

	MINISTRY OF EDUCATION AND SCIENCE OF RUSSIA FSBEI HE "Chelyabinsk State University"
Faculty of Eurasia and East Department of Philosophy	
Work program of course (module) 2.1.1.1. " History and philosophy of science " Work program of the course (module) 2.1.2.2. "Differential Equations in Linear Topological Spaces" Scientific specialty – 1.1.2. Differential equations and mathematical physics Direction - Differential equations and mathematical physics	



APPROVED

Vice-rector for Scientific Affairs

A.I. Biryukov

« 24 » 02 2025

WORKING PROGRAM OF THE COURSE (MODULE)*

2.1.1.1. " History and Philosophy of Science "

Scientific specialty – 1.1.2. Differential equations and mathematical physics

Direction - Differential equations and mathematical physics

Higher education – training of highly qualified personnel

Mode of study: Full-time

Chelyabinsk, 2025

* The work program of the course (module) is adapted for inclusive education of disabled people and people with disabilities



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Department of Philosophy

Work program of course (module) 2.1.1.1. "History and philosophy of science"

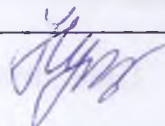
Work program of the course (module) 2.1.2.2. "Differential Equations in Linear Topological Spaces"

Scientific specialty – 1.1.2. Differential equations and mathematical physics

Direction - Differential equations and mathematical physics

The program for the course "History and Philosophy of Science" is compiled in accordance with the passport of the scientific specialty 1.1.2. Differential Equations and Mathematical Physics and federal state requirements (level of education: higher education - training of highly qualified personnel), approved by order of the Ministry of Science and Higher Education of the Russian Federation dated October 20, 2021 No. 951

Program developers:

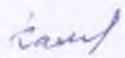
Doctor of Philosophy, Professor  A.B. Nevelev
Doctor of Philosophy, Associate Professor  N.L.
Khudyakova

The program was approved at the meeting of the Department of Philosophy on 29.01.2025,
Protocol No. 6.

The program was adopted at a meeting of the Academic Council of the Faculty of Eurasia and the East dated 19.02.2025, protocol No. 8.

APPROVED

Dean of the Faculty of Eurasia and the East V.G. Budykina 

Head Department of Philosophy A.Ya. Kamaletdinova 

Head of the Postgraduate Department
and doctoral studies N.V. Bochkareva 

Head of the Department of
International Cooperation
N.R. Arnaudova 



Program summary: The course «History and Philosophy of Science» is related to the programs for preparation for candidate examinations. The course of this course studies general problems of philosophy of science and modern philosophical problems of individual areas of scientific knowledge. The course consists of lectures and independent work. On the history of science, an approximate list of topics for preparing an essay is offered. The program is focused on the analysis of the main ideological and methodological problems of the modern stage of scientific development.

1. Objectives and tasks of mastering the course.

Objectives of the course:

1.1. The course «History and Philosophy of Science» is designed to help acquire the skills and knowledge necessary for carrying out research work, including completing a candidate's dissertation.

1.2. The program aims to examine science in a broad socio-cultural context. Particular attention is paid to the problems of changing scientific worldviews, types of scientific rationality, and value systems that scientists are guided by.

Course tasks:

- To develop competencies that underlie the development of the ability to apply acquired knowledge, skills and abilities in scientific and pedagogical work in their specialty.
- To enhance the philosophical culture necessary for a correct understanding of the meaning and significance of one's research activities.
- To reveal the content of the main modern philosophical images of science.
- To master the basic concepts of the philosophy of science, and the skills of oral and written presentation of problems of the philosophy of science.

2. The place of the course in the structure of the educational program

The course «History and Philosophy of Science» is mandatory. The course is taught in the first year (1st, 2nd semesters). The total workload of the course, including midterm assessment, is 2 credits/72 hours, of which contact work with the teacher is 1 credits/24 hours (lectures - 24 hours), Self-study – 1 credits/12 hours, control - 0.03 credits/1 hour.

To master the course, the student must have basic humanitarian training and skills in using modern computing tools. The student must have analytical skills and



also master the basic concepts of philosophical science.

The course "History and Philosophy of Science" is designed to help postgraduate students acquire the skills and knowledge necessary to prepare for the candidate's exam, carry out research work, including completing a candidate's dissertation.

Requirements for the "entry" knowledge, skills and experience of the student, necessary when studying the course

Know	Be able to	Possess
basic methods of scientific research activities	identify and systematize the main ideas in scientific texts; critically evaluate any incoming information regardless of the source; avoid automatic application of standard formulas and techniques when solving problems	skills in collecting, processing, analyzing and systematizing information on the research topic; skills in selecting methods and means for solving research problems
the main directions, problems, theories and methods of philosophy, the content of modern philosophical discussions on the problems of social development.	to form and argue one's own position on various problems of philosophy; to use the provisions and categories of philosophy to evaluate and analyze various social trends, facts and phenomena.	skills in perceiving and analyzing texts with philosophical content, techniques for conducting discussions and polemics, skills in public speaking and written, reasoned presentation of one's own point of view.
methods of critical analysis and evaluation of modern scientific achievements, methods of generating new ideas in solving research and practical	analyze alternative solutions to research and practical problems and evaluate potential gains/losses of implementing these options	skills in analyzing the main ideological and methodological problems, including those of an interdisciplinary nature, arising in science at the current stage of its development, and mastering the technologies of planning



problems, including in interdisciplinary areas, methods of scientific research activities		professional activities in the field of scientific research
Basic ethical standards of professional activity	apply ethical standards in professional activities	skills in determining ethical standards
possible areas and directions of professional self-realization; methods and technologies of goal setting and goal realization; ways of achieving higher levels of professional and personal development	identify and formulate problems of one's own development, based on the stages of professional growth and the labor market requirements for a specialist; formulate goals of professional and personal development, assess one's capabilities, the realism and adequacy of the planned methods and ways of achieving the planned goals	methods of goal setting, planning, implementation of necessary types of activities, assessment and self-assessment of the results of activities to solve professional problems; methods of identifying and realizing one's capabilities, personal and professionally significant qualities with the aim of improving them
main sources of scientific information and requirements for the presentation of information materials	independently formulate scientific issues of structural and institutional direction, organize and conduct scientific research, scientific and production activities	skills in researching promising areas of development in sociology

3. Requirements for the results of mastering the content of the course



Learning outcomes for the course	
know	basic concepts of the philosophy of science,
	traditional and modern problems of philosophy of science,
	methods of formation and verification of scientific knowledge,
	the main modern concepts of the philosophy of science.
be able to	conduct a critical analysis of texts on the philosophy of science,
	to classify and systematize the directions of the philosophy of science,
	present educational material on the philosophy of science in a consistent and well-reasoned manner;
Posses	methods of logical analysis of the material being studied;
	skills of public speaking, argumentation, discussion and debate;
	the ability to use theoretical principles of the philosophy of science in one's work;
	by the method of analyzing philosophical and scientific texts.

4. Structure and content of the course

4.1 Structure of the course

Type of work	Semester				Total
	1	2	3	4	
Total workload, academic hours	36	72			108
Contact work :	24	12			36
Lectures, academic hours	24	12			36
Practical (seminars), academic hours					
Laboratory work, academic hours					
Self-study, academic hours	12	52			64
Control		8			8
Self-study, academic hours		exam			

Вид работы	Семестр				Всего
	1	2	3	4	
Общая трудоёмкость, акад. часов	36	72			108
Контактная работа:	24	12			36
Лекции, акад. часов	24	12			36
Практические (семинары), акад. часов					
Лабораторные работы, акад. часов					
Самостоятельная работа, акад. часов	12	52			64

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Контроль		8			8
Вид контроля (зачёт, экзамен)		канд. ЭКЗ.			

№	Section name	Number of hours						Form of current control
		Total	Contact work				Self-study	
			Lectures	Practical cheskie, Semina fish	Lab. works	Control e		
1	Part 1. "General Problems of the Philosophy of Science"	37	24				13	Report
2	Part 2. "Modern philosophical problems of areas of scientific knowledge"	19	6				13	Report
2.1	Section 2.1. Philosophical Problems of Natural Sciences	19	6				13	Report
2.2	Section 2.2. Philosophical Problems of Mathematics	13	-				13	Report
	Part 3. History of Science (History of Mathematics according to scientific specialty)	12	-				12	Report
	Control	8				8		
	Total:	108	36			8	64	

4.2. Contents of course sections



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No	Section name	Section Contents
	Part 1. "General Problems of the Philosophy of Science"	
	Section 1. Formation of science as a socio-cultural phenomenon	The subject and main problems of the philosophy of science. Philosophical synthetic images of science: the classical (standard) image of science . Non-classical (non-standard) image of science. Science as a socio-cultural phenomenon: science and rationality; science as a social institution. General concept of the history of science and its main stages . Dynamics of science and its main philosophical models: cumulativist and paradismal models of the dynamics of science. Positivist version of the dynamics of science: critical rationalism (K. Popper) and the concept of research programs (I. Lakatos). Positivist version of the dynamics of science: concepts of microrevolutions (S. Toulmin) and methodological anarchism (P. Feyerabend). Continental philosophy of science: neo-Kantian (Rickert-Windelband, Cohen, Cassirer) and phenomenological (Husserl) versions. Domestic philosophy of science: Marxist version, science in the noospheric concept of Vernadsky. The evolution of science in the 19th-21st centuries as a change in types of scientific rationality.
	Section 2. The problem of the foundations of science.	Gnoseological foundations of science: Knowledge as an idealized form (relationship). Knowledge as part of goal-setting. Goal and product of activity. Product and result. Objectivity of the delta result. Delta result as ignorance. Ignorance as an incentive to cognition. Subject and objectivity of knowledge. Objective layers of being. Active capacity of man. Spirit in the process of cognition. Cognition as a hermeneutic circle. General foundations of science: Scientific picture of the world, its role and place in modern philosophy of science. Historical forms of the scientific picture of the world and their features. Inductive-empirical model of constructing scientific knowledge: its origin, development, main advantages and disadvantages. Functions of the scientific picture of the world and its ideological significance.



