



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

**Faculty of Mathematics**  
**Department of Mathematical Analysis**

Program for training scientific and scientific-pedagogical staff in postgraduate studies  
Scientific specialty – 1.1.2. Differential equations and mathematical physics  
Direction - Differential equations and mathematical physics

ADOPTED  
by decision of the Academic Council

«24» 02 2025,  
protocol No. 16

APPROVED

Vice-rector for Scientific Affairs  
A.I. Biryukov

«24» 02 2025.



**PROGRAM FOR TRAINING SCIENTIFIC AND SCIENTIFIC-  
PEDAGOGICAL STAFF IN POSTGRADUATE STUDIES\***

**Scientific specialty – 1.1.2. Differential equations and mathematical physics**

**Direction - Differential equations and mathematical physics**

Higher education – training of highly qualified personnel

Chelyabinsk, 2025

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



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The program was approved at the meeting of the Department of Mathematical Analysis on January 24, 2025, protocol No. 7.

The program was approved at the meeting of the Academic Council of the Faculty of Mathematics on January 30, 2025, protocol No. 5.

**APPROVED**

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## 1. GENERAL PROVISIONS

### 1.1. Regulatory documents for the development of a postgraduate program

The program for training scientific and scientific-pedagogical personnel in the scientific specialty - 1.1.2. Differential equations and mathematical physics was developed in accordance with the following documents:

- Federal Law of 29.12.2012 No. 273-FZ "On Education in the Russian Federation";
- Federal Law of 30.12.2020 No. 517-FZ "On Amendments to the Federal Law "On Education in the Russian Federation" and Certain Legislative Acts of the Russian Federation";
- Federal Law of 30.04.2021 No. 117-FZ "On Amendments to Certain Legislative Acts of the Russian Federation";
- Federal Law of November 24, 1995 No. 181-FZ "On Social Protection of Disabled Persons in the Russian Federation" (with amendments and additions);
- Order of the Ministry of Science and Higher Education of the Russian Federation (hereinafter referred to as the Ministry of Education and Science of Russia) dated 20.10.2021 No. 951 "On approval of federal state requirements for the structure of programs for the training of scientific and scientific-pedagogical personnel in graduate school (adjunct), the conditions for their implementation, the timing of mastering these programs, taking into account various forms of training, educational technologies and characteristics of certain categories of graduate students (adjuncts)";
- Resolution of the Government of the Russian Federation dated 30.11.2021 No. 2122 "On approval of the Regulation on the training of scientific and scientific-pedagogical personnel in graduate school (adjunct)";
- methodological recommendations for the organization of the educational process for teaching persons with disabilities and persons with disabilities in professional educational organizations, including the equipment of the educational process (approved by the Ministry of Education and Science of Russia on 08.04.2014 No. AK-44 / 05vn);
- Order of the Ministry of Science and Higher Education of the Russian Federation dated 24.02.2021 No. 118 "On approval of the nomenclature of scientific specialties for which academic degrees are awarded";
- License for the right to conduct educational activities by the Federal State Educational Institution of Higher Education "CSU" (hereinafter referred to as FSBEI VO "CSU"), issued by the Federal Service for Supervision in Education and Science dated 21.07.2016 series 90L01 No. 0009357, registration number 12283;
- Charter of FSBEI VO "CSU".

### 1.2. The scope of the postgraduate program

The total volume of the program in the scientific specialty - 1.1.2. Differential equations and mathematical physics is 240 credit units (hereinafter referred to as CU), regardless of the educational technologies used, the implementation of the program using a network form, the implementation of the postgraduate program according to an individual curriculum, including accelerated learning. The volume of the postgraduate program in full-time education, implemented in one academic year, is 60 CU. With accelerated learning, the volume of the postgraduate program, implemented in one academic year, can be more than 60 CU.

### 1.3. Duration of completion of the postgraduate program



Training in programs for scientific and scientific-pedagogical personnel in postgraduate studies is carried out in full-time education.

The term of mastering the postgraduate program in full-time education is 4 years.

When studying according to an individual curriculum, regardless of the form of education, the term is set by FSBEI HE "CSU" independently, but not more than the term of education established for the corresponding form of education.

When training according to an individual plan for individuals with disabilities, FSBEI HE "CSU" has the right to extend the term of mastering the program, but not more than by one year compared to the term established for full-time education in the scientific specialty 1.1.2. Differential equations and mathematical physics.

When implementing the postgraduate program, e-learning, distance learning technologies, as well as in case of force majeure, etc. can be used. When teaching individuals with disabilities, e-learning, distance learning technologies provide the ability to receive and transmit information in forms accessible to them. The postgraduate educational program is not implemented in a network format.

Scientific and educational activities under the postgraduate program are carried out in the state (Russian) language of the Russian Federation.

The training of highly qualified personnel (higher education level) under the programs for training scientific and scientific-pedagogical personnel is completed by final certification in the form of an assessment of the dissertation for its compliance with the criteria established by the legislation of the Russian Federation.

#### **1.4. The purpose of the program**

Acquisition of the level of knowledge, skills, abilities, and experience required for professional activities in preparation for defending a dissertation for the degree of candidate of sciences. Formation of a high level of theoretical and professional training, knowledge of general concepts and methodological issues in the field of the general theory of differential equations and systems of differential equations, differential equations and systems of differential equations in problems of optimal control and variational calculus, teaching mathematical disciplines that solve research, scientific and pedagogical, professional problems and the ability to apply the acquired knowledge to solve research and applied problems.

#### **1.5. Postgraduate program**

The postgraduate program is developed according to the scientific specialty provided for by the nomenclature of scientific specialties for which academic degrees are awarded, approved by the Ministry of Education and Science of the Russian Federation (hereinafter referred to as scientific specialties).

FSBEI HE "CSU" (Department of Mathematical Analysis) carries out scientific (research) activities (hereinafter referred to as scientific activities) in the scientific specialty 1.1.2. Differential equations and mathematical physics, including fundamental and (or) exploratory, and (or) applied scientific research, and has scientific potential in the group of scientific specialties 1.1. Mathematics and mechanics.

Implementation of scientific activities is provided for by the Charter of FSBEI HE "CSU".

Mastering the postgraduate program is carried out by postgraduate students according to an individual work plan, including an individual plan of scientific activity and an individual curriculum (hereinafter together - an individual work plan).



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The procedure for the formation and approval of an individual work plan for a postgraduate student is determined by a local regulatory act of the Federal State Budgetary Educational Institution of Higher Education "CSU".

## **2. CHARACTERISTICS OF PROFESSIONAL ACTIVITIES OF A GRADUATE OF A POSTGRADUATE PROGRAM**

### **2.1. Field of professional activity of graduates**

The area of professional activity of graduates who have completed the postgraduate program includes research activities in the following areas:

- in the scientific and production sphere - knowledge-intensive high-tech production of the defense industry, aerospace complex, aircraft manufacturing, mechanical engineering, design and creation of new materials, construction, research and analytical centers of the profile;
- in the socio-economic sphere - funds, insurance and management companies, financial organizations and business structures, as well as educational organizations of higher education.

### **2.2. Objects of professional activity of a graduates**

The objects of professional activity of graduates who have mastered the postgraduate program are: concepts, hypotheses, theorems, physical and mathematical models, numerical algorithms and programs, methods of experimental study of the properties of materials and natural phenomena, physical and chemical processes, which constitute the content of fundamental and applied mathematics, mechanics and other natural sciences.

### **2.3. Types of professional activities of graduates**

Research activities in the field of fundamental and applied mathematics, mechanics and natural sciences. Teaching activities in the field of mathematics, mechanics, computer science.

## **3. RESULTS OF MASTERING THE EDUCATIONAL PROGRAM**

The results of the program for training scientific and scientific-pedagogical personnel in postgraduate studies are determined by the ability to apply knowledge, skills and personal qualities in accordance with the chosen type of professional activity.

As a result of mastering the educational program, the student must:

	Content
<b>Know</b>	Basic concepts and theorems of the theory of differential equations and mathematical physics
	Basic methods for solving differential equations and problems of mathematical physics
	Fundamentals of functional analysis and operator theory
<b>Be able to</b>	Solve various types of differential equations and problems of mathematical physics
	Analyze and interpret the results of problem solving
<b>Possess</b>	Skills in solving complex problems arising in various fields of science and technology



	Ability to conduct scientific research and publish results in scientific journals
<b>Have experience in the activity</b>	conduct scientific research in the field of mathematical physics and differential equations, develop new methods and approaches to solving problems, analyze research results and publish them in scientific journals

#### **4. REQUIREMENTS FOR THE STRUCTURE OF THE EDUCATIONAL PROGRAM FOR TRAINING SCIENTIFIC AND SCIENTIFIC-PEDAGOGICAL PERSONNEL**

The postgraduate program includes a scientific component, an educational component, and final certification.

**The scientific component** of the postgraduate program includes:

- scientific activities of the postgraduate student aimed at preparing a dissertation for the degree of candidate of science for defense;
- preparation of publications that present the main scientific results of the dissertation in peer-reviewed scientific publications, in equivalent scientific publications indexed in international databases, Web of Science and Scopus databases and international databases determined in accordance with the recommendation of the Higher Attestation Commission under the Ministry of Science and Higher Education of the Russian Federation, as well as in scientific publications indexed in the scientometric database Russian Science Citation Index (RSCI), and (or) applications for patents for inventions, utility models, industrial designs, selection achievements, certificates of state registration of programs for electronic computers, databases, topologies of integrated circuits;
- midterm assessment at the stages of scientific research.

**The educational component** of the postgraduate program includes disciplines (modules) and practice, as well as midterm assessment for the said disciplines (modules) and practice.

The program includes disciplines (modules) aimed at preparing for candidate exams: history and philosophy of science, foreign language, special discipline in a scientific specialty, elective disciplines (modules) (disciplines at the postgraduate student's choice) - one block.

Elective disciplines (modules) are mandatory for mastering by a postgraduate student.

Elective disciplines included in the curriculum are optional for mastering by a postgraduate student.

Practice (scientific and pedagogical) is conducted by the department where the postgraduate student is trained in accordance with the curriculum and the approved schedule, as a rule, at CSU.

The main type of postgraduate practice is practice to obtain professional skills and experience in professional activities (scientific and pedagogical practice).

The methods of conducting practice are determined by the place of practice and can be as follows:

- stationary - in laboratories, departments; in specialized organizations located in the city of Chelyabinsk and possessing the necessary personnel and scientific and technical potential;
- off-site, if the place of its implementation is located outside of Chelyabinsk.



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Forms of conducting practice:

- continuous - by allocating in the academic calendar a continuous period of study time for conducting all types of practice provided for by the graduate program;
- discrete (dispersed practice) - by allocating in the academic calendar a continuous period of study time for each type (set of types) of practice or by alternating in the academic calendar periods of study time for conducting practice with periods of study time for conducting theoretical classes. Quality control of mastering postgraduate programs includes ongoing monitoring of academic performance, midterm assessment, and final assessment of postgraduate students.

