



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

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

Scientific component program 2.2.1(I) "Educational Research Internship"  
Scientific specialty – 1.1.2. Differential equations and mathematical physics  
Direction - Differential equations and mathematical physics



APPROVED

Vice-rector for Scientific Affairs

*[Signature]*  
A.I. Biryukov

« 24 » 02 2025

## **SCIENTIFIC COMPONENT PROGRAM\***

### **2.2.1 (I) "Educational Research Internship"**

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

**Direction - Differential equations and mathematical physics**

**Higher education – training of highly qualified personnel**

**Mode of study: Full-time**

Chelyabinsk, 2025

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



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The program of Educational Research Internship is compiled according to the scientific specialty 1.1.2. Differential equations and mathematical physics in accordance with federal state requirements (education level: higher education - training of highly qualified personnel), approved by order of the Ministry of Science and Higher Education of the Russian Federation dated October 20, 2021 No. 951.

Program developers:

Head of the Department of Mathematical Analysis  
Doctor of Physical and Mathematical Sciences,  
Professor

V.E. Fedorov

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

Dean of the Faculty of Mathematics

E.A. Sbrodova

Head of the Department of  
Mathematical Analysis

V.E. Fedorov

Head of the Department of  
Postgraduate and Doctoral Studies

N.V. Bochkareva

Head of the Department of  
International Cooperation

N.R. Annantova



**Abstract of the program:** Educational Research Internship is a mandatory component of professional training for teaching and research activities, which is a type of practical activity of postgraduate students related to conducting scientific research within the framework of the selected topic of research work (dissertation research), introducing the results of the conducted research into the educational process, preparing scientific publications, scientific qualification work (dissertation) and its subsequent defense. The tasks provided for by the program of scientific and pedagogical practice are aimed at forming a system of methodological knowledge, professional and pedagogical skills and management functions that ensure the quality and accessibility of the educational process in an educational organization of higher education.

## **1. Objectives and tasks of the internship**

### **Objectives of the internship:**

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

### **Tasks of the internship:**

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

- 1) consideration of issues on the topic of scientific research (dissertation); collection, processing, analysis and systematization of information on the topic of 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 activity;

**- pedagogical activity:**

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; formation of the ability to apply psychological and pedagogical knowledge in various forms of educational and extracurricular classes and events;

8) promoting the development of skills in designing the educational process of reproductive, productive and creative levels, designing various types of educational activities, didactic processing of educational material, organizing and managing the educational and cognitive activities of students;

9) providing experience of creative activity in the role of a teacher of specialized courses, skills in providing advisory assistance to students in carrying out research work;

10) developing an individual style of pedagogical activity; improving the ability to self-analyze and self-assess pedagogical activity.

**2. The place of internship in the structure of the educational program**

2.2.1(I) "Educational Research Internship" is mandatory and consists of two parts: scientific and pedagogical. Scientific and pedagogical practice is conducted in the second and third years (4th and 5th semesters). The total workload of scientific and pedagogical practice, including midterm assessment, is 4 credits/144 hours, of which contact work with the supervisor (teacher) is 0.06 credits/2 hours, including control, independent work - 3.94 credits/142 hours. This practice is based on the disciplines studied by students in mastering educational programs of the specialist/master's degree, as well as postgraduate studies. Postgraduate students receive basic psychological and pedagogical training in mastering the program for training highly qualified personnel within the framework of the disciplines of the curriculum. The program is implemented in accordance with local regulatory documents: Regulations on the practical training of students in the postgraduate programs of the Federal State Budgetary Educational Institution of Higher Education CSU, Regulations on the scientific and pedagogical practice of postgraduate students of the Federal State Budgetary Educational Institution of Higher Education CSU.



The organization and general management of scientific and pedagogical practice is carried out by the department to which the graduate student is assigned.

To manage the pedagogical part of the practice, a teacher from among the faculty or the graduate student's scientific supervisor may be appointed as the supervisor; for the scientific and research part of the practice - the graduate student's scientific supervisor.

During the practice (pedagogical part), the department guides the graduate student in preparing and conducting lectures, seminars, laboratory work, practical classes and classes on course design in the profile of specialization. It is possible for the graduate student to participate in accepting tests together with the supervisor.