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Direction - Differential equations and mathematical physics

	Section 3. Science as an activity for the production of scientific knowledge	Scientific knowledge as a purposeful activity: general characteristics. Scientific knowledge as a product of scientific knowledge. Method as a means of scientific knowledge. Scientific activity as production. The main functions of science as a way of securing the main purposes of scientific knowledge. Empirical level of scientific knowledge: rational forms of empirical knowledge, methods of empirical knowledge. Theoretical level of scientific knowledge: theoretical forms of scientific knowledge, methods of theoretical knowledge. Interrelation and interdependence of theoretical and empirical levels of knowledge. Formation of methodology (method) of scientific research. Problem as a starting point of scientific research. Hypothesis and its place in the search for a solution to the problem of scientific research. Theory as a form of systematization of scientific knowledge: general characteristics and typology, structure. Main methods of testing scientific theories . Verification and falsification as methods of testing scientific theories.
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	Part 2. "Modern philosophical problems of areas of scientific knowledge"	
	Section 2.1. Philosophical Problems of Natural Sciences	The relationship between philosophy and natural sciences and its reflection in the course "Philosophical Problems of Natural Science". Natural sciences in culture and in the system of sciences. The connection of natural sciences as a reflection of the unity and diversity of the world. Methodological foundations of natural sciences.
	Section 2.2. Philosophical Problems of Mathematics	1. The nature of objects of "pure" mathematics. 2. The method of idealization in mathematics Basic methods of mathematical abstraction The problem of truth in mathematics Intuition in mathematics. Axiomatic method in mathematics . The Infinity Problem in Mathematics The existence problem in mathematics The main directions of the justification of mathematics
	Part 3. History of Science (History of Mathematics in accordance with	

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	scientific specialty)
	The postgraduate student chooses the topic of the abstract independently and agrees with the academic supervisor. It is recommended to link the topic of the abstract with the scientific specialty and scientific problem that forms the basis of the dissertation research.

Part 1. "General Problems of the Philosophy of Science"

Section 1. Formation of science as a socio-cultural phenomenon.

- 1. The subject and main problems of the philosophy of science**
- 2. General concept of philosophy. Status of philosophy of science. Main problems of philosophy of science**
- 3. Philosophical synthetic images of science .** Classical (standard) image of science . Non-classical (non-standard) image of science
- 4. Science as a sociocultural phenomenon**
Science as a form of rationality . Scientism as a concept of the cultural value of rational science . Anti-scientism as a denial of the cultural value of rational science. Science as a social institution.
- 5. The main stages of the history of science**
General concept of the history of science . Primitive culture and science. Ancient Greek-language science. Arabic science. Science of the period of formation of Western European civilization. Science of the New Age.
- 6. Dynamics of science and its main philosophical models.**
General concept of the dynamics of science. Cumulativistic model of the dynamics of science
Dynamics of science in the paradigmatic concept of the structure of scientific revolutions by T. Kuhn: concepts of paradigm, normal science, scientific revolution. The problem of progress in science and the prospects of scientific knowledge.
The positivist version of the development of science, the general characteristics of its modifications in the philosophy of post-positivism: critical rationalism (K. Popper) and the concept of research programs (I. Lakatos); the concepts of micro-revolutions (S. Toulmin) and methodological anarchism (P. Feyerabend).
Continental philosophy of science: neo-Kantian (Rickert-Windelband, Cohen, Cassirer) and phenomenological (Husserl) variants.



Domestic philosophy of science: Marxist version, science in the noospheric concept of Vernadsky.

7. The evolution of science in the 19th-21st centuries as a change in types of scientific rationality.

Classical science, its prerequisites, content, main stages. Non-classical science, its origin, content, development paths.

Formation of a new type of scientific rationality - post-non-classical science: the importance of philosophy in understanding and overcoming the crisis tendencies of modernity; the need to form a new type of scientific rationality as a condition for the further productive development of universal human civilization.

Section 2. The problem of the foundations of science.

2.1. Epistemological foundations of science

8. Knowledge as an idealized form (relationship).

Form and its metamorphosis: form in a thing, form in action, form in thought. Abstract and concrete content of the relationship. Relationship as an elementary form of external and internal feelings, thinking.

9. Knowledge as part of goal setting. Goal and product of activity.

Knowledge: objectivity of content and subjectivity of form. Value: objectivity of form and subjectivity of content. Value and knowledge in the structure of goal setting. Means, object and product as stages of goal objectification. Goal as an idealized product, product concept.

10. Product and result. Objectivity of the delta result.

Objectification and deobjectification in the process of activity and cognition. Idealization and materialization of attitude as knowledge. Living and materialized activity. Product as a realized goal.

11. Delta result as ignorance. Ignorance as an incentive to learn.

Result and product. Objective (not intended in the goal) content of the result. Subjective (intended in the goal) content of the result. The difference between the result and the product (delta result) as a statement, detection of ignorance and motivation for knowledge. Delta result as the basis of scientific knowledge.

12. Subject and objectivity of knowledge. Object layers of being.

Subject – an object marked by a means. The structure of the means as the basis for structuring the world (the subject of knowledge). Subject layers of being and the subjectivity of knowledge. Instrumental, symbolic, sign and extremely sign subjectivity of knowledge.



13. The active capacity (energy) of a person. The spirit in the process of cognition.

Objective certainty and active capacity. The energetic component of human existence. The inverse relationship between objectivity and energetics. The hierarchy of objectivities and the corresponding hierarchy of energetics of human existence. The spirit of knowledge.

14. Cognition as a hermeneutic circle.

Cognition as a movement of a person along a hermeneutic circle. Identity of the cognizing person with the spirit – emphasis on being as a whole. Identity of a person with the objective layers of being – emphasis on the parts of being. Cognition as a mutual interpretation of the whole and parts of the objective being of a person.

15. The main points of scientific knowledge as a purposeful activity.

Purposeful activity as a culturally mediated relationship: subject of scientific knowledge, object and subject of scientific knowledge; methods as cultural means used in organizing scientific knowledge; scientific knowledge as a product of scientific knowledge.

2.2. General foundations of science

16. The scientific picture of the world, its role and place in modern philosophy of science.

The concept of a scientific picture of the world. The main content of the scientific picture of the world: fundamental categories of sciences, principles and scientific laws. Philosophical and scientific picture of the world. Natural scientific picture of the world. Ontological foundations and methodological functions of the scientific picture of the world: ontological, systematizing, heuristic.

17. Historical forms of the scientific picture of the world and their features

General scientific and specific scientific pictures of the world. Contents of the natural philosophical picture of the world, the mechanical picture of the world, the electromagnetic and quantum-relativistic pictures of the world, their main categories, principles and laws. The influence of philosophy on the construction of the scientific picture of the world.

18. Inductive-empirical model of constructing scientific knowledge: its origin, development, main advantages and disadvantages.

Empiricism and rationalism; the relationship between the logical and intuitive components in the process of scientific knowledge. Empiricism, sensualism about experience as a source of reliable knowledge about the world. Forms of empiricism: a) descriptive; b) inductive-empirical approach, that discoveries in



science arise through inductive generalization (using inductive logic) of empirical facts, putting forward various alternative hypotheses and subsequent exclusion of those that do not correspond to the facts. Inductive-empirical research model (logical scheme of this model): 1. conducting research and generalizing its results; 2. formulating a statement about the relationship between the observed variables; 3. constructing a theoretical model within the framework of which a general pattern is formulated that describes the causal relationship between phenomena. Over time, the inductive-empirical approach to the development of scientific knowledge as mechanistic is replaced by a hypothetico-deductive one.

19. Functions of the scientific picture of the world and its ideological significance.

a) systematizing, allowing to organize and order scientific theories, concepts and principles (in accordance with the principle of simplicity) and facilitating the acquisition of new knowledge, and thereby the expansion and development of the scientific picture of the world. b) explanatory, which is aimed at clarifying the causes and conditions of existence of the objects under study. c) informative, consisting in the description of the structure of the material world, the processes occurring in nature, their causes. d) heuristic - is determined by the fact that knowledge of the objective laws of nature makes it possible to foresee the existence of objects not yet discovered by natural science, to predict their most essential features.

Section 3. Science as an activity for the production of scientific knowledge

20. Scientific knowledge as a purposeful activity: general characteristics

The main points of scientific knowledge as a purposeful activity: purposeful activity as a culturally mediated relationship; subject of scientific knowledge, object and subject of scientific knowledge; methods as cultural means used in organizing scientific knowledge; scientific knowledge as a product of scientific knowledge.

21. Scientific knowledge as a product of scientific cognition.

Scientific knowledge as a product of scientific research: Knowledge as a form of human mastery of the objective world: objective reality - activity - thought (knowledge). Objective forms of the world's existence for humans: material-concrete, material-abstract, mental-abstract, mental-concrete). Scientific knowledge as mental-abstract. Mental-concrete (philosophical knowledge) as a



means of organizing scientific knowledge. Criteria for the scientific nature of knowledge.

22.Method as a means of scientific knowledge.

Method as a means of scientific knowledge: operational and subject-content essence of the scientific research method.

The method of cognition as a cultural means of scientific and cognitive activity: mediation of the subject and object of cognition by the method; correlation of the method with the qualities of the product, object, subject and subject of scientific cognition. Correlation of the method of scientific cognition with the main objects of the world.

23.Scientific activity as production.

Characteristics of production as a process that includes several actions interconnected through the product (after the first act of production, its product is integrated into a new act of activity either in the form of a subject, or in the form of a means, or in the form of an object).

Definition of the goals of scientific activity through its consideration as an element of social production. Science as the production of scientific knowledge, the necessity of which is determined by its use as a cultural means or subject of further transformation.

Science as a social institution: production of scientific knowledge in the system of social production: the relationship between science and practice, science and education, etc.

24.The main functions of science as a way of consolidating the main purposes of scientific knowledge .

The main functions of science as a way of consolidating the main purposes of scientific knowledge (gnoseological (descriptive, explanatory, predictive (prognostic), cultural and ideological; the function of productive forces; function of social force).

25.Empirical level of scientific knowledge: rational forms of empirical knowledge, methods of empirical knowledge.

Empirical forms of scientific knowledge: (rational – empirical concept (general idea), scientific fact). Methods of empirical scientific knowledge (observation, experiment, measurement).

