

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

Экологический факультет

Рекомендовано МСЧН

РАБОЧАЯ ПРОГРАММА ДИСЦИПЛИНЫ

Наименование дисциплины

PHILOSOPHICAL PROBLEMS OF NATURAL SCIENCE

Рекомендуется для направления подготовки/специальности

05.04.06 Экология и природопользование

Направленность программы (профиль)

Economics of natural resources management

1. Цели и задачи дисциплины:

Целью изучения дисциплины «PHILOSOPHICAL PROBLEMS OF NATURAL SCIENCE» является изучение естествознания во временном развитии актуальных философских проблем, оснований современной науки, имеющих первостепенное значение для формирования у магистров способности к теоретическому, методологическому, абстрактному научному мышлению, а также знакомство с философскими аспектами естественных наук.

Задачами дисциплины являются:

- выделение основных этапов и закономерностей развития науки (естествознания);
- рассмотрение философских аспектов естествознания;
- раскрытие истории науки как сложного взаимодействия аккумуляции научных знаний и смен парадигм, определение форм и типов научных революций;
- анализ факторов развития естествознания;
- демаркация науки от псевдонауки, паранауки и лженауки;
- формирование способности применения философских идей и принципов в будущей профессиональной деятельности.

2. Место дисциплины в структуре ОП ВО:

Дисциплина *PHILOSOPHICAL PROBLEMS OF NATURAL SCIENCE* относится к дисциплинам базовой части блока 1 учебного плана.

В таблице № 1 приведены предшествующие и последующие дисциплины, направленные на формирование компетенций дисциплины в соответствии с матрицей компетенций ОП ВО.

Таблица № 1

Предшествующие и последующие дисциплины, направленные на формирование компетенций

№ п/п	Шифр и наименование компетенции	Предшествующие дисциплины	Последующие дисциплины (группы дисциплин)
Общекультурные компетенции			
1	способностью к абстрактному мышлению, анализу, синтезу ОК-1	Философия	
2	готовностью действовать в нестандартных ситуациях, нести социальную и этическую ответственность за принятые решения ОК-2	Философия	
3	готовностью к саморазвитию, самореализации, использованию творческого потенциала ОК-3	Философия	
Общепрофессиональные компетенции			
Профессиональные компетенции (вид профессиональной деятельности _____)			
Профессионально-специализированные компетенции специализации _____			

3. Требования к результатам освоения дисциплины:

Процесс изучения дисциплины направлен на формирование следующих компетенций:

ОК-1 способность к абстрактному мышлению, анализу, синтезу;

ОПК-1 владение знаниями о философских концепциях естествознания и основах методологии научного познания при изучении различных уровней организации материи, пространства и времени.

ОПК-8 готовностью к самостоятельной научно-исследовательской работе и работе в научном коллективе, способностью порождать новые идеи (креативность).

ПК-1 способностью формулировать проблемы, задачи и методы научного исследования

В результате изучения дисциплины студент должен:

Знать:

Основные научные школы, направления, концепции, источники знания; методы и приемы научного исследования; методологические теории и принципы современной науки; методологию научных исследований; современные концепции философии естествознания и техники; проблемы единства науки как феномена культуры; природу научного познания, его типы и уровни; взаимосвязь репродуктивной и творческой деятельности в научном познании; социокультурные и индивидуальные начала научного творчества; взаимосвязь интуитивного, неосознанного и сознательного в научном творчестве, социальные и психологические мотивы научного творчества; проблемы нравственной оценки научного творчества; биоэтику; интегративные тенденции современного познания

Уметь:

Осуществлять методологическое обоснование научного исследования; пользоваться научной, справочной и методической литературой; формировать и аргументировано отстаивать собственную позицию по различным проблемам философии науки и естествознания; использовать положения и категории философии для оценивания и анализа различных социальных тенденций, фактов и явлений, связанных с современным развитием естествознания и техники.

Владеть:

Навыками историко-методологического анализа научного исследования и его результатов; всеми видами научного общения; приёмами ведения дискуссии и полемики, навыками публичной речи и письменного аргументированного изложения собственной точки зрения.

