

MINISTRY OF EDUCATION AND SCIENCE OF THE RUSSIAN  
FEDERATION

FSBEI of Higher Education "Bashkir State Pedagogical University named after M.  
Akmulla"

Faculty of Physical Education

PROGRAM OF THE DISCIPLINE  
**HISTORY AND PHILOSOPHY OF SCIENCE**

Recommended for the direction of training

**44.04.02 Psycho-pedagogical education**

Specialization "Organization of inclusive education"

Master's degree

**1. Objectives of the discipline are:**

- a) development of general culture competencies:
- ability to abstract thinking, analysis, synthesis (GC-1);
  - willingness to act in non-standard situations, to bear social and ethical responsibility for the decisions taken (GC-2);
  - willingness to use individual creative abilities to solve research problems independently(OC-6);

**2. Discipline workload** consists of 2 credit units (72 hours), 14 hours out of it are: lectures - 2hours and seminars - 12 hours, 31 hours of individual work and a credit.

**3. Place of the discipline in the structure of basic educational program:**

The discipline "History and Philosophy of Science" refers to the disciplines with the choice of variable part.

The study of this discipline is based on the university program knowledge on the subject "Philosophy".

Matched with this discipline, students study "Innovations in modern education".

The knowledge, skills and experience, gained by students, create a theoretical and practical basis for studying such academic disciplines as "Philosophical, methodological foundations of inclusive education".

**4. List of the expected results of the discipline:**

As a result of mastering the discipline, the student must:

***Know:***

- the subject and basic concepts of the modern philosophy of science;
- the place and role of science in the culture of modern civilization;
- the formation of science and the main stages of its historical evolution;
- the structure and dynamics of scientific knowledge
- the problem of scientific traditions and scientific revolutions, classical, non-classical and post-non-classical types of scientific rationality;
- the essence and specificity of the current stage of development of science;
- the features of science as a social institution.

***be able to:***

- explain the phenomenon of philosophy and science;
- state the results of scientific research in a logical way and acquire new knowledge based on philosophical methods;
- work with primary sources, using them when writing reports on the history of science, as well as when preparing for seminars;
- apply a critical approach in assessing and analyzing various scientific hypotheses, concepts, theories and paradigms.

***possess:***

- the fundamentals and specificity of philosophical thinking;
- the methodology and methods of scientific research.

### 5. Discipline workload and types of learning activities

| Type of activity                                  | Academic hours | Term |    |
|---|----------------|------|----|
|   |                | 1    | 2  |
| <b><i>Class hours:</i></b>                        | 14             | -    | 14 |
| Lectures (LEC)                                    | 2              | -    | 2  |
| Practical training/seminars (SEM)                 | 12             | -    | 12 |
| Laboratory works (LAB)                            | -              | -    | -  |
| Control of the individual work of a student (CIW) | -              | -    | -  |
| <b><i>Student's individual work (SIW) :</i></b>   | 31             | -    | 31 |
| - study of recommended literature                 | 8              |      | 8  |
| - work with lecture notes                         | 10             |      | 10 |
| - essay writing                                   | 13             |      | 13 |
| Midterm assessment                                | Credit         |      |    |
| <b><i>TOTAL:</i></b>                              | 72             |      | 72 |

### 6. Content of the discipline

#### 6.1 Content of the discipline units

| No | Name of the discipline unit  | Content of the unit  |
|----|--|--|
| 1. | <b>A. Subject and basic concepts of the philosophy of science</b>  | The concept of the philosophy of science. The place and role of science in modern culture and civilization. Science as a type of worldview, a special kind of cognitive activity, concrete and evidence-based knowledge, productive and social force of society, a form of social consciousness, academic, branch and university system, a definite social institution. The main aspects of the science study in the philosophy of science. The relationship between history, methodology and philosophy of science. |
| 2. | <b>B. Science in the culture of modern civilization</b><br>(Lecture in an interactive form: students' reports on | Correlation of science, culture and civilization. Descriptive, axiological, activity oriented, informational and personal concepts of culture. Three subsystems of culture: technological,   |