26.Theoretical level of scientific knowledge: theoretical forms of scientific knowledge, methods of theoretical knowledge.

Theoretical forms of scientific knowledge: theoretical concept, statement (judgment in the form of a problem, hypothesis, scientific explanation, law),



concept, theory). Methods of theoretical scientific knowledge (idealization, abstraction, analysis, synthesis, inference, modeling, formalization).

27. The relationship and interdependence of theoretical and empirical levels of knowledge.

General characteristics of the theoretical level of scientific knowledge and its relation to empirical knowledge. General characteristics of the empirical level of scientific knowledge. The role of empirical abstraction and idealization in the transition from empirical knowledge to theoretical knowledge.

28. Formation of the methodology (method) of scientific research.

The subject content of the method, determined at the level of the methodological approach, methodology, method. Formation of the research method (methodology): determination of the methodological approach and the principle of organizing knowledge, selection of the theory and determination of the system of principles expressing the conceptual basis of this theory, formulation of the rules (requirements) of organizing knowledge. Methodology as a procedure for the formation of a method, the subject content of which consists of several methodological approaches.

General scientific, interdisciplinary and specific scientific methods of cognition.

29. The problem as a starting point for scientific research.

Problem as a problem situation. Discovery of a problem in the life of a person and society. Problem situations in science. Transformation of particular tasks of scientific research into scientific problems.

Cognitive problem as a form of existence of knowledge about ignorance. Analysis of the degree of development of the cognitive problem. Application of methodological approaches in defining a scientific problem.

Scientific problem and problematic research question as a form of its expression. Research issues.

Formulation of the general problem of scientific research. Definition of the subject, object and theme of the research. Determination of the order of solving the problem (research logic) through the formulation of the goal, specific problems and tasks.

30. Hypothesis and its place in the search for a solution to a scientific research problem.

Hypothesis as a form of scientific knowledge: definition of the concept; requirements for a scientific hypothesis; types of hypotheses that differ in their functions in the cognitive process (descriptive, explanatory), and in the object of research (general and specific).



Hypothesis and theory: hypothetical propositions as part of a general theory; the difference between hypothesis and theory, hypothesis as a prototheory (hypothesis as a theory in potentiality); the role of the "protective belt" of hypotheses in the "combined" model of theory by I. Lakatos (1922-1974). Hypothesis in the structure of theory: the relation of logical consequence (implicative relation) of a hypothesis to other structural elements of the theory and testing of the hypothesis for truth; the relation of conjunctive compatibility of the added hypothesis with the structural elements of the theory itself and testing of the hypothesis for truth; the boundary of supplementing hypotheses to a theory.

Testing and substantiation of the hypothesis: the purpose of testing and substantiation of the hypothesis. Confirmation or refutation of the hypothesis. Heuristic potential for refutation. Empirical and theoretical substantiation of the hypothesis. Hypothesis as a method of scientific knowledge: the procedure for creating deductively organized systems of hypothetical positions of varying degrees of generality and plausibility.

31.Theory as a form of systematization of scientific knowledge: general characteristics and typology, structure.

The concept of "scientific theory". Scientific theory as an emerging form of scientific knowledge: Primary theoretical models and laws. Completed (developed) scientific theory.

Structure of scientific theory: categorical apparatus of the theory (key concepts that allow one to describe the subject area of the theory), concrete scientific methodology; theoretical (conceptual) models as an element of the internal organization of the theory, laws of science.

Methods of presenting theories: complementary methods of presenting theories: historical, heuristic, axiomatic. Presentation of a scientific theory as a hypothetical-deductive system.

Foundations of scientific theory: 1) the proper foundations of scientific theory; 2) the foundations of scientific theory in the form of premises: historical foundations, empirical foundations , philosophical foundations of scientific theory (ontological [in the broad philosophical sense of the word], epistemological, logical, sociological premises). Description, explanation, prediction as functions of scientific theory.

32.Basic methods for testing scientific theories.

Empirical and non-empirical testing of scientific theories. Stages of theory testing. Empirical methods of testing scientific theories: 1. Verification as a method of testing scientific theories. Disadvantages of verification as a



method. 2. Falsification as a method of testing a scientific theory. Difficulties in using the falsification method.

Part 2. "Modern philosophical problems of areas of scientific knowledge"

Section 2.1. Philosophical problems of natural sciences (optional part)

3. The relationship between philosophy and natural sciences and its reflection in the course "Philosophical Problems of Natural Science".

Subject of the philosophical course "Philosophical Problems of Natural Science". Philosophy and natural science in the modern world. The relationship between philosophy and natural sciences. Natural philosophy as the first historical form of influence of philosophy and scientific knowledge. Metaphysics of the New Age. Philosophical and natural scientific knowledge. General concept of the Natural Scientific picture of the world and its relationship with the pictures of the world of specific natural sciences.

4. Natural sciences in culture and in the system of sciences.

The place of natural sciences in culture. General classification of branches of natural science. The place of the main natural science areas (physical scientific knowledge, chemical scientific knowledge, scientific knowledge about living matter and life, cosmological scientific knowledge and geological scientific knowledge) in the system of sciences.

5. The connection between natural sciences as a reflection of the unity and diversity of the world.

Methodological foundations of natural sciences.

Physics as the foundation of natural science. Mathematization of physics. The problem of reductionism. Physicalization of chemistry. Irreducibility of biology to physics and chemistry.

Systemic, evolutionary and synergetic approaches in natural science. Methodological regulations of natural sciences: fundamental verifiability, maximum generality, predictive power, fundamental simplicity, systematicity, the principle of the "beauty" of theory. General scientific ideas about the world, about inanimate and animate nature.



Section 2.2. Philosophical problems of a special branch of science (optional part)

Philosophical problems of special sciences: mathematics

6. The nature of objects of "pure" mathematics

The philosophical aspect of the problem of the nature of objects of "pure" (not applied) mathematics. The relation of pure mathematics to reality. Number theory as the foundation of pure mathematics. The theory of natural numbers as the foundation of general number theory. The practical need to count objects as the source of the concept of natural number. The relation of natural numbers and operations with them to discretely organized and unchanging reality. Objects of mathematical knowledge as a world of abstract, idealized objects of knowledge that do not directly coincide in content with objects of the real world. The idealized nature of objects of mathematics.

7. The method of idealization in mathematics

The main methods of cognition that underlie idealization: analysis, abstraction, generalization. Mathematics as a science of abstractions: here is its method (abstraction) and subject (idealized object). The multi-level nature of idealization in mathematics. Types of idealization.

8. Basic methods of mathematical abstraction

Mathematics as a reflection of reality in the form of theoretical predicates that idealize reality. It is precisely such predicates that are considered as independent objects in mathematics. Abstractions of identification, isolating abstraction, and abstractions of feasibility as the most fundamental abstractions in mathematics. Abstraction of potential feasibility and abstraction of actual infinity in mathematics.

9. The problem of truth in mathematics

The concept of correspondent and coherent truth. The relationship between proof and truth in mathematics. The role of analogy and inductive generalizations in formulating mathematical truths. The place of unprovable propositions (axioms) in mathematical cognition. The essence of axioms. The role of physical interpretation in establishing the truth of mathematical statements and theories. The presence of subject language and metalanguage as a condition for the precise definition of coherent truth.

10. Intuition in mathematics.

Two meanings of the term "intuition". The concept of creative, heuristic intuition. The role of heuristic intuition in cognition. Heuristic intuition as a sense of mathematical order in the subject area of mathematical cognition. Creative insight in mathematics as a result of long-term unconscious work. Conscious work



preceding intuition as a decisive moment of mathematical creativity. J. Hadamard on the main stages of creative work in mathematics.

11. Axiomatic method in mathematics .

Axiom as a description and as an assumption. Axiomatic method as a way of constructing a mathematical theory. Proper foundations of an axiomatized theory. Functions of the axiomatic method – ensuring the demonstrability, accuracy, rigor of substantive mathematical theories. Axiomatization and formalization of substantive mathematical theories as conditions for proving the consistency, completeness of a theory, independence of its axioms. Limitations of axiomatization of a mathematical theory.

12. The Infinity Problem in Mathematics

Mathematics as a science of infinity. The concept of actual infinity (actual feasibility) and its unacceptability for mathematics. Abstraction of potential feasibility and its role in non-classical versions of mathematics. The essence and main stages of abstraction of actual infinity and its role in the formation of classical mathematics. Actual infinity and paradoxes of mathematical knowledge.

13. The existence problem in mathematics

The concept of existence in philosophical ontology. The problem of the existence of primary and derivative mathematical objects. Platonistic, nominalistic and semantic interpretation of the existence of mathematical objects. Criteria for the existence of mathematical objects. Justification of the existence of mathematical objects.

14. The main directions of the justification of mathematics

The problem of foundations of mathematics as a search for the basic foundation of all mathematics as a whole, determining the integrity of mathematical science. Two directions in solving the problem of the basic foundation - "arithmetization" of mathematics and general set theory. Philosophical foundations of these directions. Interpretation of the methods of "arithmetized" and set-theoretic mathematical knowledge. Paradoxes of the set-theoretic justification of mathematics and ways to overcome them (logicism, formalism, intuitionism, constructivism).

5. Educational technologies

- information and communication technologies;
- research methods in teaching;
- interactive technologies;



- the use of new teaching methods associated with the use of the capabilities of the virtual information environment (multimedia technologies).

In accordance with the approved basic educational program for scientific specialties:

1.1.1. Real, complex and functional analysis; 1.1.2. Differential equations and mathematical physics; 1.1.3. Geometry and topology;

1.1.5. Mathematical logic, algebra, number theory and discrete mathematics; 1.1.9.

Mechanics of liquids, gases and plasma The program of the course "History and Philosophy of Science" provides for the wide use in the educational process of active and interactive forms of conducting classes in combination with extracurricular work in order to form and develop professional skills in students. The effectiveness of the use of interactive forms of training is ensured by the implementation of the following conditions:

- creation of a dialogical space in the organization of the educational process;

- use of the principles of social and psychological training in educational and scientific activities;

- development of psychological readiness of teachers to use interactive forms of teaching aimed at developing the internal activity of postgraduate students and achieving a number of important educational goals: stimulating motivation and interest in mathematics; increasing the level of activity and independence of research work; developing skills of analysis, critical thinking, and scientific communication.