Ongoing monitoring of academic performance provides an assessment of the progress of stages of scientific research, mastering of disciplines (modules), and internship in accordance with the individual plan of scientific activity and the curriculum. Ongoing monitoring of academic performance by stages of a postgraduate student's scientific activity is carried out with the participation of the academic supervisor. The academic supervisor ensures control over the timely completion of the individual plan of scientific activity by the postgraduate student.

Interim assessment provides an assessment of the results of the stages of scientific (research) activity, the results of mastering disciplines (modules), and internship in accordance with the individual plan of scientific activity and the curriculum. Passing candidate exams by a postgraduate student is related to the assessment of the results of mastering disciplines (modules), carried out as part of midterm assessment.

Assessment tools for ongoing monitoring of academic performance and midterm assessment are included in the working programs of disciplines (modules).

The final certification for the postgraduate program is carried out in the form of an assessment of the dissertation for its compliance with the criteria established in accordance with the Federal Law of August 23, 1996 No. 127-FZ "On Science and State Scientific and Technical Policy". The department where the postgraduate student was trained prepares a conclusion on the dissertation work. The conclusion is signed by the head of the organization or, on his behalf, an authorized person.



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## 5. STRUCTURE OF THE EDUCATIONAL PROGRAM

### 5.1. Curriculum for postgraduate programs in scientific specialty 1.1.2. Differential equations and mathematical physics (focus (profile) - Differential equations and mathematical physics)

*The duration of training in accordance with the Federal State Educational Standards is 4 years*

	Name of the program element	Distribution by periods of study								
		TOTAL WORK INTENSITY, (credit units)	1st semester	2nd semester	3rd semester	4th semester	5th semester	6th semester	7th semester	8th semester
1	2	3	4	5	6	7	8	9		
	<b>1. Scientific Component</b>	<b>219</b>								
	<b>1.1. Scientific Activities Aimed at Preparation of the Thesis Defence</b>	<b>190</b>								
	1.1.1(S) Scientific (research) activities aimed at preparation of the thesis defence	190	+	+	+	+	+	+	+	+
	1.2.1(S) Scientific (research) activities aimed at preparation of the thesis defence	21	+	+	+	+	+	+	+	+
	1.3. Interim Certification by Stages of Scientific Research Fulfilment (1.3.1(S) - 1.3.6(S))	8	+	+	+	+	+	+	+	+
	<b>2. Educational component</b>	<b>15</b>								



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<b>2.1. Courses (Modules)</b>	<b>7</b>								
<b>2.1.1. Courses (Modules), including those aimed at preparation for candidate examination</b>	<b>6</b>								
2.1.1.1. History and Philosophy of Science	2	+	+						
2.1.1.2. Foreign Language	2	+	+						
2.1.1.3. Differential Equations and Mathematical Physics	2				+				
<b>2.1.2. Elective Disciplines (Modules) 1</b>	<b>1</b>								
2.1.2.1. Differential Equations in Linear Topological Spaces	1		+						
2.1.2.2. Integral Transformations			+						
<b>2.2. Internship</b>	<b>2</b>								
2.2.1.(I) Educational Research Internship	2				+	+			
<b>2.3. Intermediate Certification of Courses (Modules) and Internship</b>	<b>6</b>								
<b>2.3.1. Courses (Modules), Internship</b>	<b>2</b>								
2.3.1.1. Educational Research Internship	2				+	+			
<b>2.3.2. Candidate Examination</b>	<b>3</b>								
2.3.2.1. History and Philosophy of Science	1		+						
2.3.2.2. Foreign Language	1		+						
2.3.2.3. Differential Equations and Mathematical Physics	1				+				
<b>2.3.3. Elective Disciplines (Modules) 1</b>	<b>1</b>								
2.3.3.1. Differential Equations in Linear Topological Spaces	1		+						
2.3.3.2. Integral Transformations			+						



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<b>3. Final State Certification</b>	<b>6</b>									
Final State Certification in the form of evaluation of the thesis for its compliance with the criteria established by the legislation of the Russian Federation	<b>6</b>									+
<b>Bcezo:</b>	<b>240</b>									
<b>2.1.3.(OC) Optional Courses</b>	<b>2</b>									
2.1.3.1.(OC) Fundamentals of Professional Communication and Rhetoric	1			+						
2.1.3.2.(OC) Pedagogy and Psychology of Higher Education	1			+						
<b>2.3. Intermediate Certification of Courses (Modules) and Internship</b>	<b>2</b>									
2.3.4.1.(OC) Intermediate Certification of Courses (Modules) and Internship	1			+						
2.3.4.2.(OC) Pedagogy and Psychology of Higher Education	1			+						



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## 5.2. Academic calendar schedule

### Full-time education

		Course 1	Course 2	Course 3	Course 4	Total
<b>Scientific component</b>		<b>52</b>	<b>55</b>	<b>58</b>	<b>54</b>	<b>219</b>
S	Scientific (research) activity aimed at preparing a dissertation for defense	46	45	52	47	<b>190</b>
S	Preparation of articles and (or) patents applications, certificates of state registration of programmes for electronic computing machines, databases etc.	4	8	4	5	<b>21</b>
S	Interim Certification by Stages of Scientific Research Fulfilment	2	2	2	2	<b>8</b>
<b>Educational component</b>		<b>8</b>	<b>5</b>	<b>2</b>	<b>6</b>	<b>21</b>
	Courses (Modules)	5	2			<b>7</b>
I	Educational Research Internship		1	1		<b>2</b>
	Intermediate Certification of Courses (Modules) and Internship	3	2	1		<b>6</b>
	Intermediate Certification of Courses (Modules) and Internship				6	<b>6</b>
<b>Total</b>		<b>60</b>	<b>60</b>	<b>60</b>	<b>60</b>	<b>240</b>

The postgraduate program consists of 240 credits.

## 5.3. Work programs of courses (modules)

### 5.3.1. History and Philosophy of Science

**The purpose of the course:** the program is aimed at examining science in a broad socio-cultural context. Particular attention is paid to the problems of changing scientific pictures of the world, types of scientific rationality, and value systems that scientists are guided by. The program is focused on analyzing the main ideological and methodological problems of the current stage of scientific development.

**Objectives of the course:**



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- To form general cultural and professional competencies that underlie the development of a postgraduate student's ability to apply the acquired knowledge, skills and abilities in scientific and pedagogical work in their specialty.

- To increase the philosophical culture of a postgraduate student, necessary for a correct understanding of the meaning and significance of their research activities.

- To reveal the content of the main modern philosophical images of science.

- To show the place of science in modern culture and its significance for the practical activities of mankind.

**As a result of training, the student should:**

- **know:** the basic concepts of the philosophy of science, traditional and modern problems of the philosophy of science, methods of forming and testing 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, classify and systematize the directions of the philosophy of science, consistently and reasonably present the educational material on the philosophy of science;

- **possess:** methods of logical analysis of the material being studied; skills of public presentation, argumentation, conducting discussions and polemics; the ability to use the theoretical provisions of the philosophy of science in their work.

**5.3.2. Foreign Language**

**The purpose of the course:** to achieve practical proficiency in the language, allowing it to be used in scientific work.

**The objectives of the course:** to improve and further develop the knowledge, skills and abilities in a foreign language acquired in higher education in various types of speech communication.

**As a result of training, the student should:**

- **know:** 5500 lexical units taking into account the university minimum and potential vocabulary, including approximately 500 terms of the major specialty; rules of grammatical organization and functioning of the studied language; basic rules for organizing monologue and dialogic statements;

- **be able to:** freely read original literature in a foreign language in the relevant field of knowledge; present information extracted from foreign sources in the form of a translation or summary; make messages and reports in a foreign language on topics related to the scientific work of a postgraduate student (applicant); conduct a conversation in the specialty;

- **possess:** spelling, orthoepic, lexical, grammatical and stylistic norms of the studied language within the program requirements and use them correctly in all types of speech communication, in the scientific sphere in the form of oral and written communication; basic formulas of etiquette when conducting a dialogue, scientific discussion, when constructing a message, etc.

**5.3.3. Differential Equations and Mathematical Physics**

**Objective of the course:** study of ordinary differential equations; partial differential equations

**Objectives of the course:**

- conducting scientific research in accordance with the stated objective;
- compiling reports on the topic and on the results of the conducted scientific research.

**As a result of the training, the student should:**



- **know:** the main results of the theory of differential equations, including those related to dynamic systems and optimal control problems;

- **be able to:** integrate differential equations of the main classes, find solutions to initial and boundary value problems for them, solve optimal control problems for systems described by differential equations;

- **possess:** the basic concepts and skills of the theory of differential equations and dynamic systems, optimal control theory.

#### **5.3.4. Differential Equations in Linear Topological Spaces**

**Objectives of the course:** study of the basic methods and ideas of the theory of differential equations, their application to solving various applied problems.

**Course objectives:**

**As a result of the training, the student should:**

- **know:** the basic definitions and statements of the theory of differential equations;

- **be able to:** apply methods for solving differential equations when considering various problems;

- **possess:** the basic concepts and methods of the theory of differential equations.

#### **5.3.5. Integral Transformations**

**The purpose of the course:** mastering the basic concepts, properties of the Laplace transform; application of operational calculus in the theory of ordinary differential equations.

**Course objectives:**

conducting scientific research in accordance with the set goal; drawing up reports on the topic and on the results of the conducted scientific research developments.

**As a result of the training, the student should:**

- **know:** the criteria for system analysis of the tasks set, methods of planning and organizing research;

- **be able to:** search for information, determine the criteria for system analysis of the tasks set, conduct a search, study and generalize scientific experience in the relevant field of research; determine the goals and objectives of the planned research and development; conduct research, compile its description, formulate conclusions based on the results obtained;

- **possess:** the skills of using critical analysis, systematization and generalization of information to solve the problems set, the skills of conducting scientific research in accordance with the set goal, the skills of drawing up reports on the topic and on the results of the conducted scientific research developments.

The working programs of courses (modules) aimed at preparing for passing candidate examinations: history and philosophy of science, foreign language, special discipline (based on the specialty passport), are developed taking into account the programs of candidate examinations.

**Elective courses:**

#### **5.3.6. Fundamentals of Professional Communication and Rhetoric**

**The aim of the course** is to promote the acquisition of a holistic rhetorical paradigm as a system of internally interconnected and interdependent theoretical and practical components.

**Course objectives:**



- Develop a system of skills and abilities for effective verbal interaction in public discourse (the course is based on a system of general rhetorical laws and principles, the conscious possession of which ensures the creation of communicatively literate written texts).

- Provide an idea of the origin of rhetoric, the history of the development of rhetorical knowledge.

- Provide an idea of how a public speech is prepared, what requirements are imposed on the choice of topic, the wording of the title, the structure of the oratorical speech, the form of presentation of the material, and be able to use this knowledge in your practice;

- To teach the mastery of a system of interconnected methods of rhetorical activity, both analytical (method of rhetorical analysis of someone else's statement, method of speech behavior analysis, method of self-analysis) and synthetic (method of creating your own statement, method of choosing adequate speech behavior and self-control).