4. Объем дисциплины и виды учебной работы

Общая трудоемкость дисциплины составляет **2** зачетных единиц.

Вид учебной работы	Всего часов	Семестры			
		1	2	3	4
Аудиторные занятия (всего)	34		34		
В том числе:	-	-	-	-	-
<i>Лекции</i>	17		17		
<i>Практические занятия (ПЗ)</i>	17		17		
<i>Семинары (С)</i>					
<i>Тестирование (Т)</i>					
Самостоятельная работа (всего)	38		38		
Общая трудоемкость	час	72	72		
	зач. ед.	2	2		

5. Содержание дисциплины

5.1. Содержание разделов дисциплины

1. Science in the system of modern culture.

The place of science in the cultural system. Natural science as a branch of scientific knowledge. The concept of the relationship between philosophy and natural science. The mechanism and forms of the relationship between modern natural science and philosophy. Science, pseudoscience and parascience. Natural science and morality. Change of value orientations and the

problem of humanization of science. The role of science and natural science knowledge in solving global problems of modern civilization.

2. Specificity of scientific knowledge, its structure and dynamics.

Scientific knowledge as a complex developing system. Empirical and theoretical levels, their structure. The ratio of empirical and theoretical in science. Theoretical models and laws. The method of hypotheses in the construction of theories. The structure of scientific explanation. Subject, object, subject of knowledge. Driving forces of cognition. The problem of truth in scientific knowledge. Truth as a mode of existence of knowledge. Evolution of the concepts of understanding the truth and its criteria. Science is classical, non-classical, post-non-classical.

3. Genesis and evolution of the natural-scientific picture of the world.

The concept and functions of the scientific picture of the world. Concept of scientific revolutions (T. Kuhn) and scientific research programs (I. Lakatos). The concept of a paradigm, a research program. The main types of scientific revolutions and the change of pictures of the world (mechanical, electromagnetic, quantum-relational, synergetic). Ontological and epistemological significance of the theory of relativity by A. Einstein.

4. The problem of the unity of the world: a synthesis of philosophical and natural science approaches.

The problem of the unity of the world in philosophical ontology. Ontology as a search for commonality between specific objects of different spheres of life. Differences between ontological and physical pictures of the world. Evolution of the concepts of matter, motion, space and time in philosophy and natural science.

5. Specificity of the implementation of the principles of evolution, consistency, determinism and self-organization in modern natural science.

Systems ideas in philosophy and natural science. The concept of natural science objects as systems (simple, complex, self-regulating and complex self-organizing). The problem of penetration of evolutionary ideas into natural science. The principle of causality from Democritus to the present day. Causality and the birth of new knowledge. Synergetics and global evolutionism as the foundations of modern natural science.

6. The problem of the emergence of life and the diversity of its forms. Determination of the place and role of man in the "nature-society-man" system.

The role of philosophical reflection in the development of life sciences. The concept of "life" in natural science and philosophical discourses. A variety of approaches to defining the phenomenon of life. VI Vernadsky about "living matter" ("living matter"). The doctrine of the biosphere and noosphere.

5.2. Разделы дисциплин и виды занятий

№ п/п	Наименование раздела дисциплины	Лекц.	Практ. зан.	Лаб. зан.	Семин	СРС	Всего час.
1.	Science in the system of modern culture.	4	4			8	16
2.	Specificity of scientific knowledge, its structure and dynamics..	4	2			8	16
3.	Genesis and evolution of the natural-scientific picture of the world..	2	4			5	9
4.	The problem of the unity of the world: a synthesis of philosophical and natural science approaches.	2	2			5	9

5.	Specificity of the implementation of the principles of evolution, consistency, determinism and self-organization in modern natural science	2	2			5	9
6.	The problem of the emergence of life and the diversity of its forms. Determination of the place and role of man in the "nature-society-man" system.	3	3			7	13

6. Лабораторный практикум

Не предусмотрен

7. Практические занятия (семинары) (при наличии)

