12	Internship and research and development (R&D) report	A form of written work that allows the student to generalise his/her knowledge, skills and abilities acquired during the introductory and advanced field internships, scientific and industrial internships and R&D activities.	
13	Case	A problem-solving task in which the student is asked to comprehend the real work-related (occupational) situation necessary to solve the problem.	Assignments to solve the case
14	Multi-level tasks and assignments with varying difficulty	The tasks and assignments differ in terms of the following levels: a) reproductive level allows the teacher to evaluate and diagnose the students' knowledge of factual material (basic concepts, algorithms, facts) and the students' ability to correctly use special terms and concepts, recognize objects of study within a certain section of the discipline, b) reconstructive level allows the teacher to evaluate and diagnose the students' abilities to synthesise, analyse, generalise factual and theoretical material and formulate specific conclusions, establish cause-and-effect relationships, c) creative level allows to evaluate and diagnose students' skills to integrate knowledge of various fields, argue their own point of view.	Set of multi-level tasks and assignments with varying difficulty
		Self- studies	
1	Calculation and graphic work	A tool for checking students' skills in applying the acquired knowledge according to a predetermined methodology in task	Set of tasks for calculation and graphic work

		solving or fulfilling assignments for a module or discipline as a whole.	
2	Course work/project	A type of independent written work aimed at the creative development of general professional and specialised professional disciplines (modules) and the development of relevant professional competences	Course assignment themes
3	Project	The final "product" that results from planning and performance of educational and research tasks set; it allows the teacher to assess the students' ability to independently shape their knowledge in the course of solving practice tasks and problems, navigate in the information environment and the students' level of analytical, research skills, skills of practical and creative thinking; it can be implemented individually or by a group of students.	Themes for team-based or individual projects
4	Research essay (Library research paper)	The student's independent work in writing that summarises the results of the theoretical analysis of a certain scientific (educational and research) topic, where the author reveals the essence of the problem under study, considers different points of view, as well as argues his/her views on the material under consideration.	Themes for research essay (library research papers)
5	Reports, briefs	The product of the student's independent work, which is a public performance on the presentation of the results of solving a specific educational, practical, research or scientific topic.	Themes for reports, briefs
6	Essay and other creative assignments	A partially regulated assignment that has a non-standard solution and allows the teacher to diagnose students' skills in integrating knowledge from various fields and arguing their own point of view; it can be prepared individually or by a group of students.	Themes for team-based or individual creative assignments
7	Standard calculations	A tool to test skills in applying the acquired knowledge, according to a predetermined methodology, solving tasks or fulfilling assignments for a module or discipline as a whole.	Set of tasks for standard calculations
8	Homework	The tasks and assignments differ in terms of the following levels: a) reproductive level allows the teacher to evaluate and diagnose the students' knowledge of factual material (basic concepts, algorithms, facts) and the students' ability to correctly use special terms and concepts, recognize objects of study within a certain section of the discipline,	Set of multi-level tasks and assignments with varying difficulty

		b) reconstructive level allows the teacher to evaluate and diagnose the students' abilities to synthesise, analyse, generalise factual and theoretical material and formulate specific conclusions, establish cause-and-effect relationships, c) creative level allows the teacher to evaluate and diagnose students' skills to integrate knowledge of various fields, argue their own point of view.	

Examples of practical task

T1 Calculate the HDI for Western Europe. The average life expectancy of people is 77 years; percentage of educated - 99; the percentage of those receiving education - 81; GDP per capita - $23,840 (log of GDP -4.38).

T1 DEMOGRAPHIC CAPACITY OF THE DEVELOPMENT AREA Purpose: to determine its demographic capacity in the development area to maintain ecological balance.

1. Demographic capacity, people, according to the availability of territories suitable for industrial and civil construction

2. Capacity of the territory, people, by surface water

3. Territory capacity, people, for groundwater

4. Capacity of the territory, people, according to the conditions for organizing recreation in the forest

5. Capacity of the territory, people, according to the conditions for organizing recreation near the water

6. Capacity of the territory, people, according to the conditions for organizing a suburban agricultural base

The obtained calculated values of the D1...D6 values must be presented in the form of a histogram, compared with each other, and the smallest value should be taken as the final indicator of the demographic capacity of the development area.

Level of fulfillment of criteria in assessing students' knowledge

	level of performance of the indicator (completed assessment task)	level scale	
		traditional	quality
	meet the requirements (criteria), no comments	excellent (5)	high (A, B)
	meet the requirements (criteria), there are comments that do not require elimination	good (4)	medium (C)
	do not fully meet the requirements (criteria), there are comments	satisfactory (3)	threshold (D)
	do not meet the requirements (criteria), has significant errors and comments, needs to be corrected	unsatisfactory (2)	insufficient (E)
	not completed or missing		no result (F)