The supervisor provides assistance in developing a plan for completing the scientific and research part of the practice, performing the tasks provided for by the program of the scientific and research part of the practice in the scientific specialty 1.1.2. Differential equations and mathematical physics, taking into account the topic of the graduate student's dissertation.

Graduate students of the program "Differential equations and mathematical physics" undergo practical training, as a rule, at Chelyabinsk State University, in the Department of Mathematical Analysis. The specific content of the internship is planned by the supervisor (academic supervisor) of the graduate student and is reflected in the individual plan for scientific and pedagogical internship, which records all types of activities of the graduate student during the internship period.

### **2.1. Type of internship, method and form(s) of conducting internship**

**Type of practice:** practice to obtain professional skills and experience in professional activities.

**Method of conducting practice:**

- 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 the city of Chelyabinsk.

**Form of the practice:**

- continuously – by allocating in the academic calendar a continuous period of study time for conducting all types of practical training provided for by the postgraduate program;
- discretely (dispersed practice) – by allocating in the academic calendar a continuous period of study time for conducting each type (set of types) of practical training or by alternating in the academic calendar periods of study



time for practical training with periods of study time for conducting theoretical classes.

**Requirements for the "entry" knowledge, skills and experience of the student, necessary for completing Educational Research Internship:**

	<b>Know</b>	<b>Be able to</b>	<b>Possess</b>
Scientific part	possible areas and directions of professional self-realization; methods and technologies of goal setting and goal realization; ways of achieving higher levels of professional and personal development	identify and formulate problems of one's own development, based on the stages of professional growth and the labor market requirements for a specialist; formulate goals of professional and personal development, assess one's capabilities, the realism and adequacy of the planned methods and ways of achieving the planned goals	methods of goal setting, planning, implementation of necessary types of activities, assessment and self-assessment of the results of activities to solve professional problems; methods of identifying and realizing one's capabilities, personal and professionally significant qualities with the aim of improving them
Pedagogical part	the main development trends in the relevant field of science; methodological foundations for organizing pedagogical interaction	to select material that is adequate to the achievements of science, taking into account the specifics of the field of study	methods and technologies of pedagogical interaction, public speaking skills

**3. Requirements for the results of mastering the content of Educational Research Internship:**

<b>Learning outcomes for the course</b>	
know	regulatory and legal framework for teaching activities in the higher education system
	requirements for qualification works of bachelors, specialists, masters
be able to	select and use optimal teaching methods
	supervise the completion of qualifying work for bachelors, specialists, and masters



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

Scientific component program 2.2.1(I) "Educational Research Internship"  
Scientific specialty – 1.1.2. Differential equations and mathematical physics  
Direction - Differential equations and mathematical physics

possess	methods of identifying and assessing individual-personal, professionally significant qualities and ways of achieving a higher level of their development
	technology of designing the educational process at the level of higher education

#### 4. Content and structure of Educational Research Internship

The total workload of the course is 4 credit units/144 hours, of which contact work is 32 hours, independent work is 142 hours, control is 2 hours. Control - credit (4th semester), differentiated credit (5th semester).

##### 4.1. Structure of internship

Name of the type of activity	Total (hours)	Contact work (hours)			Self-study (hours)
		Classroom work	Educational and methodological work	Presentation and analytical activities	
Scientific part (4th semester)	72			1	71
1. Working with department documentation	48				48
2. Guidance/co-guidance of students' research work	23				23
3. Control	1			1	
Pedagogical part (5th semester)	72		1		71
1. Study of teaching experience	5				5
2. Conducting practical classes/laboratory work on the discipline	13				13
3. Conducting an extracurricular event on the subject	14				14
4. Assisting the lecturer during a lecture on the subject	12				12
5. Management of student practice	9				9
6. Individual work with students	8				8
7. Monitoring students' learning	10				10
8. Control	1		1		
<b>Total:</b>	<b>144</b>		<b>1</b>	<b>1</b>	<b>142</b>



## 4.2. Contents of sections

№	Title of section	Section Contents
1	Methodological training	Study of the features of the organization of the educational process in higher education. Study of regulatory documents (Federal Law No. 273, Federal State Educational Standard of Higher Education, etc.) Study of educational and methodological literature, software for the courses of the curriculum
2	Planning of training sessions	Requirements for the lesson plan. Selection of the content of the educational material. Development of didactic support. Criteria for the selection of teaching methods and tools.
3	Conducting training sessions	Requirements for organizing a class. Forms of organizing training in higher education. Main functions of a teacher when conducting a class.
4	Preparation of reporting documentation	Structure of the report on the results of teaching practice Forms of presentation of the report on the results of teaching practice

## 4. Educational technologies

In implementing various types of educational work (lectures, seminars, practical classes, independent work), the following modern educational technologies are used:

- quasi-professional modeling technologies;
- information and communication technologies;
- research methods in teaching.