- To teach the main stages of preparing the text of a speech.

- To master the basic principles of effective use of a rhetorical text.

**As a result of mastering the discipline, the student should:**

- know what rhetoric, eloquence, oratory are, have an idea of the origin of rhetoric, the history of the development of rhetorical knowledge; about how to prepare a public speech, what requirements are imposed on the choice of a topic, the wording of the title, the structure of the oratory, the form of presentation of the material, and be able to use this knowledge in their practice;

- be able to identify rhetorical devices used by the author in a written text; deliver a speech in accordance with the orthoepic norms of the Russian language, technically competently and intonationally expressive; compose and deliver a speech of a certain genre in a simulated communicative situation, write the text of the speech correctly and be able to use it effectively in the process of delivering a speech;

- possess a system of interconnected methods of rhetorical activity, both analytical (method of rhetorical analysis of someone else's statement, method of speech behavior analysis, method of self-analysis) and synthetic (method of creating your own statement, method of choosing adequate speech behavior and self-control);

- have experience of public speaking.

### **5.3.7. Pedagogy and Psychology of Higher Education**

**The purpose of the discipline:** the formation of a system of knowledge of its purposes and essence, content and structure of higher education, principles of management of educational processes in higher education and legal issues of functioning of the education system; the formation of skills in designing goals and objectives of education and training for various groups of students, analyzing and applying in practice current educational standards and programs; the formation of readiness to develop teaching materials, apply modern techniques, organizational forms and technologies of education, training and assessment of the quality of learning outcomes.

#### **Objectives of the discipline:**

1. To promote the formation of psychological and pedagogical thinking, which, in particular, implies: a) the assimilation of the idea of the uniqueness and originality of each person, his psychological makeup and, as a consequence, the idea of inadmissibility of purely prescription actions for a teacher; b) attitude to the personality as the highest value, excluding manipulation of a person and using him as a means of achieving other goals; c) the formation of ideas about the active, creative nature of the human psyche; d) recognition of human relations with other people as the main driving force and, at the same time, the source of new formations of the



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individual psyche. d) acceptance of the idea of the unity of organic and spiritual life of man with the affirmation of the primacy of the spiritual principle, its leading role in human development.

2. To acquaint with modern interpretations of the subject of pedagogical science, the subject of pedagogy and psychology of higher education. To outline the main trends in the development of higher education at the present stage.

3. To give an idea of the history and current state of higher education in Russia; to acquaint with the main approaches to defining the final and intermediate goals of higher education, methods of achieving them (methods of teaching and education); to provide means for ensuring pedagogical control (including with the help of tests) over the effectiveness of educational work and the achievement of the set pedagogical goals.

4. To form an attitude towards the constant search for applications of philosophical, socio-economic, psychological and other knowledge to solving problems of teaching and education. 5. To promote a deep understanding of the norms of professional ethics of a higher education teacher, an understanding of his/her responsibility to students, the establishment of partnerships and interactions with subjects of the educational space.

6. To gain an understanding of the specifics of the professional work of a higher education teacher.

As a result of training, the student should:

**know:**

- the main trends in the development of higher education in Russia and abroad;
- the structure of the modern Russian education system;
- methodological foundations of higher education pedagogy;
- the goals, methods, forms and means of teaching in higher education, the main forms of monitoring and evaluation of educational activities and their results;
- the tasks, principles, forms of educational work in the university;
- the essence of modern technologies of teaching and education;
- psychological and pedagogical aspects of pedagogical activity in a modern university;
- the content of the competencies of a higher education teacher;
- features of pedagogical communication in a higher education setting;
- the structure and content of the pedagogical culture of a higher education teacher;
- psychological characteristics of the student's personality as a subject of educational activity;

**be able to:**

- navigate the system of universal human values and take into account the value-semantic orientations of various social groups in Russian society;
  - apply methods and means of cognition, training and self-control for their intellectual development, growth of professional competence;
  - take a civic position in social and personal conflict situations;
  - develop and conduct lectures, seminars and control classes on pedagogy using various methods and means;
  - organize independent work of students;

**possess:**

- skills of socio-cultural communication, ensuring the adequacy of social and professional contacts;
- readiness to work in a team, social interaction on the basis of accepted moral and legal norms;



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- culture of thinking, the ability to analyze, generalize information, set goals and choose ways to achieve them, the culture of oral and written speech;
- skills of conducting psychological and pedagogical research;
- skills of self-development, improving one's qualifications and mastery;
- high motivation to perform professional activities.

#### **5.4. Educational Research Internship**

##### **The purpose of the discipline:**

- 1) the formation of professional competencies in a postgraduate student that contribute to the qualified conduct of scientific research in a scientific specialty, the use of scientific methods in research, analysis, generalization and use of the results obtained (scientific activity);
- 2) the study of the basics of pedagogical and educational-methodical work in an educational organization of higher education, mastering pedagogical skills in conducting individual types of classes in disciplines in educational organizations of higher education, the formation of a comprehensive psychological, pedagogical, socio-economic and information technology readiness of a postgraduate student for pedagogical activity.

##### **Objectives of the discipline:**

###### **- scientific activity:**

- 1) consideration of issues on the topic of scientific research (dissertation); collection, processing, analysis and systematization of information on the topic of the research
- 2) study of reference and bibliographic systems, methods of information retrieval; work with electronic databases of domestic and foreign library collections;
- 3) development of theoretical models of processes, phenomena and objects related to the field of research, assessment and interpretation of the results obtained;
- 4) argumentation for conducting a scientific discussion on the topic of the dissertation;
- 5) generalization and preparation of the results of the postgraduate student's research activities;

###### **- pedagogical activities:**

- 6) informing postgraduate students about the specifics of the content and organization of the educational process in higher education institutions;
- 7) implementation of psychological and pedagogical analysis of various objects of the pedagogical system; development of the ability to apply psychological and pedagogical knowledge in various forms of educational and extracurricular activities and events;
- 8) facilitating the development of skills in designing the educational process of reproductive, productive and creative levels, designing educational activities of various types, didactic processing of educational material, organization and management of educational and cognitive activities of students;
- 9) providing experience of creative activity as a teacher of specialized disciplines, skills in providing advisory assistance to students in performing research work;
- 10) formation of an individual style of pedagogical activity; improvement of the ability of self-analysis and self-assessment of pedagogical activity.

##### **As a result of training, the student should:**

###### **scientific activity:**

###### **know:**

- patterns of development of science and technology in the field of professional activity of the chosen focus (profile);



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- the main results of the latest research published in leading scientific journals and publications in the field of professional activity;

- modern scientific methods used in conducting scientific research in the field of professional activity;

**be able to:**

- apply modern scientific tools to solve practical problems in the field of professional activity;

- use modern software in conducting scientific research;

- formulate forecasts for the development of objects of professional activity;

**be proficient in the methods and methodology for:**

- conducting scientific research in the chosen focus (profile);

- collecting, analyzing and summarizing scientific material in the development of scientifically substantiated proposals and scientific ideas for the preparation of a scientific qualification work (dissertation);

- independently conducting scientific research and practical participation in the scientific research work of research teams;

- work on searching for information in the reference and bibliographic system and with library catalogs and electronic databases, bibliographic reference books, compiling scientific and bibliographic lists, using bibliographic descriptions in scientific papers;

- searching for scientific information using electronic information retrieval systems of the Internet;

- scientific modeling using modern scientific tools;

- experience of public speaking with scientific reports and messages at scientific and scientific-practical conferences, preparing scientific publications;

**pedagogical activity:**

**know:**

- methodological foundations of teaching the discipline;

- didactic and organizational forms of classes conducted in the traditional form and using information and communication technologies (ICT);

- fundamentals of regulatory and legal support for the educational process and protection of copyright on educational resources;

- means of supporting the teacher when using modern pedagogical technologies and virtual learning environments;

- fundamentals of the concept of continuous education;

**be able to:**

- develop teaching materials based on the modular principle;

- search for and apply didactically sound educational resources in the educational process;

- apply various forms of control over the educational process;

**possess:**

- the skills of organizing and conducting the educational process when teaching students using modern pedagogical technologies.

**5.5. A program of scientific (research) activities aimed at preparing a dissertation for the degree of candidate of science for defense**



**The purpose of scientific (research) activity:**

- obtaining new results that are important for theory and practice in the field of differential equations and mathematical physics;
- mastering the methodology of scientific creativity, acquiring skills in conducting scientific research;
- mastering theoretical and experimental research methods, mastering and creating new methods in the processes and phenomena of differential equations and mathematical physics;
- conducting scientific research based on in-depth professional knowledge and writing a dissertation for the degree of candidate of science.

**Tasks of scientific (research) activity:**

- application of the acquired knowledge in the implementation of scientific research in the field of differential equations and mathematical physics;
- defining the area of scientific research and analyzing the state of the issue in the studied subject area;
- performing theoretical research;
- developing experimental research methods; conducting experimental research;
- processing and analyzing the results of theoretical and experimental research;
- conducting independent scientific research in accordance with the developed program; further collection, systematization, processing of factual material on the topic of the dissertation.

**As a result of the training, the student should:**

- **know:** methods of searching for literary sources on the topic being developed for the purpose of using them when completing the dissertation; patent search; methods of research and conducting experimental work; methods of analyzing and processing experimental data; physical and mathematical models of processes and phenomena related to the object of study; information technology in scientific research, software products related to the professional sphere; requirements for the design of scientific and technical documentation.

- **be able to:** formulate the goals and objectives of scientific research; select and justify research methods; work with applied scientific packages and editing programs used in scientific research and development; formalize the results of scientific research (report preparation, writing scientific articles, abstracts of reports); make reports and presentations at conferences and seminars; work on experimental setups, devices and stands; analyze, systematize and generalize scientific and technical information on the research topic.

- **possess:** methods of conducting theoretical or experimental research within the framework of the set tasks, including a mathematical (simulation) experiment; methods of analyzing the reliability of the results obtained; methods of comparing the results of research on the object of development with domestic and foreign analogues; methods of analyzing the scientific and practical significance of the research conducted, as well as the technical and economic efficiency of the development; methods of preparing an application for a patent or for participation in a grant.

## **5.6. Final State Certification**

5.6.1. The final certification for postgraduate programs is carried out in the form of an assessment of the dissertation for its compliance with the criteria established in accordance with the Federal Law "On Science and State Scientific and Technical Policy", the Regulation on the Awarding of Academic Degrees, approved by the RF Government Resolution of September 24, 2013 No. 842 "On the Procedure for Awarding Academic Degrees".



5.6.2. A postgraduate student who has fully completed an individual work plan, including preparing a dissertation for defense, is admitted to the final certification. The volume of work must be at least 50 pages.