6. Assessment tools for ongoing monitoring of academic performance and midterm assessment

6.1. Passport of the fund of assessment tools for the course "History and Philosophy of Science"

No	Controlled sections of the course	Results	Name of the assessment tool
	Part 1. "General Problems of the Philosophy of Science"	Know: • basic concepts of the philosophy of science, • traditional and modern problems of philosophy of science, • methods of formation and verification of scientific knowledge,	exam



		- the main modern concepts of the philosophy of science. Be able to: - conduct a critical analysis of texts on the philosophy of science, - to classify and systematize the directions of the philosophy of science, - by the method of analyzing philosophical and scientific texts.	
	Part 2. "Modern philosophical problems of areas of scientific knowledge" Section 2.1. Philosophical problems of natural sciences. Section 2. 2. Philosophical problems of mathematics	Know: - traditional and modern problems of philosophy of science, - methods of formation and verification of scientific knowledge. Posses: - the ability to use theoretical principles of the philosophy of science in one's work; - by the method of analyzing philosophical and scientific texts.	exam
	Part 3. History of Mathematics	Be able to: to present the educational material on the philosophy of science in a consistent and well-reasoned manner. Posses:	Report



		• methods of logical analysis of the material being studied; • skills of public speaking, argumentation, discussion and debate; • the ability to use theoretical principles of the philosophy of science in one's work; • by the method of analyzing philosophical and scientific texts.	
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6. 2. Evaluation tools

Current control

Questions, topics, tasks for current control

Tasks for current control:

1. Create a dictionary of basic concepts for the questions offered for independent preparation.
2. Prepare an essay on the problems of the history of science.

Questions for independent study

Part 1. "General Problems of the Philosophy of Science"

Section 1. Formation of science as a socio-cultural phenomenon

2. The subject and main problems of the philosophy of science.
3. Philosophical synthetic images of science: classical (standard) image of science . non-classical (non-standard) image of science.
4. Science as a socio-cultural phenomenon: science and rationality; science as a social institution.
5. General concept of the history of science and its main stages .
6. Dynamics of science and its main philosophical models: cumulativistic and paradismal models of the dynamics of science.
7. The positivist version of the dynamics of science: critical rationalism (K. Popper) and the concept of research programs (I. Lakatos).



8. Positivist version of the dynamics of science: the concepts of microevolutions (S. Toulmin) and methodological anarchism (P. Feyerabend).
9. Continental philosophy of science: neo-Kantian (Rickert-Windelband, Cohen, Cassirer) and phenomenological (Husserl) variants.
10. Domestic philosophy of science: Marxist version, science in the noospheric concept of Vernadsky.
11. The evolution of science in the 19th-21st centuries as a change in types of scientific rationality.

Philosophical problems of special sciences: mathematics

1. The nature of objects of "pure" mathematics.
2. The method of idealization in mathematics
3. Basic methods of mathematical abstraction
4. The problem of truth in mathematics
5. Intuition in mathematics.
6. Axiomatic method in mathematics .
7. The Infinity Problem in Mathematics
8. The existence problem in mathematics
9. The main directions of the justification of mathematics

Topics of essays on the history of science: "History of Mathematics" (by scientific specialties)

The postgraduate student chooses the topic of the abstract independently and agrees with the academic supervisor. It is recommended to link the topic of the abstract with the scientific specialty and scientific problem that forms the basis of the dissertation research.

Interim assessment

The questions for the exam are formed in accordance with the program of the candidate exam and the passports of scientific specialties in the field of mathematics.
Abstract



It is written on the history of science: "History of Mathematics" in accordance with the general requirements for abstracts. The topic of the abstract is agreed upon with the academic supervisor (specialist in this field). The abstract is assessed by the academic supervisor (specialist) and a brief review is attached. If the assessment is positive, the grade "passed" is given. The topic of the abstract and the grade are included in the protocol of the candidate examination.

The exam is conducted in written form using tickets, each of which contains three questions. The exam tickets include two questions from the general part (philosophy of science) and one question on philosophical problems of the chosen scientific field.

Candidate Exam Questions

Examination questions on the general part of the course "General Problems of the Philosophy of Science"

1. The subject and main problems of the philosophy of science
2. Philosophical synthetic images of science: classical (standard) image of science . non-classical (non-standard) image of science.
3. Science as a socio-cultural phenomenon: science and rationality; science as a social institution.
4. General concept of the history of science and its main stages .
5. Dynamics of science and its main philosophical models: cumulativistic and paradismal models of the dynamics of science.
6. The positivist version of the dynamics of science: critical rationalism (K. Popper) and the concept of research programs (I. Lakatos);
7. Positivist version of the dynamics of science: the concepts of microrevolutions (S. Toulmin) and methodological anarchism (P. Feyerabend).
8. Continental philosophy of science: neo-Kantian (Rickert-Windelband, Cohen, Cassirer) and phenomenological (Husserl) variants.
9. Domestic philosophy of science: Marxist version, science in the noospheric concept of Vernadsky.



10. The evolution of science in the 19th-21st centuries as a change in types of scientific rationality.
11. Knowledge as an idealized form (relationship).
12. Knowledge as part of goal setting. Goal and product of activity.
13. Product and result. Objectivity of the delta result.
14. Delta result as ignorance. Ignorance as an incentive to learn.
15. Subject and objectivity of knowledge. Object layers of being.
16. The active capacity of man. The spirit in the process of cognition.
17. Cognition as a hermeneutic circle.
18. The scientific picture of the world, its role and place in modern philosophy of science.
19. Historical forms of the scientific picture of the world and their features
20. Inductive-empirical model of constructing scientific knowledge: its origin, development, main advantages and disadvantages.
21. Functions of the scientific picture of the world and its ideological significance.
22. Scientific knowledge as a purposeful activity: general characteristics.
23. Scientific knowledge as a product of scientific cognition.
24. Method as a means of scientific knowledge,
25. Scientific activity as production.
26. The main functions of science as a way of consolidating the main purposes of scientific knowledge.
27. Empirical level of scientific knowledge: rational forms of empirical knowledge, methods of empirical knowledge.
28. Theoretical level of scientific knowledge: theoretical forms of scientific knowledge, methods of theoretical knowledge.
29. The relationship and interdependence of theoretical and empirical levels of knowledge.
30. Formation of the methodology (method) of scientific research.
31. The problem as a starting point for scientific research.
32. Hypothesis and its place in the search for a solution to a scientific research problem.
33. Theory as a form of systematization of scientific knowledge: general characteristics and typology, structure.
34. The main methods of testing scientific theories. Verification and falsification as methods of testing scientific theories.

Examination questions for the second part of the course
"Modern philosophical problems of the areas of scientific knowledge"



Exam questions for sciences in the field of mathematics:

1. The relationship between philosophy and natural sciences and its reflection in the course "Philosophical Problems of Natural Science".
2. Natural sciences in culture and in the system of sciences.
3. The connection of natural sciences as a reflection of the unity and diversity of the world. Methodological foundations of natural sciences.
4. The nature of objects of "pure" mathematics
5. The method of idealization in mathematics
6. Basic methods of mathematical abstraction
7. The problem of truth in mathematics
8. Intuition in Mathematics
9. Axiomatic method in mathematics
10. The Infinity Problem in Mathematics
11. The existence problem in mathematics
12. The main directions of the justification of mathematics

Assessment tools for disabled people and people with limited health capabilities are selected taking into account their individual psychophysical characteristics.

If necessary, disabled people and people with limited health capabilities are given additional time to prepare an answer for the exam/test.

When conducting the procedure for assessing the learning outcomes of disabled people and people with limited health capabilities, it is envisaged to use technical means that are necessary for them in connection with their individual characteristics. These means may be provided by ChelSU or their own technical means may be used.

The procedure for assessing the learning outcomes of disabled people and individuals with limited health capabilities in a course involves providing information in forms adapted to the limitations of their health and perception of information:

For visually impaired persons:

- in printed form in large font,
- in the form of an electronic document,

	MINISTRY OF EDUCATION AND SCIENCE OF RUSSIA FSBEI HE "Chelyabinsk State University"
	Faculty of Eurasia and East Department of Philosophy
Work program of course (module) 2.1.1.1. "History and philosophy of science " Work program of the course (module) 2.1.2.2. "Differential Equations in Linear Topological Spaces" Scientific specialty – 1.1.2. Differential equations and mathematical physics Direction - Differential equations and mathematical physics	

- in the form of an audio file,
- in printed form in Braille.

For people with hearing impairments:

- in printed form,
- in the form of an electronic document.

For people with musculoskeletal disorders:

- in printed form,
- in the form of an electronic document,
- in the form of an audio file.

6.3. Criteria for assessing learning outcomes

The assessment of learning outcomes **during the exam** is carried out on a five-point scale:

"Excellent" - the content of the answer exhausts the content of the ticket. The postgraduate student demonstrates both knowledge and understanding of the questions of the ticket, as well as knowledge of the main and additional literature.

"Good" - the content of the answer basically reflects the content of the questions on the exam, but there are some gaps and shortcomings. The postgraduate student demonstrates knowledge of only the main literature.

"Satisfactory" - the content of the answer basically reflects the content of the ticket, but there are errors. Not all provisions of the questions of the ticket are fully disclosed. There are factual gaps and incomplete knowledge of literature. The norms of philosophical language are violated; there is vagueness and ambiguity of written speech.

"Unsatisfactory" - the content of the answer does not reflect the content of the ticket. There are gross errors, as well as ignorance of key definitions and literature. Written answers to questions are not written in full; the answer does not contain an expanded presentation of the ticket.

Essay score

The abstract is assessed based on the following criteria:

1. If, during the review of the abstract, two or more works are found that have significant textually identical fragments, as well as works that coincide with the text of textbooks and other literature, then all these works are assessed as "failed".

	MINISTRY OF EDUCATION AND SCIENCE OF RUSSIA
	FSBEI HE "Chelyabinsk State University"
	Faculty of Eurasia and East
	Department of Philosophy
Work program of course (module) 2.1.1.1. " History and philosophy of science "	
Work program of the course (module) 2.1.2.2. "Differential Equations in Linear Topological Spaces"	
Scientific specialty – 1.1.2. Differential equations and mathematical physics	
Direction - Differential equations and mathematical physics	

2. An essay that is assessed in accordance with the criteria described below and with scores above 10 points is given a "pass" grade .