In accordance with the approved main educational program for the scientific specialty 1.1.2. Differential equations and mathematical physics (focus (profile) - Differential equations and mathematical physics), the program for Educational Research Internship provides for the widespread use in the educational process of active and interactive forms of conducting classes in combination with extracurricular work in order to form and develop professional skills in students. The effectiveness of the use of interactive forms of training is ensured by the implementation of the following conditions:



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

Scientific component program 2.2.1(I) "Educational Research Internship"  
Scientific specialty – 1.1.2. Differential equations and mathematical physics  
Direction - Differential equations and mathematical physics

- implementation of the principle of participatory nature in organizing constructive interaction between subjects of the educational process;
- creation of a dialogic space in organizing the educational process;
- use of the principles of social and psychological training in educational and scientific activities;
- development of psychological readiness of teachers to use interactive forms of teaching aimed at developing the internal activity of postgraduate students and achieving a number of important educational goals: stimulating motivation and interest; increasing the level of activity and independence of research work; developing skills of analysis, critical thinking, and scientific communication.

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

### **6.1. Passport of the fund of assessment tools for Educational Research Internship**

No	Controlled sections of the course	Results	Name of the assessment tool
1	Methodological training	know: the legal framework for teaching activities in the higher education system	Lesson plan
		be able to: select and use optimal teaching methods	
		possess: the technology of designing the educational process at the level of higher education	
2	Planning of training sessions	know: the legal framework for teaching activities in the higher education system	Lesson plan
		be able to: select and use optimal teaching methods	
		possess: the technology of designing the educational process at the level of higher education	



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

Scientific component program 2.2.1(I) "Educational Research Internship"  
Scientific specialty – 1.1.2. Differential equations and mathematical physics  
Direction - Differential equations and mathematical physics

3	Conducting training sessions	know: the legal framework for teaching activities in the higher education system	Lesson plan
		be able to: select and use optimal teaching methods	
		possess: the technology of designing the educational process at the level of higher education	
4	Preparation of reporting documentation	know: the legal framework for teaching activities in the higher education system	Report on the results of teaching internship
		be able to: select and use optimal teaching methods	
		possess: the technology of designing the educational process at the level of higher education	

### ***Current control***

Current control over the progress of the pedagogical part of the internship of postgraduate students in the scientific specialty 11.1.2. Differential equations and mathematical physics (focus (profile) - Differential equations and mathematical physics) is carried out by the head of pedagogical practice (scientific supervisor): ensures clear organization, planning and recording of the internship results; approves the general plan-schedule for the internship, its place in the system of individual planning of the postgraduate student, gives consent to the admission of the postgraduate student to teaching activities; selects a course, an academic group as a basis for conducting pedagogical internship, introduces the postgraduate student to the plan of academic work, conducts open classes; provides scientific and methodological assistance in planning and organizing educational interaction; participates in holding orientation and final conferences; supervises the work of the intern, attends classes and other types of his work with students, takes measures to eliminate deficiencies in the organization of the internship; participates in the analysis and assessment of classes.



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FSBEI HE "Chelyabinsk State University"

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

Scientific component program 2.2.1(I) "Educational Research Internship"  
Scientific specialty – 1.1.2. Differential equations and mathematical physics  
Direction - Differential equations and mathematical physics

Current control over the scientific part of the internship of postgraduate students is carried out by the supervisor (scientific supervisor): ensures clear organization, planning and recording of the results of the internship; provides scientific and methodological assistance in planning and organizing the research; supervises the work of the postgraduate student, takes measures to eliminate shortcomings in the organization of the internship; participates in the analysis and evaluation of the results of the internship.