5.6.3. The final certification is mandatory.

5.6.4. FSBEI HE "CSU" (the department in which the dissertation was completed) issues a conclusion on the compliance of the dissertation with the criteria established in accordance with the Federal Law "On Science and State Scientific and Technical Policy" (hereinafter referred to as the conclusion), which is signed by the supervisor or, at his request, by the deputy supervisor (vice-rector).

5.6.5. To prepare the conclusion, the University has the right to involve members of the dissertation defense council for the degree of candidate of sciences, for the degree of doctor of sciences, who are specialists in the problems of each scientific specialty of the dissertation.

5.6.6. The conclusion reflects the personal participation of the postgraduate student in obtaining the results presented in the dissertation, the degree of reliability of the results of the research conducted by the postgraduate student, their novelty and practical significance, the value of the postgraduate student's scientific work, the compliance of the dissertation with the requirements established in accordance with the Federal Law "On Science and State Scientific and Technical Policy", the scientific specialty (scientific specialties) and the branch of science to which the dissertation corresponds, the completeness of the presentation of the dissertation materials in the works accepted for publication and (or) published by the postgraduate student.

5.6.7. A postgraduate student who has successfully passed the final certification for the postgraduate program (hereinafter referred to as a graduate) is issued a conclusion and a certificate of completion of postgraduate study no later than 30 calendar days from the date of the final certification.

• The procedure for the final certification of graduates with disabilities and disabled people provides for the provision of the necessary technical means and technical assistance, if necessary.

### **5.7. Features of the organization of the educational process in postgraduate programs for disabled people and people with disabilities**

5.7.1. The content of higher education in postgraduate programs and the conditions for organizing the training of students with disabilities are determined by the adapted postgraduate program, and for disabled people also in accordance with the rehabilitation program for disabled people.

5.7.2. The training of students with disabilities is carried out on the basis of postgraduate programs, adapted, if necessary, for the training of these students.

5.7.3. Training in postgraduate programs for students with disabilities is carried out by the organization taking into account the characteristics of the psychophysical development, individual capabilities and health status of such students.

5.7.4. Special conditions are created for students with disabilities to obtain higher education in postgraduate programs.

5.7.5. Special conditions for obtaining higher education in postgraduate programs for students with disabilities are understood to mean the conditions for training such students, including the use of special educational programs and methods of teaching and upbringing, special textbooks, teaching aids and didactic materials, special technical training aids for collective and individual use, provision of assistant (assistant) services providing students with the necessary technical assistance, conducting group and individual remedial classes, ensuring



access to the buildings of CSU and other conditions without which it is impossible or difficult for students with disabilities to master postgraduate programs.

5.7.6. In order to ensure accessibility of higher education in postgraduate programs for disabled people and people with disabilities, the university ensures:

5.7.6.1. for disabled people and people with disabilities in vision:

- the availability of an alternative version of the official CSU website on the Internet for the visually impaired;

- posting in accessible places and in a form adapted for students who are blind or visually impaired (taking into account their special needs) reference information about the schedule of classes (the information must be written in high-contrast font (on a white or yellow background) and duplicated in Braille);

- presence of an assistant providing the student with the necessary assistance;

- ensuring the release of alternative formats of printed materials (large font or audio files);

- ensuring access for a student who is blind and uses a guide dog to the CSU building;

5.7.6.2. for disabled people and people with limited hearing:

- duplication of audio reference information about the schedule of classes with visual (installation of monitors with the ability to broadcast subtitles (monitors, their size and number must be determined taking into account the size of the room));

- provision of appropriate sound means of information reproduction;

5.7.6.3. for disabled people and people with limited health capabilities who have musculoskeletal disorders, the material and technical conditions must ensure the possibility of unimpeded access of students to classrooms, canteens, restrooms and other premises of CSU, as well as their stay in the said premises (availability of ramps, handrails, widened doorways, elevators, local lowering of barrier posts; availability of special chairs and other devices).

5.7.7. Education of students with limited health capabilities can be organized both jointly with other students, and in separate groups or in separate organizations.

5.7.8. When receiving higher education under postgraduate programs, students with limited health capabilities are provided free of charge with special textbooks and teaching aids, other educational literature, as well as the services of sign language interpreters and tiflosigner interpreters.

5.7.9. Completion of teaching practice:

– when determining the places for completing practice for students with disabilities and disabled people, the recommendations contained in the conclusion of the psychological, medical and pedagogical commission, or the recommendations of the medical and social examination contained in the individual rehabilitation program for the disabled person regarding the recommended conditions and types of work are taken into account;

– if necessary, special workplaces are created for completing practice in accordance with the nature of health limitations, as well as taking into account the nature of the work and the work functions performed;

– the forms of conducting practice for disabled people and people with disabilities can be established taking into account the characteristics of their psychophysical development, individual capabilities and health status.

## **6. REQUIREMENTS TO THE CONDITIONS OF IMPLEMENTING PROGRAMS FOR TRAINING SCIENTIFIC AND SCIENTIFIC-PEDAGOGICAL STAFF IN POSTGRADUATE STUDIES**



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Requirements for the conditions for implementing the postgraduate program in scientific specialty 1.1.2. Differential equations and mathematical physics include requirements for material and technical and educational and methodological support, and for personnel conditions for implementing the program.

### **6.1. General requirements**

FSBEI HE "CSU", Department of Mathematical Analysis provides the postgraduate student with access to the following during the entire period of study:

- research infrastructure in accordance with the postgraduate program and individual work plan;

- the electronic information and educational environment of the university (EIEE) via the information and telecommunications network "Internet" and (or) the local network of CSU within the limits established by the legislation of the Russian Federation in the field of protection of state and other secrets protected by law;

- curricula, work programs of disciplines (modules), practice, research activities, electronic educational resources specified in the work programs, information on the results of midterm assessments with the results of the implementation of the individual plan of research activities and assessments of the implementation of the individual work plan;

- educational and methodological materials, library collections and library reference systems, as well as information, information and reference systems, professional databases, the composition of which is determined by this program and individual work plan.

Each student is provided with individual unlimited access to one or several electronic library systems and to the electronic information and educational environment of the university from any access point during the entire period of study.

The standard of provision of educational activities with educational publications is determined based on the calculation of at least one educational publication in printed and (or) electronic form, sufficient for mastering the postgraduate program, for each postgraduate student for each discipline (module) included in the individual work plan.

When implementing the postgraduate program in a network form, the requirements for the conditions for implementing the program, stipulated by federal state requirements, are met using the resources of several organizations carrying out educational activities, including foreign ones, and, if necessary, using the resources of other organizations using the network form of implementing the postgraduate program.

### **6.2. Personnel conditions for implementation**

The qualifications of the organization's management and scientific-pedagogical staff must correspond to the qualification characteristics established in the Unified Qualification Handbook of Positions of Managers, Specialists and Employees, section "Qualification Characteristics of Positions of Managers and Specialists of Higher Professional and Further Professional Education", approved by the order of the Ministry of Health and Social Development of the Russian Federation dated January 11, 2011 No. 1 n (registered by the Ministry of Justice of the Russian Federation on March 23, 2011, registration No. 20237), and the professional standards of a Teacher, Research Fellow and Manager.

Associate Professor: higher professional education, academic degree of candidate (doctor) of sciences and at least 3 years of experience in scientific and pedagogical work or the academic title of associate professor (senior research fellow). Professor: higher professional education, academic degree of Doctor of Science and at least 5 years of experience in scientific and pedagogical work or academic title of Professor;



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Head of Department: higher professional education, academic degree and academic title, at least 5 years of experience in scientific and pedagogical work or work in organizations in the area of professional activity corresponding to the activities of the department.

Dean of Faculty: higher professional education, at least 5 years of experience in scientific or scientific and pedagogical work, academic degree or academic title.

Head (Manager) of Educational (Educational and Industrial, Industrial) Practice: higher professional education and at least 3 years of experience in teaching positions or managerial positions in organizations in the area of professional activity corresponding to the activities of the educational institution (structural division). At least 60 percent of the number of full-time scientific and (or) scientific and pedagogical staff participating in the implementation of the postgraduate program must have an academic degree (including an academic degree obtained in a foreign state and recognized in the Russian Federation) and (or) an academic title (including an academic title obtained in a foreign state and recognized in the Russian Federation).

The postgraduate student's supervisor must:

- have an academic degree of Doctor of Science, or in certain cases, by decision of the Academic Council of the FSBEI HE "CSU", an academic degree of Candidate of Science, or an academic degree obtained in a foreign state recognized in the Russian Federation;

- carry out scientific (research) activities (participate in the implementation of such activities) in the relevant area of research within the framework of a scientific specialty over the past 3 years;

- have publications on the results of the implementation of the said scientific (research) activity in peer-reviewed domestic and (or) foreign scientific journals and publications;

- carry out testing of the results of the said scientific (research) activity, including participation with reports on the topic of scientific (research) activity at Russian and (or) international conferences over the past 3 years.

The procedure for attracting persons with a candidate of science degree to the scientific supervision of postgraduate students, as well as the requirements for publications, are determined in accordance with the procedure for appointing a scientific supervisor, approved by a local regulatory act of the Federal State Budgetary Educational Institution of Higher Education "CSU".

### **6.3. Material, technical and educational conditions for implementation**

The University has a material and technical base that meets current sanitary and technical standards and ensures all types of theoretical and practical training provided for by the graduate student's curriculum, as well as the completion of the final qualifying work. The University's computer classes are equipped with modern high-performance computers and are connected by a local network with Internet access. It maintains its own website: <http://csu.ru>.

The training of graduate students according to the presented educational program is provided by a scientific and laboratory base.

Name	Count	Room (Building 1)
Total computers	37	-
General University Computer Classes (Building 1)	3	-
Computers in computer labs	11	325
	14	333



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Information is available on the CSU website in the section "Information about CSU" (Material and technical support and equipment of the educational process).

The Faculty of Mathematics has a material and technical base that ensures all types of practice-oriented and research work. The educational process is provided with laboratory equipment and computing technology in accordance with the Federal State Educational Standards.

The faculty has educational, research laboratories equipped with modern computers and multimedia complexes: an educational computing laboratory (2 computer classes, 24 computers), a laboratory of optimization methods and modeling of game situations, an educational and scientific laboratory of computer geometry, a research laboratory of quantum topology, an educational and scientific laboratory of technical teaching aids (10 computers), an educational and scientific laboratory "Network Polygon" (15 computers). All computers of the departments and laboratories of the Faculty of Mathematics are connected by a local network and have Internet access. The faculty has its own website [math.csu.ru](http://math.csu.ru), which contains educational and scientific materials developed by faculty staff.

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

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

The rooms for independent work (room 205) are equipped with computer equipment with an Internet connection and access to the electronic information and educational environment of Chelyabinsk State University: 50 seats, 5 personal computers with an Internet connection, unlimited access to the electronic library system and database, educational furniture, air conditioning. Software: Microsoft Windows 10 Pro. (Licenses are perpetual. Agreement No. AE-223/28/18), Microsoft Office 2016 Pro (Licenses are perpetual. 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 the distribution of legal information). Microsoft Office 2013 office software package, licenses are perpetual, agreement No. 180/s dated 11.07.2013.