|    |  |  |
|----|--|--|
|    | <p>specific philosophical works, discussions, meetings with leading experts, participation in websites and portals related with topics, watching and discussion of films, television programs, etc.)</p> | <p>official and ideological. Grounds and types of culture. The concept of civilization. Traditional and technogenic types of civilization. Agrarian, industrial and post-industrial civilizations. Identification and differentiation of culture and civilization. Values of scientific rationality. Formation of rationality in antiquity. Interpretation of rationality in the Middle Ages, in the Renaissance and in the New Time. The main values of classical, non-classical and post-non-classical science. Limits of scientific rationality.</p>  |
| 3. | <p><b>C. The emergence of science and the main stages of its historical evolution</b></p>  | <p>Pre-science and science. Land surveying. Egyptian mathematics. Construction art. Anatomy, medicine, invention of writing in ancient Egypt. Egyptian astronomy. Ancient science. Rationalization of thinking. Logic and dialectics. Development of logical thinking in the Middle Ages. Experimental science formation in the new European culture. Historical background of the emergence of modern European science. The Renaissance and its representatives. The empiricism of F. Bacon and the rationalism of R. Descartes. Emergence of modern European science. Formation of technical sciences. Differences between natural and technical sciences</p>  |
| 4. | <p><b>D. The structure of scientific knowledge</b></p>   | <p>Classification of sciences. Exact, natural, technical, humanitarian and social sciences. Empirical and theoretical levels of scientific knowledge and criteria of science. Empirical level: observation, comparison and experiment. Facts, induction, history and philosophy of inductive sciences. Theoretical level of scientific knowledge. Axiomatic method. Method of idealization. Hypothetico-deductive method. The question, the problem, the hypothesis, the concept, the theory, the idea and the paradigm as stages of generation and justification of new knowledge in science. Criteria of scientific character. Science and its foundations. Ideals and norms of the research, value of the method. Methodology in the structure of scientific knowledge. Scientific picture of the world and its historical forms.</p> |

|    |   |  |
|----|---|--|
|    |   | Classical, non-classical and post-non-classical pictures of the world.   |
| 5. | <b>E. The dynamics of science as a process of generating new knowledge</b>                  | Formation of primary theoretical models and laws. I. Lakatos on threefold program of primary theoretical models formation: the Euclidean system, empiric and inductivistic programs. Signs of the theoretical model. Formation of laws. The concept of law. E. Mach about the source of the problem. Factors of theoretical innovations emergence and factors determining a certain conceptual version. The role of analogies and the procedure of theoretical knowledge substantiation. Formation and development of scientific theory. Scientific theory and scientific paradigm. The role of language in the process of forming a scientific theory. Problem situations in science. The problem of including new theoretical ideas in culture.  |
| 6. | <b>F. Scientific traditions and scientific revolutions. Types of scientific rationality</b> | Scientific revolutions as transformation of the science foundations. Forms of scientific revolutions. Types of scientific revolutions. T. Kuhn on the structure of scientific revolutions. The period of "normal science" development and scientific traditions. Symptoms of the scientific revolution.<br>Interdisciplinary and intradisciplinary mechanisms of scientific revolutions. Global scientific revolutions and historical change of scientific rationality types. "Mini-revolutions", local revolutions, global scientific revolutions. Types of global revolutions. Types of scientific rationality: classical, non-classical, post-non-classical. Open and closed rationality. Modern type of rationality and three variants of thinking and speech correlation: a field of "inexpressible"; a field of knowledge completely transmitted by means of speech; a field of "difficult understanding". The problem of "cosmic rationality." Socio-cultural type of rationality. Communicative rationality. The "traps of rationality." |
| 7. | <b>G. Features of the modern stage of science</b>   | Self-developing synergetic systems and new strategies for scientific research. Global  |