### *Interim assessment*

The supervisor (scientific supervisor) of the pedagogical part of the internship provides a final review of the results of the internship; summarizes the educational and methodological experience of the internship, makes suggestions for its rationalization; participates in the work of the postgraduate and doctoral department to discuss issues of pedagogical internship. Certification at the department based on the results of the internship is carried out on the basis of the Report on the pedagogical part of the internship and the review of the supervisor (scientific supervisor). Based on the results of a positive certification, the postgraduate student is given a differentiated credit, which is recorded in the individual plan of the postgraduate student and the credit and examination report.

Certification based on the results of the scientific part of the internship is carried out on the basis of the report on the internship and the review of the supervisor (scientific supervisor). The supervisor (scientific supervisor) of the internship provides a final review of the results of the internship; summarizes the scientific and methodological experience of the internship, makes suggestions for its rationalization. Based on the results of a positive certification, the postgraduate student is given a credit, which is recorded in the individual plan of the postgraduate student and the credit and examination report.

**PLAN-REPORT**  
**on the completion of Educational Research Internship**  
**(scientific part) of a postgraduate student of the \_\_\_\_\_ year of study**

\_\_\_\_\_  
(Full name)  
Scientific specialty \_\_\_\_\_  
(code, name)  
Direction \_\_\_\_\_  
(name)



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FSBEI HE "Chelyabinsk State University"

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

Scientific component program 2.2.1(I) "Educational Research Internship"  
Scientific specialty – 1.1.2. Differential equations and mathematical physics  
Direction - Differential equations and mathematical physics

Place of internship \_\_\_\_\_

The internship took place in \_\_\_\_\_ semester from \_\_\_\_\_ to \_\_\_\_\_ 20\_\_.

**Plan-report on the completion of Educational Research Internship (scientific part)**

Total labor intensity: 2 credit units/72 hours.

№	Activities (type of work performed)	Date	Mark as completed

An individual assignment aimed at acquiring professional skills and experience in professional activities \_\_\_\_\_

Head of the Department \_\_\_\_\_ / \_\_\_\_\_ /  
signature full name

Supervisor  
(scientific supervisor) \_\_\_\_\_ / \_\_\_\_\_ /  
signature full name

Graduate student \_\_\_\_\_ / \_\_\_\_\_ /  
signature full name

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

**Approved at the department  
meeting**

« \_\_\_\_ » \_\_\_\_\_ 20\_\_  
**Head of the Department**

**REPORT ON THE PASSAGE OF EDUCATIONAL RESEARCH INTERNSHIP  
(pedagogical part)**

20\_\_ - 20\_\_ academic year

**postgraduate student**

\_\_\_\_\_  
Full name of the postgraduate student  
**Scientific specialty** \_\_\_\_\_  
code and name



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FSBEI HE "Chelyabinsk State University"

**Faculty of Mathematics**  
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Scientific specialty – 1.1.2. Differential equations and mathematical physics  
Direction - Differential equations and mathematical physics

Direction \_\_\_\_\_  
\_\_\_\_\_

Department \_\_\_\_\_

name

Place of internship \_\_\_\_\_

The internship took place in \_\_\_\_\_ semester from \_\_\_\_\_ to \_\_\_\_\_ 20\_\_\_\_.

**Head of internship**

(by order) \_\_\_\_\_

Full name, position, academic degree, academic title

Graduate student \_\_\_\_\_ / \_\_\_\_\_

Head of internship \_\_\_\_\_ / \_\_\_\_\_

Total labor intensity: 2 credit units/72 hours.

### 1. Study of teaching experience

№	Date	Topic	Full name of the teacher	Count of hours	Signature of the teacher

### 2. Individual work with students

№	Date	Topic	Format of the event	Count of hours	Signature of the scientific supervisor

### 3. Conducting extracurricular activities

№	Date	Topic	Format of the event	Count of hours	Signature of the scientific supervisor

### 4. Conducting training sessions



**Faculty of Mathematics**  
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№	Date	Group	Topic	Type of educational lesson	Count of hours	Signature of the scientific supervisor