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

The implementation of disciplines, practices using e-learning, distance learning technologies (hereinafter referred to as EL, DET) is carried out on the basis of the "Regulations on the implementation of basic and additional educational programs using e-learning and distance learning technologies in the Federal State Budgetary Educational Institution of Higher Education "Chelyabinsk State University"", "Regulations on the procedure for crediting students in the main professional educational programs of higher education at the FSBEI HE "CSU" the results of mastering in organizations implementing educational activities, academic subjects, courses, disciplines (modules), practices, additional educational programs" through the electronic information and educational environment of the FSBEI VO "CSU". In exceptional cases (force majeure, etc.), when implementing educational activities using EL, DET, components that are not included in the structure of the electronic information and educational environment of the university can be used. Educational and educational-methodical literature and other library and information resources of Chelyabinsk State University ensure the educational process and

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guarantee the possibility of high-quality mastering of the educational program by postgraduate students. The Scientific Library of Chelyabinsk State University meets the requirements of the Model Regulation on the formation of funds of the library of a higher educational institution, approved by the order of the Ministry of Education of Russia dated 27.04.2000 No. 1246. The library receives abstract journals of VINITI, bibliographic indexes of INION, domestic and local text journals, including on electronic media. The library funds contain the main Russian abstract and scientific journals on physical and mathematical sciences and related sciences, included in the "List of Russian peer-reviewed scientific journals in which the main scientific results of dissertations for the degrees of doctor and candidate of sciences must be published", approved by the Higher Attestation Commission of the Ministry of Education and Science of the Russian Federation.

Information resources of the university library.

The library website [www.lib.csu.ru](http://www.lib.csu.ru) is the means of access to the system of its own electronic resources. The electronic catalogue provides a complete and prompt overview of the library collection, improves the quality and efficiency of information retrieval – more than 1.5 million records.

1. Electronic catalogue. Bibliographic databases.

Books, electronic resources, dissertations and dissertations.

2. Electronic library.

Chelyabinsk State University publications, teaching and methodological complex; dissertations defended in Chelyabinsk State University councils, reserve collections, rare book collection, Informio electronic reference book, statistical publications of Russia and the CIS countries.

3. Abstract

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 the full-text collection of Russian scientific journals (2011-2015, 148 titles), publishers: Taylor&Francis, Sage Publications (archive of scientific journals); Springer, American Physical Society (<http://www.journals.aps.org/about>), American Mathematical Society (<http://www.ams.org/mathscinet>), Wiley (<http://onlinelibrary.wiley.com>).

5. Electronic library systems with the ability to use licensed materials from anywhere with access to the Internet (registration from the university network of a personal account): University Library Online ([www.biblioclub.ru](http://www.biblioclub.ru)), Lan ([www.e.lanbook.com](http://www.e.lanbook.com)).

In case of non-use of the electronic library system (electronic library) in the organization, the library collection must be equipped with printed publications at the rate of not less than 50 copies of each of the publications of the required literature listed in the work programs of disciplines (modules), practices, and not less than 25 copies of additional literature per 100 students.

The electronic library system (electronic library) and the electronic information and educational environment must provide simultaneous access to at least 25 percent of students in the postgraduate program.



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The university departments have equipped laboratories, educational and methodological offices, including research literature on the scientific specialty, scientific journals and proceedings of scientific conferences.

Students with disabilities and disabled students must be provided with printed and electronic educational resources (programs, textbooks, teaching aids, materials for independent work, etc.) in forms adapted to their health limitations and information perception:

**for visually impaired students:**

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

**for hearing impaired students:**

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

**for students with musculoskeletal disorders:**

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

For students with disabilities and students with disabilities to obtain higher education in postgraduate programs, the university has classrooms equipped with the following equipment:

Room name	Equipment
Room 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.
Room 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 Room, Room A-27, First Academic Building	Computer class for 2 people, interactive whiteboard ActiveBoard with voting system, acoustic amplifier and speakers, multimedia projector, TV, VCR, VCON HD3000 videoconferencing device.

All disciplines 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 CSU.

#### 6.4. Financial terms of implementation

Financial support for the implementation of the postgraduate program is provided at a level not lower than the basic standard costs established by the Ministry of Education and Science



of the Russian Federation for the provision of public services in the field of education for the level of training of highly qualified personnel in accordance with the Methodology for determining standard costs for the provision of public services for the implementation of state-accredited higher education programs in specialties and areas of training, approved by the Ministry of Education and Science of the Russian Federation on August 2, 2013, No. 638.

## **7. CHARACTERISTICS OF THE UNIVERSITY'S SOCIAL-CULTURAL ENVIRONMENT AND EDUCATIONAL WORK**

FSBEI HE "CSU" has created a favorable socio-cultural environment that provides the opportunity to form general cultural competencies of the student, comprehensive development of the individual, and also directly contributes to the development of the main educational program of the corresponding field of study.

The socio-cultural environment is a relatively stable set of material and personal elements surrounding a person, directly influencing the process of his professionalization, socialization and individualization.

A factor in the development of the socio-cultural environment at the university is educational work.

Educational work is a pedagogical activity aimed at organizing an educational environment and managing various types of activities of students in order to create conditions for their introduction to the socio-cultural and spiritual and moral values of the peoples of the Russian Federation, full development, self-development and self-realization of the individual with the active participation of the students themselves.

The main areas of educational work are: civic-patriotic and spiritual and moral education; volunteer activities; legal and social protection of students; environmental education; formation of motivation for a healthy lifestyle; work on the formation of a psychologically comfortable environment; physical education and health work; work on the prevention of offenses; cultural and mass work; development of student self-government; strengthening the public image and corporate spirit of the university.

At Chelyabinsk State University, the main goal of educational work is the development of professional, intellectual, personal and social potential of students, the development of civic responsibility and legal awareness, spirituality and culture, initiative, independence, tolerance, the ability to successfully socialize in society, competitiveness and active adaptation in the labor market among students.

To achieve this goal, the following tasks have been defined:

1. formation of an optimal university environment aimed at fostering high spiritual qualities, patriotism, hard work, responsibility and self-discipline in students, as well as developing competitiveness;
2. formation of psychological and legal readiness of students for future professional activities;
3. development of student self-government and youth associations;
4. support for the development of student initiatives;
5. promotion of a healthy lifestyle, prevention of drug addiction, alcoholism and other socially harmful phenomena in the university environment;
6. preservation and enhancement of the university's traditions;
7. promotion of its history, symbols, prestige and high quality of education.

The set tasks are implemented in accordance with the following documents:

- The Constitution of the Russian Federation;



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– Federal Laws of 29.12.2012 No. 273-FZ "On Education in the Russian Federation", of 31.07.2020 No. 304-FZ "On Amendments to the Federal Law "On Education in the Russian Federation" on Issues of Upbringing of Students", of 05.02.2018 No. 15-FZ "On Amendments to Certain Legislative Acts of the Russian Federation on Issues of Volunteering (Volunteering)";

– Decrees of the President of the Russian Federation of 31.12.2015 No. 683 "On the National Security Strategy of the Russian Federation" (as amended on 06.03.2018), of 19.12.2012 No. 1666 "On the Strategy of the State National Policy of the Russian Federation for the Period up to 2025", of 24.12.2014 No. 808 "On Approval of the Fundamentals of the State Cultural Policy", of 07.05.2018 No. 204 "On National Goals and Strategic Objectives for the Development of the Russian Federation for the Period up to 2024", of 09.05.2017 No. 203 "Strategy for the Development of the Information Society in the Russian Federation for 2017-2030"; – Government Orders of 29.11.2014 No. 2403-r "Fundamentals of the State Youth Policy of the Russian Federation for the Period up to 2025", of 29.05.2015 No. 996-r "Strategy for the Development of Education in the Russian Federation for the Period up to 2025", of 29.12.2014 No. 2765-r "Concept of the Federal Target Program for the Development of Education for 2016-2020";

– Resolution of the Government of the Russian Federation of 26.12.2017 No. 1642 On Approval of the State Program of the Russian Federation "Education Development";

– Action plan for the implementation of the Fundamentals of the State Youth Policy of the Russian Federation for the period up to 2025, approved by the Order of the Government of the Russian Federation dated November 29, 2014 No. 2403-r;

– Methodological recommendations on the creation and activities of student councils in educational organizations (letter of the Ministry of Education and Science of the Russian Federation dated February 14, 2014 No. VK-262/09).

The educational environment at the university is built in accordance with local regulations:

- Charter of the Federal State Budgetary Educational Institution of Higher Education "Chelyabinsk State University", approved by order of the Ministry of Education and Science of Russia dated December 24, 2018 No. 1251;

- Internal Regulations for Students of the Federal State Budgetary Educational Institution of Higher Education "CSU", approved by order dated July 8, 2020 No. 341-1;

- The concept of educational work of the Federal State Budgetary Educational Institution of Higher Education "CSU" for 2021-2025, approved by the order of 27.01.2021 No. 50-1;

- The program of spiritual, moral and civic-patriotic education of students;

- The regulation on the procedure for students to attend events not provided for by the curriculum, approved by the order of 06.09.2016 No. 486-1;

- The plan of activities for organizing work on the prevention and prophylaxis of extremism and terrorism in the Federal State Budgetary Educational Institution of Higher Education "CSU" for 2022-2023, approved by the order of 01.04.2022 No. 203-1;

- Regulations on the student council "United Council of Students" of the Federal State Budgetary Educational Institution of Higher Education "CSU", approved by order dated 30.06.2016 No. 454-1;

- Regulations on scholarship provision and other forms of social support for students of the Federal State Budgetary Educational Institution of Higher Education "CSU", approved by order dated 27.01.2021 No. 49-1, as amended on 09.12.2021 No. 679-1;



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- Regulations on the student dormitory of the Federal State Budgetary Educational Institution of Higher Education "CSU", approved by order dated 24.08.2021 No. 477-1;
- Internal regulations in the hostel of Chelyabinsk State University, approved by order of 24.08.2021 No. 476-1.

In order to improve the efficiency and quality of organizational and managerial support for the functioning of the educational system, the university has created the following organizational structures and public associations: Educational Work Department, Students' Trade Union Organization, United Students' Council, Students' Creativity Center, Sports and Tourist Clubs, etc.

FSBEI HE "CSU" has a material and technical base that ensures the organization and implementation of extracurricular activities: an assembly hall, a coworking center, a conference hall, sports halls, a workout area, a mini-football area, a roller ski track, etc.