|    |   |  |
|----|---|--|
|    | <b>development</b>  | evolutionism and modern picture of the world. Types of global evolutionism: cosmic, chemical, biological and social. Justification of global evolutionism in the theory of non-stationary universe, in the concept of the biosphere and noosphere, in synergetics. Philosophy of Russian cosmism and V.I. Vernadsky's teaching on the biosphere. Comprehension of intrascientific and social values interrelations as a condition of modern development. Autonomy, impartiality and neutrality of science. K. Popper on interaction of social and intrascientific values. The problem of scientific discoveries authorship. The problem of the scientists existence. Ethical problems of the science development. Scientism and antiscentism. Post-non-classical science and the change of ideological orientations. Correlation of science and parascience. The diversity of knowledge forms. |
| 8. | <b>H. Science as a social institution</b>                       | The concept of social institution and historical development of the scientific activity institutional forms. Components of science as a social institution. Sociology of science. Science studies. Scientometrics. Scientific society and the historical background of the institutional resource. Disciplinary and interdisciplinary. Evolution of the scientific knowledge translation ways: synchronous and diachronic methods. Science and economics. Science and power. The problem of state regulation of science. The role of science in overcoming global crises.  |
| 9. | <b>I. Philosophy and historical, legal and social education</b> | Formation of history, law and social education in philosophy (antiquity, Middle Ages, Renaissance, New Times). These problems in the philosophy of Hegel (G. Hegel "Encyclopedia of Philosophical Sciences"). Problems of history, law and social knowledge development in modern philosophy.  |

## 6.2 Discipline units and types of educational activities

| № | Name of the discipline unit | Distribution of workload (in hours) by types of educational activity |
|---|-----------------------------|--|
|---|-----------------------------|--|

|    |   | LEC | SEM | LAB | SIW | Total |
|----|---|-----|-----|-----|-----|-------|
| 1. | Subject and basic concepts of the philosophy of science                           | 2   | 2   | -   | 4   | 8     |
| 2. | Science in the culture of modern civilization                                     |     | 2   | -   | 4   | 6     |
| 3. | The emergence of science and the main stages of its historical evolution          |     | 2   | -   | -   | 2     |
| 4. | The structure of scientific knowledge   |     | 2   | -   | 2   | 4     |
| 5. | The dynamics of science as a process of generating new knowledge                  |     | 2   | -   | 4   | 6     |
| 6. | Scientific traditions and scientific revolutions. Types of scientific rationality |     |     | -   | 5   | 5     |
| 7. | Features of the modern stage of science development                               |     | 2   | -   | 4   | 6     |
| 8. | Science as a social institution   |     | -   | -   | 4   | 4     |
| 9. | Philosophy and historical, legal and social disciplines                           |     | -   | -   | 4   | 4     |
|    | Total:  | 2   | 12  | -   | 31  | 72    |

**6.3. Laboratory course is not provided.**

**Themes of practical trainings:  
Seminar 1 (2 hours)**

**Theme: Subject and basic concepts of the philosophy of science**

Questions for discussion:

1. The concept of the philosophy of science.
2. The place and role of science in modern culture and civilization.
3. Science as a type of worldview, a special kind of cognitive activity, concrete and evidence-based knowledge, productive and social force of society, a form of social consciousness, academic, branch and university system, a definite social institution.
4. The main aspects of the science study in the philosophy of science.
5. The relationship between history, methodology and philosophy of science.

**Seminar 2 (2 hours)**

**Theme: Science in the culture of modern civilization**

Questions for discussion:

1. Correlation of science, culture and civilization.
2. Three subsystems of culture: technological, official and ideological.
3. Grounds and types of culture.
4. The concept of civilization.
5. Traditional and technogenic types of civilization.
6. Agrarian, industrial and post-industrial civilizations.