### 5. Analysis of a lesson attended by a graduate student

Topic \_\_\_\_\_

Teacher \_\_\_\_\_

Date \_\_\_\_\_

Course, group \_\_\_\_\_

1. Consideration of the objective of the lesson, the correctness of its choice.
2. Determination of the type of lesson, its compliance with the content of the educational material and the objectives of the course.
3. Analysis of the organizational stage.
4. Analysis of the frontal check of the assignment completed by students during their independent homework.
5. Analysis of the stage of preparing students to perceive new material.
6. Analysis of the stage of assimilation of new knowledge:
  - compliance with the content of training, the ability to highlight the main ideas and concepts, the accessibility of explanation of the material is established;
  - the relationship between the content of the educational material and teaching methods;
  - the relationship between the necessary and used forms of organization of students' cognitive activity;
  - compliance of teaching methods with the requirements of activating the mental activity of students.
7. Analysis of the stage of consolidation of the studied material:
  - forms of consolidation, their diversity;
  - the degree of assimilation of the material of the lesson by students.
8. Analysis of information about the assignment for independent work of students - the volume of the assignment, its types compliance with the objectives of the lesson and the academic course.
9. Use of technical teaching aids:
  - the purpose of using TSA;
  - the feasibility of using TSA when studying the topic;
  - the result of using TSA;
10. Use of modern teaching technologies:
  - feasibility;
  - efficiency.
11. General conclusions:
  - advantages and disadvantages of interaction between subjects of the educational process;
  - the main reasons for the shortcomings;
  - the influence of the reasons on the final result of the lesson.
12. General assessment of the lesson.
13. Suggestions for improving the organization and conduct of the lesson.

### 6. Self-analysis of a study session



1. The place of the lesson in the topic and the general course.
  2. The correspondence of the objectives of the lesson for students and the teacher and the results achieved in the lesson.
  3. The level of achievement of the developmental goal.
  4. Optimality of the structure of the lesson.
  5. The degree of student activity in the lesson.
  6. Characteristics of the pace of the lesson.
  7. Organization of educational material.
  8. Use of multimedia/technical teaching aids.
  9. Use of modern teaching technologies.
  10. Characteristics of the level of knowledge control.
  11. Organization of assignments for independent work of students.
  12. Characteristics of the psychological atmosphere of the lesson.
  13. Characteristics of the psychological state of the teacher.
- 7. Work done during teaching internship**

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**8. Self-assessment of the work done (difficulties, meeting expectations, successes)**

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**9. Suggestions for conducting teaching practice**

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**REVIEW <sup>1</sup>**

**about completing \_\_\_\_\_ practice**

**graduate student** \_\_\_\_\_

Full name of the postgraduate student

**scientific specialty** \_\_\_\_\_

<sup>1</sup> Заполняется руководителем практики (научным руководителем)  
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\_\_\_\_\_

**year of study** \_\_\_\_\_

**Department** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Head (Scientific Supervisor)** \_\_\_\_\_ **/Full name/**

## 6.2. Criteria for assessing the results of internship

The assessment of the results of the internship is carried out on a five-point scale:

"Excellent" (5 points) - for the complete completion of the tasks.

"Good" (4 points) - for the correct approach with minor errors in reasoning and conducting classes.

"Satisfactory" (3 points) - for the correct approach with significant errors in preparing materials for classes.

"Unsatisfactory" (1-2 points) - for failure to complete the task, for conducting classes without justifying the solutions to the tasks at the board.

Assessment tools for disabled people and people with disabilities are selected taking into account their individual psychophysical characteristics. When conducting the procedure for assessing the learning results of disabled people and people with disabilities, it is envisaged to use technical means that they need in connection with their individual characteristics. These means can be provided by CSU or their own technical means can be used. The procedure for assessing the learning outcomes of disabled people and people with limited health capabilities in pedagogical practice involves providing information in forms adapted to their health limitations and information perception:

For people with visual impairments:

- 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 people with hearing impairments:



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

For people with musculoskeletal disorders:

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

When conducting the procedure for assessing the learning outcomes of disabled people and individuals with limited health capabilities in pedagogical practice, the following additional requirements are met depending on the individual characteristics of the students:

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

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

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

If necessary, for students with limited health capabilities and disabled people, the procedure for assessing the learning outcomes in a course (module) can be carried out in several stages.

The procedure for assessing the learning outcomes of disabled people and individuals with limited health capabilities may be carried out using distance learning technologies.