Criteria and indicators used in assessing the abstract

Criteria	Indicators
1. Novelty of the reviewed text Max - 3 points	- relevance of the problem and topic; - novelty and independence in the formulation of the problem, in the formulation of a new aspect of the problem chosen for analysis; - the presence of the author's position, independence of judgments.
2. Degree of disclosure of the essence of the problem Max. - 6 points	- compliance of the plan with the topic of the paper; - compliance of the content with the topic and plan of the paper; - completeness and depth of disclosure of the main concepts of the problem; - validity of the methods and techniques of working with the material; - ability to work with literature, systematize and structure the material; - ability to generalize, compare different points of view on the issue under consideration, argue the main provisions and conclusions.
3. Justification of the choice of sources Max. - 2 points	- circle, completeness of use of literary sources on the problem; - involvement of the latest works on the problem (journal publications, materials from collections of scientific papers, etc.).
4. Compliance with design requirements Max - 5 points	- correct formatting of references to the literature used; - literacy and culture of presentation; - knowledge of the terminology and conceptual apparatus of the problem; - compliance with the requirements for the volume of the abstract; - culture of formatting: highlighting paragraphs.
5. Literacy Max - 3 points	- absence of spelling and syntactic errors, stylistic errors; - absence of typos, abbreviations of words, except for generally accepted ones; - literary style.



When conducting the procedure for assessing the learning outcomes of disabled people and people with limited health capabilities in a course (module), the following additional requirements are met depending on the individual characteristics of the students:

a) instructions on the procedure for conducting the assessment procedure are provided in an accessible form (orally, in writing, in writing in Braille, orally using the services of a sign language interpreter);

b) accessible form of providing assessment tools assignments (in printed form, in printed form in large print, in printed form in Braille, in the form of an electronic document, assignments are read out by an assistant, assignments are provided using sign language translation);

c) an accessible form of providing answers to tasks (written on paper, typing answers on a computer, written in Braille, using the services of an assistant, orally).

If necessary, for students with disabilities and those with disabilities, the procedure for assessing the learning outcomes in a course (module) can be carried out in several stages.

7. Educational and methodological support of the course

Independent work of postgraduate students is carried out in the form of studying individual theoretical issues on the proposed literature and independently solving problems with their subsequent analysis or discussion in the classroom. During independent preparation, students are provided with access to databases and library collections and access to the Internet.

Independent work promotes:

- deepening and expanding knowledge;
- developing interest in independent research activities;
-
- mastering the techniques of the cognitive process and developing cognitive abilities.

The independent work of postgraduate students has the main goal of ensuring the quality of training of graduating specialists.

Educational and methodological materials for self-study of students:

Independent work of a postgraduate student is an indicator of scientific potential, ability to work with literary sources and regulatory acts, practice materials,



MINISTRY OF EDUCATION AND SCIENCE OF RUSSIA

FSBEI HE "Chelyabinsk State University"

Faculty of Eurasia and East

Department of Philosophy

Work program of course (module) 2.1.1.1. "History and philosophy of science"

Work program of the course (module) 2.1.2.2. "Differential Equations in Linear Topological Spaces"

Scientific specialty – 1.1.2. Differential equations and mathematical physics

Direction - Differential equations and mathematical physics

the ability of a postgraduate student to independently analyze problematic issues. It consists of studying educational and scientific literature, and completing assignments for independent work.

Full-time postgraduate students study and develop theoretical and practical material largely independently. The Department of Philosophy offers a volume of educational and scientific literature in the list of recommended literature, therefore, a postgraduate student must refer to the funds of scientific libraries as often as possible, as well as to periodicals, and follow the latest developments in the field of economic development. When studying scientific and educational literature, it is necessary to compare the content of the available literature with the program of the candidate's examination in the specialty. In the absence of a particular source of literature, it is necessary to refer to the funds of the Russian State Library (Moscow). A postgraduate student must conduct careful preparatory work with scientific literature in his specialty, master theoretical, general and specific scientific search methods.

Educational and methodological materials for independent work of students with disabilities and individuals with limited health capabilities are provided in forms adapted to the limitations of their health and perception of information.

For visually impaired persons:

- in printed form in large font,
- in the form of an electronic document,
- in the form of an audio file,
- in printed form in Braille.

For people with hearing impairments:

- in printed form,
- in the form of an electronic document.

For people with musculoskeletal disorders:

- in printed form,
- in the form of an electronic document,
- in the form of an audio file.

Main literature

(* literature available in the Chelyabinsk State University library or electronic library system; ** literature available in the electronic library system)

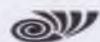
General part of the course "General problems of philosophy of science"

Textbooks and teaching aids:



Main literature

1. *Sukhanov K.N. Philosophy of Science: Lecture Course / K. N. Sukhanov. Chelyabinsk: Chelyabinsk State University, 2009. 225 p. (Classical University Education].
2. Arefyev M.A., Davydenkova A.G., Kozhurin A.Ya., Alyabyeva S.V. Lecture course and guidelines for graduate students in the history and philosophy of science: a tutorial. Moscow; Berlin: Direct-Media, 2018. 383 With.; Same . URL : <http://biblioclub.ru/index.php?page=book&id=485271>
3. *Bartenev, S. A. History and Philosophy of Economic Science [Electronic resource]: Handbook for the candidate's exam. - 1. - Moscow; Moscow: Publishing house "Magistr": OOO "Scientific Publishing Center INFRA-M", 2016. - 271 p. - URL : <http://znanium.com/go.php?id=51545> (date of access: 04. 08. 2017).
4. B udanov V.G. Methodology of synergetics in post-non-classical science and education: New edition, supplemented with materials: Synergetics of the third wave. Digital life techno-way. Education of the era of great anthropological transition. Publ. 4th, suppl. M.: URSS, 2017. 272 p.
5. Buchllo N.F., Isaev I.A. History and Philosophy of Science: Textbook. Moscow: Prospect, 2018. 427 p.
6. Ivin A.A. Philosophy of modern science. M.; Berlin: Direct-Media, 2017. 836 s.; Ditto. URL: <http://biblioclub.ru/index.php?page=book&id=453947>
7. History and Philosophy of Science: textbook / [M. G. Fedotova et al.]; edited by M. G. Fedotova; Ministry of Education and Science of Russia, Omsk State Technical University. – Omsk: Omsk State Technical University Publishing House, 2018.
https://www.omgtu.ru/scientific_activities/division_of_graduate_and_doctorate/graduate%20school%20plus/%D0%A4%D0%B5%D0%B4%D0%BE%D1%82%D0%BE%D0%B2%D0%B0%20%D0%9C.%D0%93.%20%D0%B8%20%D0%B4%D1%80.%20%D0%98%D1%81%D1%82%D0%BE%D1%80%D0%B8%D1%8F%20%D0%B8%20%D1%84%D0%B8%D0%BB%D0%BE%D1%81%D0%BE%D1%84%D0%B8%D1%8F.pdf
1. Ishchenko E. N. History and Philosophy of Science: a teaching aid for preparing postgraduate students and applicants for social and humanitarian specialties for the candidate's exam / E. N. Ishchenko, A. S. Kravets; Voronezh State University. - Voronezh: VSU Publishing House, 2018. - 67 <http://www.vsu.ru/ru/university/structure/education/graduate-school/literature/hist-philosophy-soc.pdf>



2. Nikiforov A.L. Philosophy and history of science: textbook. manual. Moscow: INFRA-M, 2018. 176 With.
3. Stepin V.S. History and Philosophy of Science: Textbook for Postgraduates and Candidates of Science. Moscow: Academic Project, 2017. 424 p.
4. Yashin B.L. Philosophy of Science. Lecture Course: A Textbook for Master's and Postgraduate Students. Moscow; Berlin: Direct-Media, 2017. 340 s.; Ditto. URL : <http://biblioclub.ru/index.php?page=book&id=480084>

Further reading:

1. *Alekseev, P.V. Philosophy [Text]: textbook / P. V. Alekseev, A. V. Panin. — 4th ed., revised. and additional — Moscow: Prospekt, 2015. — 588 p.
2. History and Philosophy of Science: [study guide] / [N. V. Bryanik, O. N. Tomyuk, E. P. Starodubtseva, L. D. Lamberov]; edited by N. V. Bryanik, O. N. Tomyuk; Ministry of Education and Science of the Russian Federation, Ural. Federal University — Ekaterinburg: Publishing House of Ural. University, 2014. — 288 p.
3. *Bessonov. Boris Nikolaevich. History and Philosophy of Science [Text] / V. N. Bessonov. - Moscow: Yurait. 2014.
4. *Belskaya, E. Yu. History and Philosophy of Science (Philosophy of Science) [Electronic resource]: Study guide. - 2, revised and enlarged. - Moscow; Moscow: Publishing house "Alfa-M": OOO "Scientific Publishing Center INFRA-M", 2011. - 416 p. - URL : <http://znanium.com/go.php?id=254523> . (date of access : 04.08.2017).
5. *Guseva, E. A. Philosophy and History of Science [Electronic resource]: Textbook. - Moscow: OOO "Scientific Publishing Center INFRA-M", 2013. - 128 p. - URL : <http://znanium.com/go.php?id=356848> . (date of access: 04. 08. 2017).
6. *Mokiy Mikhail Stefanovich. Methodology of scientific research [Text] / M. S. Mokiy, A. L. Nikiforov, V. S. Mokiy. - Moscow: Yurait. 2016.
7. *Nikiforov, A.L. Philosophy and History of Science [Electronic resource]: Study guide. - 1. - Moscow: OOO "Scientific Publishing Center INFRA-M", 2018. - 176 p. - ISBN 9785160092515. - URL : <http://znanium.com/go.php?id=925781> .
8. *Nevelev, A.B., Khudyakova, N.L., Philosophy of knowledge: textbook. [Text] / Nevelev, A.B., Khudyakova, N.L., - Chelyabinsk: ChelGu Publishing House, 2015.
9. of Science [Electronic resource]. - 1. - Moscow : UNITY-DANA Publishing House, 2012. - 400 p. - URL : <http://znanium.com/go.php?id=395478> . (date of access : 04.08.2017).
10. Modern philosophical problems of natural, technical and social-humanitarian sciences: a textbook for postgraduate students and candidates for the degree of



candidate of sciences. [Electronic resource] / edited by V. V. Mironov. - M.: Gardariki, 2006. - 639 p. - URL : <http://scicenter.online/science-scicenter/modern-philosophical-problems.html>, free, (date of access: 04.08.2017)

- 11.*Sukhanov, K. N. Philosophy of Science [Text]: course of lectures / K. N. Sukhanov. - Chelyabinsk: Publishing House of Chelyabinsk State University, 2009. - 225 p.
- 12.*Tsaregorodtsev, G. I. History and Philosophy of Science [Electronic resource]: a textbook / G. I. Tsaregorodtsev; G. Kh. Shingarov; N. I. Gubanov. - Moscow: SSU Publishing House, 2011. - 438 p. - URL : <http://biblioclub.ru/index.php?page=book&id=275148>. (date accessed : 04.08.2017).