Education in the educational activities of FSBEI HE "CSU" is systemic, planned and continuous. The main means of implementing such activities is the educational system and the corresponding Educational Work Program, which defines a set of basic characteristics of the educational work system implemented by the university, and the Educational Work Plan for the calendar year, which specifies the list of educational events and activities that are organized and conducted by the Federal State Budgetary Educational Institution of Higher Education "CSU" ([https://www.csu.ru/Shared%20Documents/sveden/metod\\_mat/Prilogenie\\_6\\_KPVR.pdf](https://www.csu.ru/Shared%20Documents/sveden/metod_mat/Prilogenie_6_KPVR.pdf)

[https://www.csu.ru/Shared%20Documents/sveden/metod\\_mat/Prilogenie\\_5\\_RPV.pdf](https://www.csu.ru/Shared%20Documents/sveden/metod_mat/Prilogenie_5_RPV.pdf)).



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Application

**PLANNED LEARNING OUTCOMES AND THEIR ASSESSMENT CRITERIA**

Planned learning outcomes	Criteria for assessing learning outcomes				
	1	2	3	4	5
<b>Scientific component</b>					
<b>Scientific Activities Aimed at Preparation of the Thesis Defence</b>					
KNOW: methods of critical analysis and evaluation of modern scientific achievements, as well as methods of generating new ideas when solving research and practical problems, including in interdisciplinary areas	Lack of knowledge	Fragmentary knowledge of methods of critical analysis and evaluation of modern scientific achievements, as well as methods of generating new ideas when solving research and practical problems	General but unstructured knowledge of methods of critical analysis and evaluation of modern scientific achievements, as well as methods of generating new ideas when solving research and practical problems	Formed, but containing some gaps, knowledge of the main methods of critical analysis and evaluation of modern scientific achievements, as well as methods of generating new ideas in solving research and practical problems, including interdisciplinary ones	Formed systematic knowledge of methods of critical analysis and evaluation of modern scientific achievements, as well as methods of generating new ideas in solving research and practical problems, including interdisciplinary ones



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BE ABLE TO: analyze alternative solutions to research and practical problems and evaluate potential gains/losses from implementing these options	Lack of skills	Partially mastered ability to analyze alternative solutions to research and practical problems and evaluate potential gains/losses of implementing these options	In general, successful but not systematic analysis of alternative solutions to research and practical problems and assessment of potential gains/losses in implementing these options	Overall successful, but containing some gaps, analysis of alternative options for solving research problems and assessment of potential gains/losses from implementing these options	Developed ability to analyze alternative solutions to research and practical problems and evaluate potential gains/losses in implementing these options
BE ABLE TO: generate new ideas that can be operationalized based on available resources and limitations when solving research and practical problems	Lack of skills	Partially mastered ability to generate ideas that can be operationalized based on available resources and constraints when solving research and practical problems	A generally successful, but not systematically implemented, ability to generate ideas that can be operationalized based on available resources and constraints when solving research and practical problems	Overall successful, but with some gaps, ability to generate ideas that can be operationalized based on available resources and limitations when solving research and practical problems	Developed ability to generate ideas that can be operationalized based on available resources and limitations when solving research and practical problems



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POSSESS: skills in analyzing methodological problems that arise when solving research and practical problems, including in interdisciplinary areas	Lack of skills	Fragmentary application of skills in analyzing methodological problems arising in solving research and practical problems	Generally successful, but not systematic application of skills in analyzing methodological problems that arise when solving research and practical problems	Overall successful, but containing some gaps, application of skills in analyzing methodological problems arising in solving research and practical problems	Successful and systematic application of skills in analyzing methodological problems arising in solving research and practical problems, including in interdisciplinary areas
POSSESS: skills of critical analysis and evaluation of modern scientific achievements and results of activities in solving research and practical problems, including in interdisciplinary areas	Lack of skills	Fragmentary application of technologies of critical analysis and evaluation of modern scientific achievements and results of activities in solving research and practical problems.	In general, successful, but not systematic application of technologies of critical analysis and evaluation of modern scientific achievements and results of activities in solving research and practical problems.	In general, the application of technologies for critical analysis and evaluation of modern scientific achievements and results of activities to solve research and practical problems is successful, but contains some gaps.	Successful and systematic application of technologies of critical analysis and evaluation of modern scientific achievements and results of activities in solving research and practical problems.
<b>Successful and systematic application of technologies of critical analysis and evaluation of modern scientific achievements and results of activities in solving research and practical problems.</b>					
KNOW: methods of scientific research activities	Lack of knowledge	Fragmentary ideas about the methods of scientific research activities	Incomplete understanding of research methods	Formed, but containing some gaps, ideas about the methods of scientific research activities	Formed systematic ideas about the methods of scientific research activities



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BE ABLE TO: use the provisions and categories of the history and philosophy of science to analyze and evaluate various facts and phenomena	Lack of skills	Fragmentary use of the provisions and categories of the philosophy of science for the evaluation and analysis of various facts and phenomena	Generally successful, but not systematic, use of the principles and categories of the philosophy of science to evaluate and analyze various facts and phenomena	Overall successful, but containing some gaps, use of the provisions and categories of the philosophy of science to evaluate and analyze various facts and phenomena	Developed ability to use the provisions and categories of the philosophy of science to evaluate and analyze various facts and phenomena
POSSESS: skills in analyzing the main ideological and methodological problems, including interdisciplinary ones, arising in science at the current stage of its development	Lack of skills	Fragmentary application of skills in analyzing the main ideological and methodological problems arising in science at the current stage of its development	In general, successful, but not systematic application of skills in analyzing the main ideological and methodological problems arising in science at the current stage of its development	Overall successful, but containing some gaps, application of skills in analyzing the main ideological and methodological problems arising in science at the current stage of its development	Successful and systematic application of skills in analyzing the main ideological and methodological problems arising in science at the current stage of its development
<b>Educational component</b>					
<b>Courses (modules)</b>					
<b>History and Philosophy of Science</b>					
KNOW: basic concepts of the philosophy of science, traditional and modern problems of the philosophy of	Lack of knowledge	There is a superficial understanding of the concepts of philosophy of science, but it is not	There is a sufficient understanding of the basic concepts of the philosophy of science,	A good understanding of the basic concepts of the philosophy of science	Deep understanding of the basic concepts of philosophy of science and the ability to



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science, methods of formation and verification of scientific knowledge, basic modern concepts of the philosophy of science		sufficiently precise and systematized.	but does not always know how to apply them in practice	and the ability to apply them in practice	critically analyze their application in practice. Deep knowledge of traditional and contemporary problems in the philosophy of science and the ability to critically analyze their relationship with the basic concepts
BE ABLE TO: conduct a critical analysis of texts on the philosophy of science, classify and systematize areas of philosophy of science, consistently and reasonably present educational material on the philosophy of science;	Lack of skills	Has limited ability to conduct critical analysis of texts on the philosophy of science, but not in a sufficiently accurate and systematic manner	Able to present educational material on the philosophy of science in a consistent and well-reasoned manner, but not always in a consistent and well-reasoned manner	He is good at classifying and systematizing the directions of philosophy of science, consistently and reasonably.	Excellent at classifying and systematizing the directions of philosophy of science, consistently and reasonably, taking into account various points of view
POSSESS: methods of logical analysis of the material being studied; skills of public presentation, argumentation, conducting discussions and polemics; the ability to use	Lack of skills	Has a limited ability to use theoretical principles of philosophy of science in his/her work, but not	Able to use theoretical principles of philosophy of science in his work, but not always consistently and reasonably	Well able to use theoretical principles of philosophy of science in his work, consistently and reasonably	Excellent ability to use theoretical principles of philosophy of science in his/her work, consistently and reasonably, applies



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theoretical provisions of the philosophy of science in one's work.		in a precise or systematic manner			them in the context of specific problems and issues related to scientific research and practical activities, and is also able to analyze and critically evaluate the methods and approaches used in scientific research from the point of view of the philosophy of science
<b>Foreign Language</b>					
KNOW: 5500 lexical units, taking into account the university minimum and potential vocabulary, including approximately 500 terms of the major specialty; rules of grammatical organization and functioning of the language being studied; basic rules for organizing monologue and dialogic statements	Lack of knowledge	Has limited knowledge of the grammar rules of the language, is familiar with some basic rules, but does not have a good command of them.	Knows the grammar rules of the language, has basic rules necessary for communication in the language. Knows the vocabulary minimum, has basic words and expressions necessary for communication in the language. Can organize monologues and dialogic statements, but not	Has a good knowledge of the vocabulary minimum, owns a large number of words and expressions necessary for communication in the language. Has a good knowledge of the grammar rules of the language, owns a large number of rules necessary for	Excellent knowledge of the vocabulary minimum, a large number of words and expressions necessary for communication in the language, as well as specific vocabulary related to the profile specialty. Excellent knowledge of the grammar rules of the



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			always consistently and reasonably	communication in the language. Has a good knowledge of the terminology of the profile specialty, owns a large number of terms necessary for understanding and communication in a professional environment.	language, mastery of all the rules necessary for communication in the language, and can apply them in various situations. Excellent knowledge of the terminology of the profile specialty, mastery of all the terms necessary for understanding and communication in a professional environment, and is also able to apply them in practical activities and scientific work.
BE ABLE TO: freely read original literature in a foreign language in the relevant field of knowledge; present information extracted from foreign sources in the form of a translation or summary;	Lack of skills	Has limited ability to conduct a conversation in a foreign language in their specialty, uses a limited set of vocabulary and cannot	Can conduct a conversation in a foreign language in the specialty, using specialized vocabulary and is able to maintain a dialogue at a professional level. Can	Can make reports and presentations in a foreign language on topics related to scientific work, using specialized vocabulary and structuring information in	Excellent at making reports and presentations in a foreign language on topics related to scientific work, using a high level of



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make reports and presentations in a foreign language on topics related to the scientific work of a postgraduate student (applicant); conduct a conversation on the specialty;		maintain a dialogue at a professional level	make reports and presentations in a foreign language on topics related to scientific work, using specialized vocabulary and structuring information in accordance with the requirements of the task.	a logical sequence. Can conduct a conversation in a foreign language in the specialty, using a high level of specialized vocabulary and is able to express his/her thoughts clearly and logically.	specialized vocabulary, excellent structuring of information and a professional approach to preparing and delivering reports. Excellent at conducting a conversation in a foreign language in his/her specialty, using a high level of specialized vocabulary, a professional approach to preparing and delivering a conversation and is able to effectively communicate with colleagues in a foreign language.
POSSESS: the spelling, orthoepic, lexical, grammatical and stylistic norms of the language being studied within the program	Lack of skills	Has limited knowledge of spelling rules, makes some mistakes in his written speech. Has limited knowledge of	Can pronounce words in the target language correctly, but may make minor mistakes in rare cases. Can correctly use	Has a good command of etiquette formulas and uses them correctly when conducting a dialogue and scientific discussion.	Has excellent command of orthoepic norms and pronounces all words in the language being studied