Disabled persons and persons with disabilities who are unable to perform the tasks provided for in the work program of pedagogical practice must be provided with an individual program of pedagogical practice.

## **7. Educational and methodological support**

**7.1. Independent work** of postgraduate students is carried out in the form of studying individual theoretical issues on the proposed literature and independently solving pedagogical situations. During independent preparation, students are provided with access to databases and library collections and access to the Internet.

Independent work contributes to:

- deepening and expanding knowledge;
- developing interest in independent research activities;



• mastering the techniques of the cognition process and developing cognitive abilities.

Educational and methodological materials for independent work of students:

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

For individuals with visual impairments:

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

For individuals with hearing impairments:

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

For persons with musculoskeletal disorders:

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

## **7.2. References**

### **Main literature**

1. \*\* Kharchenko, L. N. Pedagogical design: presentation / L. N. Kharchenko. – Moscow: Direct-Media, 2014. – 116 p. –URL: <https://biblioclub.ru/index.php?page=book&id=240804>.
2. \*\* Sultanova, L. F. Pedagogical design: educational and methodological manual / L. F. Sultanova, L. S. Skryabina, L. A. Mitakovich. - Ufa: BSPU named after M. Akmulla, 2015. - 95 p. — Text: electronic // Lan: electronic library system. — URL: <https://e.lanbook.com/book/72548>.
3. \*\* Tsibulnikova, V. E. Management of educational systems: educational and methodological complex of the course / V. E. Tsibulnikova; Moscow State Pedagogical University, Faculty of Pedagogy and Psychology, Department of Pedagogy and Psychology of Professional Education named after academician V.A. Slastenina. – Moscow: Moscow State Pedagogical University (MPGU), 2016. – 51 p.: ill. URL: <https://biblioclub.ru/index.php?page=book&id=469586>

### **Further reading**

1. Zagvyazinsky, V.I. Pedagogical creativity of the teacher. M., 2008. – 351 p.
2. Kolesnikova I.A. Pedagogical design: textbook. Manual for higher educational institutions /. M.: Publishing center "Academy", 2009. –288 p.



3. Shamova T.I. Management of educational systems: Textbook. / T.I. Shamova, T.M. Davydenko, G.N. Shibanova – M.: Publishing center "Academy", 2008.
4. \*\* Tyunnikov, Yu. S. Design of innovative processes in vocational education: teaching aid / Yu. S. Tyunnikov, V.V. Krylova. - Sochi: SSU, 2018. – 50 p. — Text: electronic // Lan: electronic library system. — URL: <https://e.lanbook.com/book/147757>.

#### **Internet resources:**

- eLIBRARY.RU [Electronic resource]: electronic library / Scientific electronic library – URL: <http://elibrary.ru/defaultx.asp>
- Lan [Electronic resource]: electronic library system (ELS) / Lan publishing house. – URL: <http://e.lanbook.com>
- University library online [Electronic resource]: electronic library system (ELS) / OOO Directmedia Publishing. – URL: <http://biblioclub.ru>

#### **Licensed software**

OpenOffice, Adobe Reader

#### **Electronic funds and resources**

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 catalog 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 catalog. Bibliographic databases.

Books, electronic resources, dissertations and abstracts.

##### 2. Electronic library.

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

##### 3. Abstracts

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

##### 4. Full-text

Databases of dissertations of the Russian State Library, ARBICON, SIGLA, scientific electronic library <http://elibrary.ru>, subscription to the full-text collection of Russian scientific journals (2011-2014, 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 any point 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)).

### **8. Logistics and technical support**

To conduct Educational Research Internship envisaged by the curriculum for the training of postgraduate students, there is the necessary material and technical base that complies with the current sanitary and fire safety rules and regulations, ensuring the implementation of all types of theoretical and practical training, as well as the effective implementation of the final qualifying work (dissertation):

- lecture halls equipped with multimedia systems based on a vandal-proof tribune;
- specialized computer classes with peripheral devices and equipment connected to them;
- methodological materials for independent work (room 441a) on the course.

The Faculty of Mathematics has educational and research laboratories equipped with modern computers and multimedia systems: educational computing laboratory (2 computer classes, 24 computers), laboratory of optimization methods and modeling of game situations, educational and scientific laboratory of computer geometry, educational and scientific laboratory of differential equations and operator theory of the department of mathematical analysis, research laboratory of quantum topology, educational and scientific laboratory of technical teaching aids (10 computers), 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 the faculty staff. Room for independent work (room 205, 206).