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1. *Bakeeva, E.V. Introduction to Ontology: Images of the World in European Philosophy: Lecture Course: Textbook [Electronic resource]. / E.V. Bakeeva - Ekaterinburg: Ural University Publishing House, 2014. - 388 p. - URL : <http://biblioclub.ru/index.php?page=book&id=275630> (date accessed: 09.02.2016).
2. *Nevelev A. B., Khudyakova N. L. KNOWLEDGE AND SUBJECT AS DIFFERENCES WITHIN THE FORM OF HUMAN EXPLORATION OF THE WORLD [Electronic resource] // Bulletin of Chelyabinsk State University. 2014. No. 25 (354). Philosophy. Sociology. Cultural Studies. Issue 35. P. 12–16. URL : <http://www.lib.csu.ru/vch/354/002.pdf> (date of access: 18.01.2016).
3. *Nevelev A. B., Neveleva. V. S. SUBJECT-ENERGY APPROACH TO THE PROCESS OF COGNITION [Electronic resource] // Bulletin of Chelyabinsk State University. 2014. No. 25 (354). Philosophy. Sociology. Cultural Studies. Issue 35. Pp. 137–140. URL : <http://www.lib.csu.ru/vch/354/029.pdf> (date of access: 18.01.2016).
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5. *Rybin V.A. The idea of a 21st century university: Research experience. [Text] / V.A. Rybin – Chelyabinsk: Publ. Chelyabinsk state university, 2012. – 209 p.

Philosophical problems of natural sciences.

Textbooks and teaching aids.

Main literature

1. *Lipkin, A.I. Concepts of modern natural science [Electronic resource]: course of lectures. 1. Sciences of the inanimate (physics, chemistry, synergetics) / A.I. Lipkin. © FSBEI HE "CSU"



- M. Berlin: Direct-Media, 2015. - 151 p. - URL : <http://biblioclub.ru/index.php?page=book&id=272963>. (date of access 20.08.2017)
2. *Nikiforov, A.L. Philosophy and History of Science [Electronic resource]: Textbook. — Moscow: OOO "Scientific Publishing Center INFRA-M", 2014. — 176 p. — URL : <http://znanium.com/go.php?id=429039>. (date accessed 20.08.2017)
 3. *Nikiforov, A.L. Philosophy and History of Science [Electronic resource]: Textbook. - 1. - Moscow: OOO "Scientific Publishing Center INFRA-M", 2018. - 176 p. - URL : <http://znanium.com/go.php?id=925781>. (accessed 20.08.2017).

Further reading

4. *Kanke, V. A. Philosophy of Mathematics, Physics, Chemistry, Biology [Text]: a textbook / V. A. Kanke. - M.: KnoRus, 2011. - 368 p.
5. Lipkin A.I. Sociocultural and political factors in the development of Russian natural science (XVII - XX centuries) [Electronic resource] : textbook M.: 2012. - 130 p. - URL : <https://mipt.ru/education/chair/philosophy/textbooks/LipkinRusSci2012.pdf>, free (date of access 20.08.2017)
6. *Shutaleva, A.V. Philosophical Problems of Natural Science [Electronic resource]: study guide / A.V. Shutaleva. - Ekaterinburg: Ural University Publishing House, 2012. - 164 p. - URL : <http://biblioclub.ru/index.php?page=book&id=240436>. (date of access 20.08.2017)
7. *Philosophy of Natural Sciences [Text]: a textbook for universities / edited by S. A. Lebedev. - M.: Academic Project: Mir, 2006. - 556 p.

Philosophical problems of mathematics

Textbooks and teaching aids:

Main literature

1. Zemtsov Yu. T. "Philosophy of Mathematics". [Electronic resource] / Yu. T. Zemtsov. - M: Publisher: "URSS", 2016. - URL : <http://i.uran.ru/webcab/system/files/bookspdf/filosofiya-matematiki/filosofiya.pdf>, free (date of access: 19.08.2017).
2. Svetlov V.A. "Philosophy of Mathematics. Basic Programs for the Justification of Mathematics of the Twentieth Century" [Electronic resource] : a tutorial / V.A. Svetlov. - Publisher: "URSS", 2016. - URL : <http://nsportal.com.ua/book/598>, free (date of access : 19.08.2017).

Further reading



3. Demenev, A.G. Modern philosophical problems of mathematical, natural and technical sciences: [Electronic resource] teaching method, manual / compiled by A.G. Demenev. - Arkhangelsk: Publishing house of ASTU, 2007. - 79 p. - URL : <https://narfu.ru/university/library/books/0095.pdf>, free (date of access: 08/19/2017).
4. *Kanke, V. A. Philosophy of Mathematics, Physics, Chemistry, Biology [Text]: textbook / V. A. Kanke. - M.: KnoRus, 2011. - 368 p.

Primary sources

5. *Asmus, V.F. The Problem of Intuition in Philosophy and Mathematics [Text]: (historical essay: 10th- 17th - early 20th centuries) / V. F. Asmus. - 2nd ed. - M.: Mysl, 1965. - 312 p.
6. Weil G. On the philosophy of mathematics. [Electronic resource] / G. Weil. - M.-L., GTTI, 1934. - - URL : <http://padaread.com/?book=56168&pg=2>, free (date of access: 19.08.2017).
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11. *Philosophy of Mathematics and Technical Sciences [Text]: a textbook for universities / edited by S. A. Lebedev. - M.: Academic Project, 2006. - 778 p.
12. *Philosophy of Mathematics and Technical Sciences [Text]: a textbook for universities / edited by S. A. Lebedev. - M.: Academic Project, 2006. - 778 p.
13. Yashin B.L. Mathematics in the context of philosophical problems. [Electronic resource] / B.L. Yashin - - Moscow-Berlin. - 2015. - URL : https://books.google.ru/books?id=bs85CwAAQBAJ&pg=PA106&lpg=PA106&dq=2.+%D0%A1%D0%B2%D0%B5%D1%82%D0%BB%D0%BE%D0%B2+%D0%92.%D0%90.+%D1%84%D0%B8%D0%BB%D0%BE%D1%81%D0%BE%D1%84%D0%B8%D1%8F+%D0%BC%D0%B0%D1%82%D0%B5%D0%BC%D0%B0%D1%82%D0%B8%D0%BA%D0%B8&source=bl&ots=iK_7JP5sN5&sig=b4aqap0ZA3ttSGcyYnHzYinJ-I4&hl=ru&sa=X&ved=0ahUKEwiCq_a_t97XAhWHdp0KHdPaBJEQ6AEIYDAJ#v=onepage&q=2.%20%D0%A1%D0%B2%D0%B5%D1%82%D0%BB%D0%BE%D0%B2%20%D0%92.%D0%90.%20%D1%84%D0%B8%D0%BB%D0%BE%D1%81%D0%BE%D1%84%D0%B8%D1%8F%20%D0%BC%D0%B0%D1%82%D0%B5%D0%BC%D0%B0%D1%82%D0%B8%D0%BA%D0%B8&f=false , free (accessed on 19.08.2017).

Electronic funds and resources

The means of access to the system of its own electronic resources is the library website www.lib.csu.ru . The electronic catalogue provides a complete and prompt overview of the library collection, improves the quality and efficiency of information searches – more than .5 million records.

1. *Electronic catalogue. Bibliographic databases.*

Books, electronic resources, dissertations and abstracts.

2. *Electronic library.*

Publications of ChelSU, teaching and methodological complex; dissertations defended in the councils of ChelSU, reserve collections, rare book collection,

	MINISTRY OF EDUCATION AND SCIENCE OF RUSSIA FSBEI HE "Chelyabinsk State University"
	Faculty of Eurasia and East Department of Philosophy
	Work program of course (module) 2.1.1.1. " History and philosophy of science " Work program of the course (module) 2.1.2.2. "Differential Equations in Linear Topological Spaces" Scientific specialty – 1.1.2. Differential equations and mathematical physics Direction - Differential equations and mathematical physics

electronic reference book "Informio", statistical publications of Russia and the CIS countries.

3. *Abstracts*

INION RAS databases, VINITI databases, Scopus (<http://www.scopus.com>), Science (archive).

4. *Full text*

Dissertation databases RSL, ARBICON, SIGLA , scientific electronic library <http://elibrary.ru> , subscription to a full - text collection of Russian scientific journals (20-205, 48 titles), publishers: Taylor & Francis , Sage Publications (archive of scientific journals); Springer , Wiley (<http://onlinelibrary.wiley.com>) .

5. *Electronic library systems with the ability*

licensed materials from any point with access to the Internet (registration from the university network of a personal account): University Library Online (www.biblioclub.ru) , Lan (www.e.lanbook.com) .