**Seminar 3 (2 hours)****Theme: The emergence of science and the main stages of its historical evolution**Questions for discussion:

1. Pre-science and science. Land surveying. Egyptian mathematics.
2. Construction art. Anatomy, medicine, invention of writing in ancient Egypt.
3. Egyptian astronomy. Ancient science.
4. Rationalization of thinking. Logic and dialectics.

**Seminar 4 (2 hours)****Theme: The structure of scientific knowledge**Questions for discussion:

1. Classification of sciences. Exact, natural, technical, humanitarian and social sciences.
2. Empirical and theoretical levels of scientific knowledge and criteria of science.
3. Empirical level: observation, comparison and experiment.
4. Facts, induction, history and philosophy of inductive sciences.
5. Theoretical level of scientific knowledge.
6. Axiomatic method. Method of idealization.

**Seminar 5 (2 hours)****Theme: The dynamics of science as a process of generating new knowledge**Questions for discussion:

1. Formation of primary theoretical models and laws.
2. I. Lakatos on threefold program of primary theoretical models formation: the Euclidean system, empiric and inductivistic programs.
3. Signs of the theoretical model. Formation of laws. The concept of law.
4. E. Mach about the source of the problem

**Seminar 6 (2 hours)****Theme: Scientific traditions and scientific revolutions. Types of scientific rationality**Questions for discussion:

1. Scientific revolutions as transformation of the science foundations.



2. Forms of scientific revolutions. Types of scientific revolutions. T. Kuhn on the structure of scientific revolutions.
3. The period of "normal science" development and scientific traditions. Symptoms of the scientific revolution.
4. Interdisciplinary and intradisciplinary mechanisms of scientific revolutions.
5. Global scientific revolutions and historical change of scientific rationality types.

### **Seminar 7 (2 hours)**

#### **Theme: Features of the modern stage of science development**

##### Questions for discussion:

1. Self-developing synergetic systems and new strategies for scientific research.
2. Global evolutionism and modern picture of the world. Types of global evolutionism: cosmic, chemical, biological and social.
3. Justification of global evolutionism in the theory of non-stationary universe, in the concept of the biosphere and noosphere, in synergetics.
4. Philosophy of Russian cosmism and V.I. Vernadsky's teaching on the biosphere.
5. Scientism and antiscentism.
6. Post-non-classical science and the change of ideological orientations.
7. Correlation of science and parascience.
8. The diversity of knowledge forms.

**6.4. Complimentary disciplines of the study:** National history, ethics, sociology, political science, logic, methodology of scientific research.

| №  | Name of the provided (subsequent) discipline                         | No. of the discipline unit, needed for study of the provided (subsequent) discipline |   |   |   |   |   |   |   |   |    |
|----|--|--|---|---|---|---|---|---|---|---|----|
|    |  | 1  | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 1. | Philosophical, methodological foundations of the inclusive education | +  | + | + | + | + | + | + | + | + | +  |

#### **6.5. Requirements for the student's individual work:**

1. Study of the recommended literature – workload of 20 hours.
2. Work with lecture notes - workload of 10 hours.
4. Report writing - workload of 18 hours.