№ п/п	№ раздела дисциплины	Тематика практических занятий (семинаров)	Трудоемкость (час.)
1.	1.	The place of science in the cultural system. Natural science as a branch of scientific knowledge. The concept of the relationship between philosophy and natural science. The mechanism and forms of the relationship between modern natural science and philosophy. Science, pseudoscience and parascience.	2
2.	1.	Natural science and morality. Change of value orientations and the problem of humanization of science. The role of science and natural science knowledge in solving global problems of modern civilization.	2
3.	2.	Scientific knowledge as a complex developing system. Empirical and theoretical levels, their structure. The ratio of empirical and theoretical in science. Theoretical models and laws. The method of hypotheses in the construction of theories. The structure of scientific explanation.	2
4.	2.	Subject, object, subject of knowledge. Driving forces of cognition. The problem of truth in scientific knowledge. Truth as a mode of existence of knowledge. Evolution of the concepts of understanding the truth and its criteria. Science classical, non-classical, post-non-classical	2
5.	3.	The concept and functions of the scientific picture of the world. The concept of scientific revolutions (Т. Kuhn) and research programs (I. Lakatos). The concept of a paradigm, a research program. The main types of scientific revolutions and the change of pictures of the world (mechanical, electromagnetic, quantum-relational, synergetic). Ontological and epistemological significance of the theory of relativity by A. Einstein.	2
6.	4.	The problem of the unity of the world in philosophical ontology. Ontology as a search for commonality between specific objects of different spheres of life. Differences between ontological and physical pictures of the world. Evolution of the concepts of matter, motion, space and time in philosophy and natural science.	2
7.	5.	Systemic ideas in philosophy and natural science. The concept of natural science objects as systems (simple, complex, self-regulating and complex self-organizing). The problem of penetration of evolutionary ideas into natural science. The principle of causality	2

		from Democritus to the present day. Causality and the birth of new knowledge. Synergetics and global evolutionism as the foundations of modern natural science.	
8.	6.	The role of philosophical reflection in the development of life sciences. The concept of "life" in natural science and philosophical discourses. A variety of approaches to defining the phenomenon of life. VI Vernadsky about "living matter" ("living matter"). The doctrine of the biosphere and noosphere.	3

8. Материально-техническое обеспечение дисциплины:

Мультимедийная аудитория, компьютер, проектор

9. Информационное обеспечение дисциплины

а) базы данных, информационно-справочные и поисковые системы:

Учебный портал РУДН.

Библиотека Елены Косиловой <http://www.elenakosilova.narod.ru/uhref.html>

Философский портал <http://philosophy.ru>

Педагогическая библиотека <http://www.bim-bad.ru/biblioteka/index.php>

Электронные журналы на платформе www.elibrary.ru

Электронные ресурсы <http://Lib/rudn.ru>

10. Учебно-методическое обеспечение дисциплины:

(указывается наличие печатных и электронных образовательных и информационных ресурсов)

а) основная литература

1) Nikolaeva E., Khazieva N. History and philosophy of science: common problems: textbook for Masters, graduate students and applicants. Kazan: Publ. House of Kazan University, 2017. 224 p. URL:

https://kpfu.ru/staff_files/F812164186/HISTORY_AND_PHILOSOPHY_OF_SCIENCE_COMMON_PROBLEMS.pdf

2. Шибаршина С.В. Философские проблемы естествознания: Учебное пособие. – Нижний Новгород: Нижегородский госуниверситет, 2015. – 54 с. – URL: http://www.unn.ru/books/met_files/mppofNS.pdf

11. Методические указания для обучающихся по освоению дисциплины (модуля)

Methodological instructions for the implementation of various types of classroom work of students

The presentations are part of a seminar in which most of the class time is devoted to joint collective mastering and discussion of philosophical problems. Participants in the discussion learn to accurately express and argue their own point of view, hear, understand and respect the opinion of their opponent. It is important to be able not only to defend your position, but also to admit that you are wrong if it is convincingly proven by others. The presenter has a choice: to do 1) a traditional oral presentation or 2) a presentation with an electronic presentation. The time limit for the presentation of the report is up to 10 minutes.