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

Scientific component program 2.2.1(I) "Educational Research Internship"  
Scientific specialty – 1.1.2. Differential equations and mathematical physics  
Direction - Differential equations and mathematical physics

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

For obtaining higher education in postgraduate programs by disabled people and people with limited health capabilities, 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 courses specified in this work program, methodological and technical support for the educational process for disabled people and people with limited health capabilities are provided by the Regional Educational and Scientific Center for Inclusive Education of CSU.

## **9. Methodological instructions for students**

### **9.1. Scientific part**

Preparatory stage: development of an individual plan for completing scientific and pedagogical practice (scientific part), work with the supervisor to determine the content of upcoming work on the topic of the dissertation.

Completion of the main stage includes clarification of the conceptual apparatus of the research work, selection of additional methods and techniques of empirical research, methods of mathematical processing of research results, selection of additional scientific sources, processing of the obtained data and analysis of the results of the empirical research, preparation of scientific



publications on the topic of the dissertation research, preparation of an application for scientific grants. When carrying out these works, it is recommended to rely on the research materials of other authors in similar areas, presented in the specialized literature.

The final stage includes drawing up a report on scientific research practice and submitting the report to the department, preparation for the public defense of the report and public defense of the report on completing the practice at a meeting of the department. Here, when preparing a presentation on the report, it is recommended to highlight and present the main results obtained, without overloading the presentation with secondary materials.

It is recommended to carry out the practice in accordance with the program gradually, during the semester. You should not move on to the next stage until the previous one is completed. When studying scientific literature, attention should be paid to the Internet links provided in class. Before conducting any information search, a strategy should be carefully thought out: carefully approach the selection of keywords, think through their logical combinations in advance, familiarize yourself with the help system of a particular search tool, etc. During the search, it is necessary to pay attention to the relevance of the documents issued during the search. When searching for information in abstract databases, it is advisable to remember/write down the names of authors working on the topic of interest to the postgraduate student and search for other works by these authors. After each search, it is necessary to record in detail the information about the documents found (indicate when you searched, where you searched, what keywords you used, etc.).

## **9.2. Pedagogical part**

At the preparatory stage (methodological preparation), the main types of work of postgraduate students in performing practical training to obtain professional skills and experience in professional activity are: working with a supervisor to determine the topic and content of upcoming methodological developments and classes.

The implementation of the stage "planning of training sessions" includes clarification of the content of the lesson, determination of the selection of methods and techniques for its implementation, interactive methods, selection of additional scientific sources, methods for assessing the joint work of the teacher with students and analysis of the results of the lesson. When planning training sessions, it is recommended to rely on the methodological materials of other authors in similar areas, presented in specialized literature.

The implementation of the stage "conducting training sessions" includes the presentation of educational material to students in an interactive form using modern



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presentation methods and information technology, recording the activity and quality of the content of students' speeches and messages.

The final stage includes drawing up a report on the practice and submitting the report to the department, preparation for a public defense of the report and a public defense of the report on the course of the practice at a meeting of the department. Here, when preparing a presentation on the report, it is recommended to highlight and present the main results obtained, without overloading the presentation with secondary materials. When studying scientific literature to prepare for class, you should pay attention to the Internet links provided in class. Before conducting any search for information, you should carefully consider your strategy: carefully select keywords, think through their logical combinations in advance, familiarize yourself with the help system of a particular search tool, etc. During the search, you should pay attention to the relevance of the documents returned during the search. When searching for information in abstract databases, it is advisable to remember/write down the names of authors working on the topic of interest to the graduate student and search for other works by these authors. After each search, you should record in detail the information about the documents found (indicate when you searched, where you searched, what keywords you used, etc.).

Individual work is of great importance in the practical training of disabled people and people with limited health capabilities. Individual work means two forms of interaction with the teacher: individual work (consultations), i.e. additional explanation of the practical training material and in-depth study of the material with those students who are interested in it, and individual educational work. Individual consultations are an important factor contributing to the individualization of training and the establishment of educational contact between the teacher and the disabled student or student with limited health capabilities.