#### **Approximate report topics on the history and philosophy of science:**

1. The concept and subject of the philosophy of science.

2. Classical positivism as a historical stage in the philosophy of science (O. Comte, D. Mill, G. Spencer).
3. Empirio-criticism as a historical stage in the philosophy of science (E. Mah and R. Avenarius).
4. The essence and features of neopositivism.
5. Conventionalism of J.A. Poincare and P. Duhem.
6. Phenomenology of E. Husserl.
7. Postpositivism: general characteristic.
8. The relationship of science, culture and civilization.
9. Types of civilizations.
10. Values of scientific rationality.
11. Science and Philosophy.
12. Science and non-philosophical types of worldview (art, mythology, religion and mysticism).
13. The role of science in modern education and human formation.
14. Pre-science and ancient science.
15. Science in the Middle Ages.
16. Science of the Renaissance.
17. Science of the New times.
18. Classification of sciences: traditional and modern concepts.
19. Empirical and theoretical levels of scientific knowledge and science criteria.
20. Metatheoretical level of science.
21. Logic of the new knowledge generation and justification in science: general characteristic.
22. The developed scientific theory: essence and features.
23. Modern problems of the science dynamics.
24. Scientific revolutions as transformation of the science foundations.
25. Global scientific revolutions and historical change of scientific rationality types (classical - non-classical - post-non-classical).
26. Main directions of the modern science development (synergetics, global evolutionism and philosophy of cosmism).
27. Ethics of science.
28. Scientism and antiscentism.
29. Change of ideological orientations in post-non-classical science.
30. Science and parasience. The variety of knowledge forms.
31. Science as a social institution.
32. Critical rationalism of K. Popper (K. Popper "Conjectures and Refutations: The Growth of Scientific Knowledge").
33. The concept of the historical dynamics of science T. Kuhn (T. Kuhn "The Structure of Scientific Revolutions").
34. "Epistemological anarchism" by P. Feyerabend (P. Feyerabend "Selected Works on the Methodology of Science").

35. The model of scientific knowledge of I. Lakatos: the idea of competing research programs (I. Lakatos "History of Science and Its Rational Reconstruction").

## **7. Methodological and informational support of the discipline:**

a) basic literature:

1. Baturin V. K. Philosophy of Science [Text]: [Manual]. Moscow: UNITY - DANA Publ., 2012. - 303 p.
2. Bessonov B. N. History and Philosophy of Science [Text]: Manual for magistrates. Moscow: Yurayt Publ., 2012. - 394 p.
3. Zelenov L. A. History and Philosophy of Science [e-resource]. Moscow, Flinta-Nauka Publ., 2011. <https://ibooks.ru/>
4. Ostrovskiy E. V. History and Philosophy of Science [e-resource]: Manual. Moscow: UNITY - DANA Publ., 2012. - 161 p. <http://biblioclub.ru/>
5. Asadullin R. M. The person in the pedagogics mirror. / Bashkir State Pedagogical University named after M. Akmulla. Moscow: 2013. - 247 p.
6. Chueshov V. I. Philosophy. Course of lectures [e-resource] / V. I. Chueshov, I. ƏI. Tarkan. Minsk: TetraSystems, 2012. - 272 p. <http://biblioclub.ru>

b) additional literature:

1. Kahn T. The Structure of Scientific Revolutions. - M., 2003.
2. Popper K. Conjectures and Refutations: The Growth of Scientific Knowledge. - M., 2004.
3. Fomicheva I. G. Philosophy of Education: some approaches to the problem. Novosibirsk, 2004.
4. Continuous education and need for it. M., 2005.
5. Davidov J. S. Bologna process and the Russian realities. - M., 2004.
6. Globalization and education: Bologna process: materials of the "round table". - M., 2004.
7. Philosophy of science. Training manuals for post-graduate students and external doctoral candidates / Editor-in-chief prof. Matyash T. P. - Rostov on the Don, 2006.

c) software

- Pedagogical Attestation Data;
- Windows programs (PowerPoint, Paint, Moviemaker) for reports preparing, making presentations and videos.

d) databases, resource materials and search systems:

<http://window.edu.ru/>

## **8. Material and technical support of the discipline study**

Discipline ensuring requires such auxiliary facilities as: audiences for lecture and seminar classes, provided with technical equipment for viewing video and

photo materials, presentations; technical means of teaching: projector; a laptop; TV, DVD-player; educational and visual aids: thematic presentations and slides, video films, technical teaching aids: mobile multimedia installation; screen, Internet.

## **9. Methodological recommendations for discipline learning**

The proposed program represents a systematic exposition of the foundations of the most important discipline for the researchers – philosophy of science. It determines the guidelines for the thorough assimilation of the course content, facilitates the organization of independent discipline study.