The time spent on preparing a message depends on the complexity of the question. Estimated time for preparation of the report - 4 hours.

Messages are a small addition to the issues discussed in the seminars. The student presents the materials prepared by him in the classroom, taking part in a discussion on a particular issue. The information message must meet the following requirements: it sets out theoretical approaches to the issue under consideration, provides an analysis of principles, laws, concepts and categories; theoretical positions are supported by facts, examples, presentation must be reasoned. The purpose of this presentation is to prepare students for independent analysis of educational and scientific literature and develop their experience of independent thinking on the problems of the course. Questions for preparing an information message are contained in the plans of seminars on the discipline and other methodological literature or are offered by the teacher after studying the relevant topic of the course. Time limit for reporting - up to 5 minutes.

The time spent on preparing a message depends on the complexity of the question. The approximate time for preparing an information message is 1 hour.

Speeches during the discussion of the topic of the seminar are an obligatory element of the students' work.

Reports with electronic presentations. Presentation, according to the explanatory dictionary of the Russian language D.N. Ushakova: "... a way of presenting information, in which there are drawings, photographs, animation and sound." To prepare a presentation, it is recommended to use: PowerPoint, MS Word, Acrobat Reader, LaTeX beamer package. The easiest presentation software is Microsoft PowerPoint. To prepare a presentation, you need to collect and process the initial information.

The sequence of preparation of the presentation:

1. Clearly formulate the purpose of the presentation: you want your audience to motivate, convince, infect with some idea or just formally report.
2. Determine what the presentation format will be: live presentation (then how long it will be) or e-mail (what will be the context of the presentation).
3. Select all the content for the presentation and build a logical presentation chain.
4. Identify the key points in the content of the text and highlight them.
5. Determine the types of visualization (pictures) to display them on slides in accordance with the logic, purpose and specifics of the material.
6. Choose the design and format the slides (the number of pictures and text, their location, color and size).
7. Check the visual perception of the presentation.

Time limit for a report with an electronic presentation - 10-15 minutes.

The time spent on preparing the material depends on the complexity of the topic chosen. Estimated preparation time - 6 hours.

Methodical instructions for the organization and implementation of independent work of students

An abstract is a short written presentation of the content of a scientific work (works), books, articles, formatted accordingly. This is a summary of the content of scientific articles, books. Preparation of an essay is an independent work of students to master a particular topic of a philosophy course, and ends with the delivery of an essay to the teacher.

The choice of the topic of the abstract is important: the topic should be of professional interest, relate to the issues discussed in modern literature. The abstract is written on the basis of the study of a number of monographic publications, articles placed in periodicals.

The list of proposed topics for writing abstracts can be found in the plans of seminars in the discipline, in the methodological literature or on the department's website. The student has the right

to propose the topic of the essay himself, in this case it requires coordination of its wording with the teacher.

The time spent on preparing the material depends on the complexity of the topic chosen. Estimated preparation time - 4 hours, maximum number of points - 5.

A synopsis is one of the varieties of secondary documents of a factual series, a short record of the main content of the text using abstracts. Outline writing teaches you to work on a topic, thinking it over comprehensively, analyzing different points of view on the same issue.

There are two types of note-taking:

- note-taking of written texts (documentary sources, normative documents, articles placed in specialized periodicals);
- note taking of oral messages (eg lectures). The synopsis can be short or detailed.

It should be clarified that the verbatim recording of both written and spoken speech does not apply to note taking. The success of the outline depends on the ability to structure the material. It is important not only to learn how to highlight the basic concepts, but also to outline the connections between them.

The abstract should begin with an indication of the output of the source. If we are talking about a scientific article published in specialized periodicals, then you should indicate the name of the author, the title of the article, the name of the journal, as well as the year and number of this periodical. The summary report is provided in writing. In addition, the student summarizes the main points and conclusions in the classroom. The time limit for oral communication at seminars is 3-4 minutes. The teacher reviews the provided notes.

The laboriousness of a brief note-taking of normative documents on the topics of the course is 2 hours; note-taking of a scientific article in specialized journals - 4 hours.