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<p>requirements and use them correctly in all types of speech communication, in the scientific field in the form of oral and written communication; the basic formulas of etiquette when conducting a dialogue, scientific discussion, when constructing a message, etc.</p>		<p>orthoepic rules, makes some mistakes in pronunciation of words. Has limited knowledge of lexical and grammatical rules, makes some mistakes in his speech.</p>	<p>the lexical and grammatical norms of the target language in his/her speech, but may make minor mistakes in rare cases. Can correctly use stylistic norms in his/her speech, but may make minor mistakes in rare cases.</p>	<p>Has a good command of stylistic norms and uses them effectively and correctly in his speech. Has a good command of the lexical and grammatical norms of the language being studied and does not make mistakes in his speech. Has a good command of orthoepic norms and correctly pronounces all words in the language being studied.</p>	<p>without mistakes. Has excellent command of spelling norms and does not make mistakes in his written speech under any circumstances. Has excellent command of the lexical and grammatical norms of the language being studied and uses them correctly in his speech without mistakes.</p>
<p><b>Differential Equations and Mathematical Physics</b></p>					
<p>KNOW: the main results of the theory of differential equations, including those related to dynamic systems and optimal control problems;</p>	<p>Lack of knowledge</p>	<p>Has limited knowledge of differential equations and can define them in some cases, but does not know their classification and properties. Has limited ability to solve</p>	<p>Has basic knowledge of differential equations, their classification and properties, but may make mistakes in their definition. Can solve differential equations of various types, but may make small mistakes in</p>	<p>Knows differential equations well, their classification and properties, and can define them without errors. Can solve differential equations of various types well and does not</p>	<p>Excellent knowledge of differential equations, their classification and properties, and can apply them in various contexts. Excellent knowledge of solving differential equations</p>



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		differential equations, but may make mistakes in the process of solving. Has limited knowledge of dynamic systems, their properties and behavior, but cannot apply them in practical problems.	rare cases. Has basic knowledge of dynamic systems, their properties and behavior, and can apply them to simple problems.	make mistakes in the process of solving.	of various types and can apply them in various contexts.
BE ABLE TO: integrate differential equations of the main classes, find solutions to initial and boundary value problems for them, solve problems of optimal control of systems described by differential equations;	Lack of skills	Limited ability to solve differential equations and integrate them, with possible errors. Limited ability to find solutions to initial and boundary value problems for differential equations, with possible errors.	Basic ability to solve optimal control problems for systems described by differential equations, without significant errors. Basic ability to find solutions to initial and boundary value problems for differential equations, without significant errors. Basic ability to solve differential equations and integrate them, without significant errors.	Good ability to solve differential equations and integrate them, without errors. Good ability to find solutions to initial and boundary value problems for differential equations, ability to solve problems of optimal control of systems described by differential equations, without errors.	Excellent ability to solve optimal control problems for systems described by differential equations and apply them in various contexts. Excellent ability to find solutions to initial and boundary value problems for differential equations. Excellent ability to solve differential equations and integrate



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					them and apply them in various contexts.
POSSESS: the basic concepts and skills of the theory of differential equations and dynamic systems, the theory of optimal control.	Lack of skills	Limited understanding of the basic concepts and theory of differential equations, theory of dynamic systems with possible errors. Limited understanding of the basic concepts and theory of optimal control, with possible errors.	Basic understanding of the fundamental concepts and theory of differential equations, the fundamental concepts and theory of dynamic systems, the fundamental concepts and theory of optimal control, without significant errors.	Good understanding of the basic concepts and theory of optimal control, the basic concepts and theory of dynamic systems, the basic concepts and theory of differential equations, without errors.	Excellent understanding of the basic concepts and theory of differential equations, the basic concepts and theory of dynamical systems, the basic concepts and theory of optimal control, and the ability to apply them in a variety of contexts.
<b>Differential Equations in Linear Topological Spaces</b>					
KNOW: fundamental principles of differential equations, dynamic systems and optimal control	Lack of skills	Limited knowledge of the basic definitions of the theory of differential equations, with possible errors.	Basic knowledge of the main definitions of the theory of differential equations, without significant errors.	Good knowledge of the basic statements of the theory of differential equations, without errors.	Excellent knowledge of the basic concepts of differential equation theory, with the ability to apply them in various contexts.
BE ABLE TO: apply methods of mathematical analysis, differential equations and dynamic systems in solving	Lack of skills	Limited ability to apply methods for solving differential equations with possible errors.	Basic ability to apply methods of differential equations when	Good ability to apply methods of solving differential equations	Excellent ability to apply differential equation solving techniques to problems



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problems of higher mathematics			considering problems without significant errors.	when considering problems without errors.	and the ability to apply them in a variety of contexts.
POSSESS: skills in solving problems related to differential equations	Lack of skills	Limited knowledge of the basic concepts of the theory of differential equations, with possible errors.	Basic knowledge of the main concepts of the theory of differential equations, without significant errors.	Good knowledge of the basic concepts of the theory of differential equations, without errors.	Excellent knowledge of the basic concepts of differential equation theory, with the ability to apply them in various contexts.
<b>Integral Transformations</b>					
KNOW: criteria for system analysis of assigned tasks, methods of planning and organizing research;	Lack of skills	Limited knowledge of basic concepts of systems analysis, with possible errors.	Basic knowledge of system analysis criteria, without significant errors.	Good knowledge of research planning and organization methods	Excellent knowledge of research planning and organization methods, with the ability to apply them in various contexts. Excellent knowledge of the basic concepts of systems analysis, with the ability to apply them in various contexts.
BE ABLE TO: search for information, determine the criteria for a systemic analysis	Lack of skills	Limited ability to search for information, determine criteria for	Basic ability to search for information, determine criteria for systems	Good ability to search for information, determine the criteria for system	Excellent ability to conduct research, write a description of it and



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<p>of the tasks set, conduct a search, study and generalize scientific experience in the relevant area of research; determine the goals and objectives of planned research and development; conduct research, compile its description, formulate conclusions based on the results obtained;</p>		<p>systems analysis, conduct searches, study and generalize scientific experience, determine the goals and objectives of planned research and development, with possible errors in assessing reliability and significance.</p>	<p>analysis, conduct searches, study and generalize scientific experience, determine the goals and objectives of planned research and development, without significant errors in assessing the reliability and significance.</p>	<p>analysis, conduct a search, study and generalize scientific experience, determine the goals and objectives of planned research and development, conduct research, compile its description and formulate conclusions based on the results obtained, without errors in assessing the reliability and significance.</p>	<p>formulate conclusions based on the results obtained. Excellent ability to define the goals and objectives of planned research and development, with the ability to formulate tasks and develop a strategy for achieving goals in complex and uncertain conditions. Excellent ability to search, study and generalize scientific experience, with the ability to find and use the most modern and most significant sources of information.</p>
<p>POSSESS: skills in using critical analysis, systematization and generalization of information to solve assigned tasks, skills</p>	<p>Lack of skills</p>	<p>Limited ability to use critical analysis, systematize and generalize information to solve assigned tasks,</p>	<p>Basic ability to conduct scientific research in accordance with the set goal, without significant errors in the choice of</p>	<p>Good ability to use critical analysis, systematize and generalize information to solve assigned tasks,</p>	<p>Excellent ability to use critical analysis, with the ability to apply it in various contexts. Excellent ability to</p>



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<p>in conducting scientific research in accordance with the assigned goal, skills in preparing reports on the topic and on the results of the conducted scientific research.</p>		<p>with possible errors in assessing the reliability and significance of data. Limited ability to conduct scientific research, with possible errors in the selection of research methods and techniques, analysis and interpretation of data and the formulation of conclusions based on them.</p>	<p>research methods and techniques, analysis and interpretation of data and formulation of conclusions based on them. Basic ability to prepare reports on the topic and on the results of scientific research developments, without significant errors in structuring information, formulating conclusions and recommendations and presenting research results.</p>	<p>conduct scientific research in accordance with the set goal, prepare reports on the topic and on the results of scientific research, without errors in assessing the reliability and significance of data.</p>	<p>systematize and generalize information to solve assigned tasks, with the ability to apply various methods of systematization and establish complex connections between tasks. Excellent ability to conduct scientific research in accordance with the set goal, with the ability to apply various methods and techniques of research, analyze and interpret data and formulate conclusions based on them in complex and multifaceted tasks.</p>
<p><b>Internship</b></p>					
<p><b>Educational Research Internship</b></p>					
<p>KNOW:</p>	<p>Lack of knowledge</p>	<p>Limited knowledge of the laws of</p>	<p>Basic knowledge of the laws of development of</p>	<p>Good knowledge of the main results of the latest</p>	<p>Deep knowledge of modern scientific</p>



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<ul style="list-style-type: none"> <li>- patterns of development of science and technology in the field of professional activity of the chosen focus (profile);</li> <li>- main results of the latest research published in leading scientific journals and publications in the field of professional activity;</li> <li>- modern scientific methods used in conducting scientific research in the field of professional activity;</li> </ul>		<p>development of science and technology in the field of professional activity of the chosen focus, of the main results of the latest research published in leading scientific journals and publications in the field of professional activity, of modern scientific methods used in conducting scientific research in the field of professional activity, with possible errors and omissions.</p>	<p>science and technology in the field of professional activity of the chosen focus. Basic knowledge of the main results of the latest research published in leading scientific journals and publications in the field of professional activity.</p>	<p>research published in leading scientific journals and publications in the field of professional activity. Good knowledge of modern scientific methods used in conducting scientific research in the field of professional activity, with the ability to apply them in one's work.</p>	<p>methods used in conducting scientific research in the field of professional activity, with the ability to develop and apply new methods and technologies in one's work.</p>
<p><b>BE ABLE TO:</b></p> <ul style="list-style-type: none"> <li>- apply modern scientific tools to solve practical problems in the field of professional activity;</li> </ul>	<p>Lack of skills</p>	<p>Limited ability to apply modern scientific tools to solve practical problems in the field of professional activity.</p>	<p>Ability to apply modern scientific tools to solve practical problems in the field of professional activity.</p>	<p>Good ability to apply modern scientific tools to solve practical problems in the field of professional activity.</p>	<p>Deep ability to apply modern scientific tools to solve practical problems in the field of professional activity, with the ability to develop and apply new</p>



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<ul style="list-style-type: none"> <li>- use modern software when conducting scientific research;</li> <li>- formulate forecasts for the development of objects of professional activity;</li> </ul>					<p>methods and technologies in one's work.</p>
<p>POSSESS: the methods and methodology for:</p> <ul style="list-style-type: none"> <li>- conducting scientific research in the chosen direction (profile);</li> <li>- collecting, analyzing and summarizing scientific material in the development of scientifically substantiated proposals and scientific ideas for the preparation of a scientific qualification work (dissertation);</li> <li>- independently conducting scientific research and practical participation in the scientific research work of research teams;</li> </ul>	<p>Lack of skills</p>	<p>Limited ability to conduct scientific research in the chosen area (profile). Limited ability to collect, analyze and summarize scientific material when developing scientifically sound proposals and scientific ideas for the preparation of a scientific qualification work (dissertation).</p>	<p>Ability to conduct scientific research in the chosen area (profile). Ability to collect, analyze and summarize scientific material when developing scientifically sound proposals and scientific ideas for the preparation of a scientific qualification work (dissertation). Ability to independently conduct scientific research and participate in the scientific research work of research teams.</p>	<p>Good ability to conduct scientific research in the chosen direction (profile), with the ability to apply modern methods and technologies in their work. Good ability to collect, analyze and summarize scientific material when developing scientifically sound proposals and scientific ideas for the preparation of a scientific qualification work (dissertation), with the ability to apply modern methods and technologies in their work.</p>	<p>Profound ability to conduct scientific research in the chosen area (profile), with the ability to develop new methods and technologies and apply them in one's work. Profound ability to collect, analyze and summarize scientific material when developing scientifically substantiated proposals and scientific ideas for the preparation of a scientific qualification work (dissertation), with the ability to</p>



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- work on searching for information in the reference and bibliographic system and with library catalogs and electronic databases, bibliographic reference books, compiling scientific and bibliographic lists, using bibliographic descriptions in scientific works;
- searching for scientific information using electronic information retrieval systems of the Internet;
- scientific modeling using modern scientific tools;
- experience in public speaking with scientific reports and messages at scientific and scientific and practical conferences, preparing scientific publications;

develop new methods and technologies and apply them in one's work. Profound ability to independently conduct scientific research and participate in the scientific research work of research teams, with the ability to develop new methods and technologies and apply them in one's work.