The study of "History and Philosophy of Science" is aimed at presenting the modern understanding of the universal in the "person-world" system through concepts and categories expressing the systematicity, structure, correlation of the phenomenon and essence, the individual and the general, the part and the whole, identifying the determination relations in the natural, social and human world itself.

Philosophy is primarily an ideological and methodological discipline, therefore it occupies a central place in the system of pedagogical education and has strong relations with other disciplines, both natural-science and social-humanitarian.

This course contributes to the development of a distinct moral, ethical and aesthetic position. The study of the course is based on the disclosure of concepts on specific examples from the modern social life. The logic of the material presentation implies the possibility of reasoning the thoughts with theoretical definitions and citing relevant facts. Part of the classes is conducted in an interactive form: these are practical classes on topics E, F, G, where such forms of work as discussion, heuristic conversation and lecture-conversation are used.

## **10. Requirements for the midterm assessment on the discipline**

Midterm assessment is carried out in a form of examination.

### **Approximate list of questions:**

1. What are the main features of the new paradigm of social cognition?
2. What is the specificity of the means and methods of socio-humane sciences?
3. What are the characteristics of modern social knowledge?
4. The main characteristics of modern post-non-classical science?
5. Does the mastering of self-developing synergetic systems offer any new strategies of the scientific research?
6. Is the science free of values?
7. How are the social and intrascientific values interrelated?
8. How important is the ethos of science in solving the problems of our time?
9. What are the changes in world outlook orientations of technogenic civilization?

10. What is understood by scientism and anti-scientism?
11. What are the canons of induction?
12. What are the general methods and methods of research?
13. What are the general scientific methods of theoretical knowledge.
14. What is the specificity of the dialectical approach?
15. What are the methods of empirical research?
16. What are the main functions of philosophy in scientific knowledge?
17. What is cumulativism and anti-cumulativism?
18. What is the dynamics of scientific knowledge?
19. Is scientific knowledge the only form of knowledge?
20. What is personal knowledge?
21. What is the role of science in modern education and formation of personality?
22. What is deviant and abnormal knowledge?
23. Does philosophy have practical significance?
24. How did the evolution of scientific knowledge translation methods occur?
25. What is social cognition and what are its basic models?

### **The assessment criteria**

Midterm assessment includes:

- checking the content of lecture and seminar notes.
- presenting reports at seminars.
- discussion of the individually studied topics, analysis of the literature after every discipline unit.

To assess the knowledge and formed (forming) competencies of the student, one can use the following score-rating system of knowledge:

| <b>Type of activity</b>                                       | <b>Scores</b>   |  |  |
|---|---|--|--|
|   | Unsatisfactory (score 2) (insufficient level of knowledge and competence) | Satisfactory-good (score 3-4) (sufficient level of knowledge and competence) | Excellent (score 5) (high level of knowledge and competence) |
| Active participation in lecture classes and work at seminars  | 0-7 points  | 8-13 points  | 14-15 points   |
| Writing a report on one of the selected topic and its defense | 0-15 points   | 16-24 points   | 25-30 points   |

|                                       |            |            |             |
|---------------------------------------|------------|------------|-------------|
| Knowledge of basic terms and concepts | 0-5 points | 6-8 points | 9-10 points |
|---------------------------------------|------------|------------|-------------|

In accordance with this rating system, a midterm assessment – exam – is carried out for the discipline:

- 0-26 points – unsatisfactory;
- 27-34 points – satisfactory;
- 35-46 points - good;
- 47-55 points – excellent.

The results of the examination are entered in electronic record lists and students' credit books, and are also displayed in the student's electronic portfolio in the electronic information and educational environment of the university.

The program is compiled in accordance with FSES of Higher Education in the direction of training No. 44.04.02 Psycho-pedagogical education (master's level). Specialization: "Organization of inclusive education" dated May 12, 2016 No. 549. The program was approved at a meeting of the Department of Philosophy, Sociology and Political Science on August 30, 2016, Protocol No. 1.

**The author of the program:**

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