Internet resources

1. Scientific Library of Chelyabinsk State University [Electronic resource]: [website] / Chelyab. state university – Chelyabinsk, [2001 –]. – Access mode: <http://www.lib.csu.ru/>, free. – Title from the screen. (Accessed: 22.09.2015).
2. eLIBRARY . RU [Electronic resource]: scientific electronic library [of scientific periodicals in Russian]. — Moscow, [1999 –]. – Access to full texts after registration from the Chelyabinsk State University network. – URL : <http://elibrary.ru/defaultx.asp> (Accessed: 22.09.2015).
3. Moodle [Electronic resource]: learning management system: [database] / Chelyabinsk state university – Chelyabinsk, [b.g.]. – Access from the Chelyabinsk state university network or, after registration from the university network, from any point with Internet access. – URL : <http://moodle.uio.csu.ru/login/index.php> (Accessed: 22.09.2015).
4. Questions of Philosophy [Electronic resource]: scientific-theoretical journal / Russian Academy of Sciences. - 1947, July - . - Moscow: Science, - Monthly. - Access mode from the Chelyabinsk State University network: http://elibrary.ru/title_about.asp?id=7714 (12/15/2015)
5. Electronic library of dissertations [Electronic resource]: official website / Russian State Library. – Moscow: Ros. gos. b-ka, 2003 – . – Access to full texts from the



MINISTRY OF EDUCATION AND SCIENCE OF RUSSIA
FSBEI HE "Chelyabinsk State University"

Faculty of Eurasia and East
Department of Philosophy

Work program of course (module) 2.1.1.1. "History and philosophy of science"
Work program of the course (module) 2.1.2.2. "Differential Equations in Linear Topological Spaces"
Scientific specialty – 1.1.2. Differential equations and mathematical physics
Direction - Differential equations and mathematical physics

reading rooms of the Chelyabinsk State University library: <http://diss.rsl.ru/> (12/17/2015).

6. Digital library on philosophy [Electronic resource]: scientific electronic library. - Free access. - URL : <http://filosof.historic.ru/enc/item/f00/s10/a001094.shtml>
 7. National Philosophical Encyclopedia [Electronic resource]: scientific electronic library. - Free access. - URL : <http://terme.ru/dictionary/195/word/substrat>
 8. Institute of Philosophy of the Russian Academy of Sciences - philosophical encyclopedia [Electronic resource]: scientific electronic library. - Free access. - URL : <http://iph.ras.ru/elib/2869.html>
 9. Library Gumer - philosophy [Electronic resource]: scientific electronic library. - Access is free. - URL : http://www.gumer.info/bogoslov/Buks/Philos/fil_dict/770.php
 10. Philosophy of Science (lectures, questions and answers) [Electronic resource]: scientific electronic library. - Free access. - URL : http://uy.by/page/metodologicheskie_funkcii_filosofii, <http://filnauk.ru/>
 11. National Philosophical Encyclopedia [Electronic resource]: scientific electronic library. - Free access. - URL : <http://terme.ru/>
 12. Portal "Socio-Humanitarian and Political Science Education" [Electronic resource]: scientific electronic library. - Free access. - URL : <http://www.humanities.edu.ru>
 13. Portal "Bibliotekar.ru" [Electronic resource]: scientific electronic library. - Free access. - URL : www.bibliotekar.ru/index.htm
 14. Federal portal "Russian education" [Electronic resource]: scientific electronic library. - Free access. - URL : <http://www.edu.ru/>
 15. Stanford Encyclopedia of Philosophy [Electronic resource]: scientific electronic library. - Free access. - URL : <http://www.philosophy.ru/iphras/library/iph1.html#2>
- Library of the Bookseller's Regiment [Electronic resource]: scientific electronic library. - Free access. - URL : http://society.polbu.ru/mareev_histphilosophy/ch48_i.html

Licensed software for the course (module)

1. LMS Moodle
2. MS Office365
3. Adobe Reader

8. Logistics

To conduct classes on the course "History and Philosophy of Science", provided for by the curriculum for the training of postgraduate students, there is the
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	MINISTRY OF EDUCATION AND SCIENCE OF RUSSIA FSBEI HE "Chelyabinsk State University"
Faculty of Eurasia and East Department of Philosophy	
Work program of course (module) 2.1.1.1. " History and philosophy of science " Work program of the course (module) 2.1.2.2. "Differential Equations in Linear Topological Spaces" Scientific specialty – 1.1.2. Differential equations and mathematical physics Direction - Differential equations and mathematical physics	

necessary material and technical base that complies with current sanitary and fire safety rules and regulations, ensuring the implementation of all types of theoretical and practical training, as well as the effective completion of the final qualifying work (dissertation):

- lecture halls equipped with multimedia systems based on vandal-proof platforms;
- specialized computer classes with peripheral devices and equipment connected to them;
- methodological materials for independent work on the subject.

The Faculty of Eurasia and the East has a material and technical base that ensures the implementation of all types of practice-oriented and scientific research work. The educational process is provided with equipment and computing technology. All computers of the departments and laboratories of the faculty are connected by a local network and have access to the Internet.

Educational, scientific research laboratories are equipped with modern computers and multimedia complexes. All computers of the Department of Philosophy of the Faculty of Eurasia and the East are connected by a local network and have Internet access.

The implementation of the postgraduate program is ensured by the availability of educational and methodological documentation for each course, corresponding to the working programs of courses, practice and ensuring independent work of students.

There are special rooms for lectures and seminars, group and individual consultations for independent study.

- **Lecture hall** No. 301 (room number according to the documents of the technical inventory bureau: Letter A, 3rd floor, No. 13): Number of seats – 74. Equipment: mobile multimedia complex (projector, screen, speakers) Benq – 1 pc.; HP Compag 610 laptop – 1 pc.; student wall-mounted board - 1 pc., lectern -1 pc.; single-pedestal teacher's desk -1 pc.; two-seater desks (table combined with a bench) – 37 pcs.; blinds – 4 pcs.; soft chairs – 2 pcs.
- **Classroom for conducting practical seminar-type classes - Office No. 204.** Room number according to the documents of the technical inventory



bureau: Letter A, 2nd floor, No. 11. Number of seats – 13. Equipment: Computers INTEL LGA775-5 pcs. Monitors LOS, FUJITSU, ACTR - 5 pcs. Copier Canon fc226 – 1 pc. Printer HP laserJet P1102 – 2 pcs. Cabinets for methodological literature - 4 pcs. Methodological literature. Student desk board – 1 pc. Two-seater tables for classes – 7. Teacher's table – 1 pc. Chairs – 13 pcs. INTERNET ACCESS

- **A room for independent work, for course design (dissertation work), for current monitoring and midterm assessment, group and individual consultations - office No. 204.** Equipped with computer equipment with Internet connection and access to the electronic information and educational environment of Chelyabinsk State University: Room number in accordance with the documents of the technical inventory bureau: Letter A, 2nd floor, No. 11. Number of seats - 13. Equipment: Computers INTEL LGA775-5 pcs. Monitors LOS, FUJITSU, ACTR - 5 pcs. Copier Canon fc226 - 1 pc. Printer HP laserJet P1102 - 2 pcs. Cabinets for methodological literature - 4 pcs. Methodological literature. Student desktop board - 1 pc. Two-seater tables for classes - 7. Teacher's table - 1 pc. Chairs - 13 pcs. INTERNET ACCESS; 5 personal computers with Internet connection, unlimited access to electronic library system and database, classroom furniture, air conditioning. Software: Microsoft Windows 10 Pro . (Licenses are perpetual. Agreement No. AE-223/28/18), Microsoft Office 2016 Pro (Perpetual licenses. Agreement No. AE-223/28/18). ConsultantPlus (Cooperation Agreement No. 31 dated 20.05.2003 with the regional information center of the all-Russian network for disseminating legal information). Microsoft Office suite Office 2013, perpetual licenses, agreement No. 180/s dated 11.07.2013.

Antivirus software "Kaspersky Anti-Virus", license agreement No. 1013/K-2773 dated 11.12.2017.

- **Independent work areas - Computer class #214:** Room number according to the technical inventory bureau documents: Letter A, 2nd floor, #46). Number of seats – 20. Equipment: Mobile multimedia complex (projector, screen, speakers) Epson EB – 965 H – 1 pc. Microlab 2mk3 acoustic system – 1 pc. INTEL LGA775 computers – 21 pcs. Samsung TFT "19" monitor - 21 pcs. HP copier Color LaserJet CH 1312 MFP – 1 pc. D-Link network switch - 1 pc. Student desk – 1 pc. Computer desks – 15 pcs. Two-seater study



tables – 13 pcs. Teacher's desk – 1 pc. Podium -1 pc. Chairs – 28 pcs.
INTERNET access

- **Room for independent work - Reading room of the library of building 3:**
Room number in accordance with the documents of the technical inventory bureau: Letter A, 1st floor, No. 47. Number of seats - 40. Equipment: Terminal stations - 10 pcs. Computers for students - 9 pcs. Computers for library staff - 3 pcs. Computer desks - 9 pcs. Electronic books -8 pcs. Two-seater writing desks - 33 pcs. Chairs - 7 pcs. INTERNET access Rooms for storage and preventive maintenance of educational equipment .

The University has computer classes connected to a local network, Internet access, and equipped with modern high-performance computers. It maintains its own website : <http://csu.ru> .

For the purpose of obtaining higher education in postgraduate programs for disabled people and people with limited health capabilities, the university has classrooms equipped with the following equipment:

Cabinet name	Equipment
Auditorium for the typhlotechnical patient, room A-28 of the first academic building	Typhlotechnical aids: Braille computer with display and printer, typhlocomplex "Reading machine", television magnifying device, tiflocassette tape recorders (3 units) and digital voice recorders (6 units). Special software: speech navigation program JAWS , speech synthesizers ("talking mouse"), screen magnifiers.
Auditorium for the deaf, room A-27 of the first academic building	Radio class "Sonet-R" (for 6 people), programmable hearing aids (6 pcs.) for individual use with a device for setting the operating mode on a computer, audio equipment.
Adaptive Information Technologies Auditorium, Room A-27, First	Computer class for 2 people, interactive whiteboard ActiveBoard with voting system, acoustic amplifier and speakers, multimedia projector, TV, VCR, VCON videoconferencing device HD 3000.

	MINISTRY OF EDUCATION AND SCIENCE OF RUSSIA FSBEI HE "Chelyabinsk State University"
	Faculty of Eurasia and East Department of Philosophy
	Work program of course (module) 2.1.1.1. " History and philosophy of science " Work program of the course (module) 2.1.2.2. "Differential Equations in Linear Topological Spaces" Scientific specialty – 1.1.2. Differential equations and mathematical physics Direction - Differential equations and mathematical physics

Academic Building	
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All courses specified in this work program, methodological and technical support for the educational process for disabled people and people with limited health capabilities are provided by the Regional Educational and Scientific Center for Inclusive Education of Chelyabinsk State University.