An essay is a small written work on a topic proposed by a teacher (a topic can also be suggested by a student, but must be agreed with the teacher). The purpose of the essay is to develop the skills of independent creative thinking and the written presentation of one's own thoughts. Writing an essay is extremely useful, because it allows the author to learn how to clearly and competently formulate thoughts, structure information, use the main categories of analysis, highlight cause-and-effect relationships, illustrate concepts with relevant examples, and argue their conclusions; master the scientific style of speech. The essay should include a clear, clearly expressed understanding by the author of the problem considered in the essay and the author's personal attitude to the problem (s).

The essay should contain the author's reasoned position on the main issues discussed in the essay based on his own experience, the experience of other people, and the facts of public life. It is necessary to use the categorical and conceptual apparatus of philosophy. The final paragraphs summarize the essay.

The complexity of this type of independent work depends on the complexity of the chosen topic, the general training of the student in the discipline being studied. Estimated preparation time - 4 hours.

An essay can be presented at a practical lesson, at a competition of student papers, scientific conferences.

12. Фонд оценочных средств для проведения промежуточной аттестации обучающихся по дисциплине (модулю)

The assessment of all the results of the development of competencies is carried out in accordance with the scale of the international point-rating system ECTS. In accordance with the calculated grading system (* see the passport of the FOS), the student gains the necessary points.

Work in class: max 1 point. The mark is given for the presence and active work at a seminar or at a lecture (lectures are held in an interactive form) - answers to current questions, notes, discussion.

Self-preparation for the lesson: max 2 points for each topic. The topic is prepared, there is a presentation, calculation results, the student freely answers the questions - 2 points; the student is present at the lesson, participates in the discussion, but finds it difficult to answer the questions - 1 point. The student is absent or the assignment is not prepared - 0 points

Midterm and final certification:

The assessment is made as a percentage of the total number of checked tasks, with the subsequent conversion of percentages into points in accordance with the approved BRS. For example, a student answered correctly 10 test questions out of 15, therefore, he scored 67%. The maximum score for the midterm certification is 9, multiplying 0.67 by 9, we get 6 points. This point is set in the general statement and is added to the rest of the points. A student is considered to have successfully passed the midterm or final certification if the sum of points for all types of activities at the time of certification exceeds 50% of the maximum possible score.

The final grade for the semester is the sum of the points for all the student's activities (* see the passport of the FOS) and can reach a maximum of 86 points, that is, the lower limit of the grade "excellent", category B.

The final exam is surrendered by a student voluntarily, if he scored the minimum possible score for certification - 51 points. In other cases, the exam is mandatory and is estimated at a maximum of 14 points, as a result, the total score is derived taking into account the result of passing the exam and the final grade corresponds to the international ECTS scale. If a student scores less than 7 points on the exam, then the exam is considered not passed and the student can take it again (re-exam).

13. Фонд оценочных средств для проведения промежуточной аттестации обучающихся по дисциплине

Код контролируемой компетенции или компетенции	Контролируемый раздел дисциплины	Контролируемая тема дисциплины	ФОСы (формы контроля уровня освоения ООП)													Экзамен/Зачет	Баллы темы	Баллы раздела	
			Аудиторная работа							Самостоятельная работа									
			Опрос	Тест	Коллоквиум	Контрольная работа	Выполнение ЛР	Работа на занятии	Выполнение ЛЗ	Реферат	Выполнение РГР	Выполнение КР/КП
OK-1 ОПК-1	Раздел 1: Science in the system of modern culture.	Topic 1 Place of science in the cultural system.						2				4						6	12
		Topic 2: Science and morality						2				4						6	
OK-1 ОПК-1	Section 2: Specificity of scientific knowledge, its structure and dynamics.	Topic 1 Scientific knowledge as a complex developing system.						2				4						6	20
		Topic 2 Subject, object, subject of knowledge. The problem of truth in scientific knowledge.						2				4						6	
		Topic 3 Science classical, non-classical, post-non-classical.			2								6					8	
OK-1 ОПК-1	Section 3: Genesis and Evolution of the Natural Science Picture of the World.	Topic 1 The concept and functions of the scientific picture of the world.						2				4						6	22
		Topic 2: The concept of scientific revolutions (T. Kuhn) and research programs (I. Lakatos).				5						5						10	
		Topic 3: The main types of scientific revolutions and the change of pictures of the world.						2				4						6	
OK-1 ОПК-1	Section 4: The problem of the unity of the world:	Topic 1 The problem of the unity of the world in						2				4						6	12