**Optional Courses**



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**Fundamentals of Professional Communication and Rhetoric**

KNOW: what rhetoric, eloquence, oratory are, have an idea of the origin of rhetoric, the history of the development of rhetorical knowledge; how a public speech is prepared, what requirements are imposed on the choice of topic, the formulation of the title, the structure of the oratory speech, the form of presentation of the material, and be able to use this knowledge in your practice;	Lack of knowledge	Limited knowledge of the history and development of rhetoric. Limited ability to prepare a public speech. Limited ability to take into account the requirements for choosing a topic, formulating a title, the structure of an oratorical speech, and the form of presentation of the material.	Ability to take into account the requirements for the choice of topic, the wording of the title, the structure of the oratorical speech, the form of presentation of the material. Ability to prepare a public speech. Good knowledge of the history and development of rhetoric.	Deep knowledge of the history and development of rhetoric, with the ability to apply them in practice. Good ability to prepare a public speech, with the ability to apply modern methods and technologies in your work. Good ability to take into account the requirements for choosing a topic, formulating a title, the structure of an oratorical speech, the form of presentation of the material, with the ability to apply modern methods and technologies in your work.	Excellent ability to take into account the requirements for the choice of topic, the wording of the title, the structure of the oratorical speech, the form of presentation of the material, with the ability to develop new methods and technologies and apply them in your work. Excellent ability to prepare a public speech, with the ability to develop new methods and technologies and apply them in your work.
BE ABLE TO: identify rhetorical techniques used by the author in a written text;	Lack of skills	Limited ability to identify rhetorical devices in a written	Ability to identify rhetorical devices in a written text. Ability to	Good ability to write a speech text correctly and use it effectively in the	Excellent ability to write a speech text correctly and use it



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<p>deliver a speech in accordance with the orthoepic norms of the Russian language, technically competently and intonationally expressive; compose and deliver a speech of a certain genre in a simulated communicative situation, correctly write the text of the speech and be able to use it effectively in the process of delivering a speech;</p>		<p>text, deliver a speech in accordance with the orthoepic norms of the Russian language, compose and deliver a speech of a certain genre in a simulated communicative situation, correctly write the text of a speech and the inability to effectively use it in the process of delivering a speech.</p>	<p>compose and deliver a speech of a certain genre in a simulated communicative situation. Ability to correctly write a speech text and the ability to effectively use it in the process of delivering a speech.</p>	<p>process of delivering a speech, with the ability to use various technologies to improve your speech.</p>	<p>effectively in the process of delivering a speech, with the ability to develop new methods and technologies and apply them in practice to achieve maximum effect.</p>
<p>POSSESS: a system of interconnected methods of rhetorical activity, both analytical (method of rhetorical analysis of someone else's statement, method of speech behavior analysis, method of self-analysis) and synthetic (method of creating one's own statement, method</p>	<p>Lack of skills</p>	<p>Limited ability to use a system of interconnected methods of rhetorical activity, to use analytical methods of rhetorical activity, to use synthetic methods of rhetorical activity.</p>	<p>The ability to use a system of interconnected methods of rhetorical activity, analytical methods of rhetorical activity, synthetic methods of rhetorical activity.</p>	<p>Good ability to use synthetic methods of rhetorical activity, analytical methods of rhetorical activity, with the ability to apply them in practice.</p>	<p>Deep ability to use a system of interconnected methods of rhetorical activity, with the ability to develop new methods and technologies and apply them in practice.</p>



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of choosing adequate speech behavior and self-control);					
<b>Pedagogy and Psychology of Higher Education</b>					
KNOW: the main trends in the development of higher education in Russia and abroad; - the structure of the modern Russian education system; - methodological foundations of higher education pedagogy; - the goals, methods, forms and means of teaching in higher education, the main forms of monitoring and evaluation of educational activities and their results; - the tasks, principles, forms of educational work in the university; - the essence of modern technologies of teaching and education; - psychological and pedagogical aspects of	Lack of knowledge	Limited ability to describe the main trends in the development of higher education in Russia and abroad, describe the structure of the modern Russian education system, describe the methodological foundations of higher education pedagogy, describe the goals, methods, forms and means of teaching in higher education, the main forms of monitoring and evaluating educational activities and their results, describe the	Ability to describe the main trends in the development of higher education in Russia and abroad, describe the structure of the modern Russian education system, describe the methodological foundations of higher education pedagogy, describe the goals, methods, forms and means of teaching in higher education, the main forms of monitoring and evaluating educational activities and their results, describe the tasks, principles, and forms of educational work at the university.	Good ability to describe the main trends in the development of higher education in Russia and abroad, describe the structure of the modern Russian education system, describe the methodological foundations of higher education pedagogy, describe the goals, methods, forms and means of teaching in higher education, the main forms of monitoring and evaluating educational activities and their results, describe the tasks, principles, and forms of educational work at the university.	Excellent ability to describe the main trends in the development of higher education in Russia and abroad, describe the structure of the modern Russian education system, describe the methodological foundations of higher education pedagogy, describe the goals, methods, forms and means of teaching in higher education, the main forms of monitoring and evaluating educational activities and their results, describe the



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<p>pedagogical activity in a modern university; - the content of the competencies of a higher education teacher; - features of pedagogical communication in the context of higher education; - the structure and content of the pedagogical culture of a higher education teacher; - psychological characteristics of the student's personality as a subject of educational activity;</p>		<p>tasks, principles, and forms of educational work at the university.</p>			<p>tasks, principles, and forms of educational work at the university.</p>
<p>BE ABLE TO: navigate the system of universal human values and take into account the value-semantic orientations of various social groups in Russian society; - apply methods and means of cognition, training and self-control for their intellectual development, growth of professional competence;</p>	<p>Lack of skills</p>	<p>Limited ability to understand the basic values and beliefs accepted in society, to take into account the value-semantic orientations of various social groups, to apply methods and means of cognition, learning and self-control for one's</p>	<p>Basic ability to understand the main values and beliefs accepted in society, to take into account the value-semantic orientations of various social groups, to apply methods and means of cognition, learning and self-control for one's</p>	<p>Good ability to understand the basic values and beliefs accepted in society, to take into account the value-semantic orientations of various social groups, to apply methods and means of cognition, learning and self-control for one's</p>	<p>Excellent ability to understand the basic values and beliefs accepted in society, to take into account the value-semantic orientations of various social groups, to apply methods and means of cognition, training and self-control for one's</p>



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<ul style="list-style-type: none"> <li>- take a civic position in social and personal conflict situations;</li> <li>- develop and conduct lectures, seminars, and control classes on pedagogy using various methods and means;</li> <li>- organize independent work of students;</li> </ul>		<p>intellectual development and growth of professional competence, to take a civic position in social and personal conflict situations, to develop and conduct lectures, seminars and tests on pedagogy using various methods and means.</p>	<p>intellectual development and growth of professional competence, to take a civic position in social and personal conflict situations, to develop and conduct lectures, seminars and control classes on pedagogy using various methods and means.</p>	<p>intellectual development and growth of professional competence, to take a civic position in social and personal conflict situations, to develop and conduct lectures, seminars and control classes on pedagogy using various methods and means.</p>	<p>intellectual development and growth of professional competence, to take a civic position in social and personal conflict situations, to develop and conduct lectures, seminars and control classes on pedagogy using various methods and means.</p>
<p><b>POSSESS:</b> socio-cultural communication skills that ensure the adequacy of social and professional contacts;</p> <ul style="list-style-type: none"> <li>- readiness to work in a team, social interaction based on accepted moral and legal norms;</li> <li>- a culture of thinking, the ability to analyze, generalize information, set goals and choose ways to achieve them,</li> </ul>	<p>Lack of skills</p>	<p>Limited ability to use sociocultural communication skills to ensure the adequacy of social and professional contacts, to conduct psychological and pedagogical research. Limited readiness to work in a team and to take into account accepted moral and</p>	<p>Ability to use sociocultural communication skills to ensure the adequacy of social and professional contacts. Readiness to work in a team and take into account accepted moral and legal norms. Good command of the culture of thinking and the ability to analyze, generalize information,</p>	<p>Good ability to use socio-cultural communication skills to ensure the adequacy of social and professional contacts, with the ability to analyze them and apply them in practice. Good readiness to work in a team and take into account accepted moral and legal norms, with the ability to analyze them</p>	<p>High level of ability to use socio-cultural communication skills to ensure the adequacy of social and professional contacts, with the ability to develop new approaches and technologies and apply them in practice. Full readiness to work in a team and take into</p>



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<p>a culture of oral and written speech; - skills for conducting psychological and pedagogical research; - skills for self-development, improving one's qualifications and skills; high motivation to perform professional activities.</p>		<p>legal norms. Some mastery of the culture of thinking and the ability to analyze, generalize information, set goals and choose ways to achieve them, some culture of oral and written speech.</p>	<p>set goals and choose ways to achieve them, good culture of oral and written speech.</p>	<p>and apply them in practice. Very good command of the culture of thinking and the ability to analyze, summarize information, set goals and choose ways to achieve them, very good culture of oral and written speech, with the ability to apply them in practice. Good ability to conduct psychological and pedagogical research, with the ability to analyze the results and apply them in practice.</p>	<p>account accepted moral and legal norms, with the ability to develop new approaches and technologies and apply them in practice. High command of the culture of thinking and the ability to analyze, generalize information, set goals and choose ways to achieve them, high culture of oral and written speech, with the ability to develop new approaches and technologies and apply them in practice.</p>
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### Change Registration Sheet

№	Academic year (20___/ 20___)	Changes	Date and number of the minutes of the meeting of the Academic Council of CSU	Signature of the Dean of the Faculty/ Director of the Institute	Signature of the Head of Department