9. Methodological instructions for students on mastering the course (module)

You master the content of the academic course in the process of working in lectures, seminars, and in the process of independent study activities.

A lecture by a teacher is one of the forms of pedagogical interaction. Therefore, it should not be viewed as a passive form of mastering the content of an academic course on your part, which consists only of writing down what the teacher says.

The lecture material will be remembered from the first time if you are ready to actively participate in it. This means that, first of all, you need to be ready to enter into a dialogue with the teacher, especially when he or she asks you questions. Often these are questions that activate your existing experience, which is necessary for better mastering the lecture content. Not all of you will be able to state your answer out loud, but it is important that this answer is formulated by you for yourself. If, during the further presentation of the material, your experience does not agree with what the teacher says in the lecture, then be sure to say so. The teacher will definitely analyze the situation that has arisen. Often such a discrepancy arises not because you and the teacher have different positions, but because, unfortunately, many things are not included in the lecture content due to lack of time.

Creating conditions for developing your independent thinking, the teacher may ask questions that encourage you to critically perceive information. When answering them, you are often required to show your position, express your opinion. Do not be afraid to say something wrong. Can we say about anyone that he or she speaks the ultimate truth? Feel free to enter into a dialogue - it will help your thoughts become more precise and meaningful.



Your independence of thinking is also developed by questions that create "challenging situations." To ask such a question, the teacher may suggest the following:

- two or three contradictory formulations, or definitions of the content of one concept, from which you will need to select the one that most accurately and fully characterizes the subject being studied and justify your choice;
- a statement by any author (without indicating his last name) for analysis and determination of his conceptual position and last name.

Active participation in a lecture is also ensured by your use of such an active listening method as clarification, which is expressed in a request to the teacher to clarify or explain something that has been said. Clarification will allow you to save time on independent preparation.

Modern approaches to conducting lectures also suggest such a form of your participation as you formulate questions on the topic of the lecture a week or two before it is held.

You are all given the opportunity to familiarize yourself with the course program. Based on it, formulate, write down and pass on to the teacher the questions to which you would like to receive answers in a lecture on a certain topic. If the teacher still could not include an answer to your question in the lecture, or if his answer was insufficient, then determine the search for an answer to your question as the goal of your independent work. Include the set goal in the assignment for preparing for the seminar.

As a rule, lectures present material that contains the most important characteristics of the sphere of reality you are learning about. These characteristics should serve as a starting point for you, a basis for analysis when independently mastering knowledge on the topic under consideration.

This does not mean that you must necessarily adhere to the conceptual position of the teacher when preparing. The content of the lectures reveals to you the main aspects of the problem under consideration, which must be covered in the material that you independently select. If the material you have prepared reflects a position different from the position of the teacher, try to ensure that this is both consciously and reasonably supported by you.

Particular attention should be paid to the content of concepts. All new concepts should be highlighted in the text so that they can be easily found and remembered. In addition, you should create a dictionary of basic concepts.

Independent work of postgraduate students



Your independent work on mastering the program content should ensure the formation of the competencies provided by the program.

The product of your independent work is:

- preparedness for the exam;
- dictionary of basic concepts for the course:
- essay on the history of science.

The dictionary of the main concepts for the course must be compiled according to the topics specified in the educational program of the course. The dictionary must include all definitions of concepts from the lecture. If in the process of independent work you find definitions of concepts that, from your point of view, most accurately and fully characterize the subject of knowledge, then include them in the dictionary. It must also include definitions of concepts that are listed as basic, but were not included in the content of the lecture.

Independent mastery of the content of the academic course, or more precisely, independent knowledge of its subject, is carried out by you in preparation for the exam.

One of the main forms of independent work in preparation for the exam is **reading**.

The most important types of reading for you are:

- Continuous reading* is a careful reading of all the material in a row for a holistic study of the content of the text.

- Commented reading* is reading accompanied by an explanation or interpretation of the text in the form of explanations, reasoning, assumptions, critical comments. Such an explanation or interpretation is a logical answer to the questions that arise in you when reading the texts. Therefore, if you do not have questions when reading the texts, then there will be no commented reading. Commented reading is the first stage of your independent work on writing reports, argumentative essays, preparing for conversations, participating in a round table and discussions.

- Analytical reading* is a critical study of the content of a text with the aim of deeply understanding it, accompanied by the recording of facts, quotes, and the preparation of theses and abstracts.

- Browsing reading* - view reading, which we use when we need to look through a book, magazine, article, etc. We do not need to know the details and understand the meaning of the text. The main thing for us here is to get the most general idea of the content as a whole. What the text is about in general and to determine whether this material is of interest to us. All our efforts are aimed only at determining whether the information we need is in this text. We use skimming reading to understand in the

	MINISTRY OF EDUCATION AND SCIENCE OF RUSSIA FSBEI HE "Chelyabinsk State University"
	Faculty of Eurasia and East Department of Philosophy
	Work program of course (module) 2.1.1.1. "History and philosophy of science " Work program of the course (module) 2.1.2.2. "Differential Equations in Linear Topological Spaces" Scientific specialty – 1.1.2. Differential equations and mathematical physics Direction - Differential equations and mathematical physics

most general terms what the text is about, and not what exactly is reported on this or that issue.

• *Bibliographic reading* is looking through catalog cards, reference lists, summary lists of journal articles for the year, etc. The purpose of such reading is to find sources that may be useful in further work based on thermographic descriptions.

Preparing an essay for the candidate's exam in the course "History and Philosophy of Science".

The condition for admission to the candidate exam in the course "History and Philosophy of Science" is the preparation of an abstract.

The postgraduate student/applicant chooses the topic of the abstract independently and agrees with the academic supervisor. It is recommended to link the topic of the abstract with the scientific problem that forms the basis of the dissertation research. The abstract must be prepared independently and submitted within the established deadlines. Abstracts are checked for compliance with the history of science, read and assessed by teachers no later than a month before the exam.

On the title page of each abstract, a mark is placed on the abstract's compliance with the established requirements. A positive assessment of the abstract "passed" means that graduate students are admitted to take the candidate's exam.

The volume of the abstract should not exceed 30 pages.

Requirements for the abstract:

- the abstract is completed on A4 sheets of paper;
- the text is placed on one side of the sheet;
- the text is typed on a computer using Times New Roman font;
- font size – 14;
- line spacing – 1.5;
- font color is black;
- margins: left – 3 cm, right – 1.5 cm, top – 2 cm, bottom – 2 cm;
- text links are formatted in accordance with GOST 7.05-2008;
- the title page is signed by the graduate student and the supervisor;
- the pages of the abstract are numbered with Arabic numerals, observing continuous numbering throughout the text. The number is placed at the bottom in the center of the page. The numbering starts from page 2; there is no number on the title page.

	MINISTRY OF EDUCATION AND SCIENCE OF RUSSIA FSBEI HE "Chelyabinsk State University"
	Faculty of Eurasia and East Department of Philosophy
	Work program of course (module) 2.1.1.1. "History and philosophy of science " Work program of the course (module) 2.1.2.2. "Differential Equations in Linear Topological Spaces" Scientific specialty – 1.1.2. Differential equations and mathematical physics Direction - Differential equations and mathematical physics

Special requirements for an abstract on the subject "History and Philosophy of Science"

The abstract should analyze the emergence and development of relevant scientific theories, concepts, ideas and their role in the progressive development of scientific thought, as well as assess the contribution of individual scientists and scientific schools to the development of this branch of knowledge.

A mistake that is often made when writing an abstract is the substitution of an analysis of the problems of the history of science with a description of modern theoretical concepts. This mistake is typical, first of all, of those who write an abstract on "young sciences" that do not yet have a long history of development. In this case, it is necessary to show the prehistory and genesis of the given science or to turn to the history of related sciences, identifying in them similar ideas of a more general nature. A significant drawback of the abstract is the lack of use of philosophical methodology. The abstract must demonstrate the ability to use the philosophical conceptual and categorical apparatus and the main philosophical approaches and principles in the course of presenting the material on the chosen topic.

The structure of the abstract must include the following elements:

- title page;
- content with mandatory indication of pages;
- an introduction that states the topic of the work, reveals its relevance to the dissertation research/research work of the graduate student, its purpose and objectives, and indicates the main problems;
- the main abstract text, which contains an analysis of the problems of the original text and may contain the opinion of the referent on these problems, as well as an assessment of the judgments of the authors of the original sources. In the main part, it is advisable to highlight 2-3 questions reflecting different aspects of the topic; it is important to present different points of view on the problem and evaluate them. The main part should include from two to five or six sections, which can be divided into subsections;
- a conclusion, which contains a general conclusion and a definition of promising directions for studying the problem;
- list of references.

References in the text to works included in the Bibliographic List are given in square brackets with the obligatory indication of the page number [Birikh, 1998, p. 34]. References (when citing) are indicated in the text by the authors' surnames (or by the names of sources) in accordance with GOST R 7.05-2008 "Bibliographic reference.



MINISTRY OF EDUCATION AND SCIENCE OF RUSSIA
FSBEI HE "Chelyabinsk State University"

Faculty of Eurasia and East
Department of Philosophy

Work program of course (module) 2.1.1.1. "History and philosophy of science "
Work program of the course (module) 2.1.2.2. "Differential Equations in Linear Topological Spaces"
Scientific specialty – 1.1.2. Differential equations and mathematical physics
Direction - Differential equations and mathematical physics

General requirements and rules for compilation"). All references must allow unambiguous

establish a connection between the link itself, the author and his work.

The references, including electronic documents and sources, are arranged on a new page in the form of a bibliographic list, compiled alphabetically. The list is numbered using a paragraph indent.

The source indication in the bibliographic list is given in the form of a standard bibliographic description. For this, it is necessary to comply with the uniform rules established by GOST R 7.0.5-2008 "Bibliographic reference. General requirements and rules for compilation".

The bibliographic list has its own structure and includes several sections (documents, research sources, references, dictionaries, etc.).