	a synthesis of philosophical and natural science approaches.	philosophical ontology.																				
		Topic 2: Differences between ontological and physical pictures of the world.					2			4										6		
OK-1 ОПІК-1	Section 5: The specifics of the implementation of the principles of evolution, consistency, determinism and self-organization in modern natural science.	Topic 1 System Ideas in Philosophy and Natural Science.					2			4										6	18	
		Topic 2: The problem of the penetration of evolutionary ideas into natural science.					2			4										6		
		Topic 3 The principle of causality from Democritus to the present day. Causality and the birth of new knowledge.					2			4										6		
OK-1 ОПІК-1	Section 6: The problem of the emergence of life and the diversity of its forms. Determination of the place and role of man in the "nature-society-man" system.	Topic 1 The concept of "life" in natural science and philosophical discourses.					2			4										6	16	
		Topic 2: VI Vernadsky about "living matter" ("living matter"). The doctrine of the biosphere and noosphere.	4								6									10		
		TOTAL:																			100	100

ВОПРОСЫ К ЗАЧЕТУ ПО ДИСЦИПЛИНЕ «ФИЛОСОФСКИЕ ПРОБЛЕМЫ ЕСТЕСТВОЗНАНИЯ»

1. Предмет, задачи и особенности философии науки как сферы познания. Роль философии науки в системе научного знания и культуры.
2. Особенности научного познания Проблемы развития науки. Динамика научного знания.
3. Структура и динамика научного знания. Основания науки. Эмпирический и теоретический уровни научного исследования.
4. Мироззренческий аспект научного познания. Философский смысл картины мира.
5. Понятие научной картины мира (НКМ). Роль науки в процессе формирования НКМ.
6. Исторические типы НКМ: классическая, неклассическая и постнеклассическая.
7. Проблема единства мира в философской онтологии. Отличия онтологической и естественнонаучной картин мира.
8. Эволюция понятий материя, движение, пространство и время в философии и естествознании.
9. «Парадигма» Т.Куна и «научно-исследовательская программа» И.Лакатоса как надтеоретические образования.
10. Современная физика и развитие релятивистской научной картины мира. Теория относительности Эйнштейна.
11. Дискуссии по проблемам причинности от Д.Юма до К.Поппера.
12. Глобальные проблемы современной цивилизации и проблема ценности научно-технического прогресса.
13. Синергетика как синтез системного и эволюционного подходов.
14. Учение В.И. Вернадского о биосфере и ноосфере, экологические проблемы в научном творчестве русского ученого.
15. Определение места и роли человека в системе «природа-общество-человек»

ТЕМЫ ДЛЯ ТВОРЧЕСКИХ ЗАДАНИЙ (ЭССЕ)

1. Наука и мировоззрение, наука и ценностные убеждения, наука и политическая идеология.
2. Проблема ответственности учёного за внедрение результатов научных исследований.
3. Наука как способ самореализации и самоутверждения человека.
4. Научно-техническая политика и проблема управления научно-техническим прогрессом общества.
5. Социокультурные проблемы передачи технологии и внедрения инноваций.
6. Проблема комплексной оценки социальных, экономических,

- экологических и других последствий техники.
7. Этика ученого и социальная ответственность.
 8. Научная, техническая и хозяйственная этика и проблемы охраны окружающей среды.
 9. Проблемы гуманизации и экологизации современной техники.
 10. Проблема этической ответственности ученого в трудах ученых и философов

Программа составлена в соответствии с требованиями ОС ВО РУДН/ФГОС ВО.

Разработчики:

**Старший
преподаватель**

кафедры онтологии и
теории познания



подпись,

О.Г. Арапов