Federal State Autonomous Educational Institution of Higher Education

PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA
RUDN University

Faculty of Physics, Mathematics and Natural Sciences

educational division (faculty/institute/academy) as higher education programme developer

COURSE SYLLABUS

History and methodology of mathematics
course title

Recommended by the Didactic Council for the Education Field of:

01.04.01 Mathematics
field of studies / speciality code and title

The course instruction is implemented within the professional education programme of higher education:

«Functional methods in differential equations and interdisciplinary research»

higher education programme profile/specialisation title

1. COURSE GOAL(s)

The purpose of mastering the discipline "History and methodology of mathematics" is to make students acquainted with classical mathematical facts and theories in their history, to trace the methodology of mathematics on examples, to compare the “mathematical method” with methods of other fields of science (including physics, philosophy etc.) as well as different methods in the history of mathematics itself.

2. REQUIREMENTS FOR LEARNING OUTCOMES

Mastering the discipline "History and methodology of mathematics" is aimed at developing the following competencies (parts of competencies):

Table 2.1. List of competences that students acquire through the course study

Code	Competence	Competence achievement indicators (within this discipline)
GC-6	Able to determine and implement the priorities of their own activities and ways to improve it based on self-assessment	GC-6.1 Evaluates his resources and their limits (personal, situational, temporary), uses them optimally for the successful completion of the assigned task
		GC-6.2 Determines priorities for professional growth and ways to improve their own activities based on self-assessment according to selected criteria
		GC-6.3 Builds a flexible professional trajectory using the tools of continuous education, taking into account the accumulated experience of professional activity and the dynamically changing requirements of the labor market
GPC-1	Able to formulate and solve actual and important problems of mathematics	GPC-1.1. Uses existing methods of solving mathematical problems and obtains new ones
		GPC-1.2. Uses modern equipment, software and professional data bases for solving problems in the chosen field of mathematics or related science
		GPC-1.3. Uses modern methods of calculation and theory for solving professional problems

3.COURSE IN HIGHER EDUCATION PROGRAMME STRUCTURE

The discipline "History and methodology of mathematics" refers to the part formed by the participants in the educational relations of block B1 of the EP HE.

As part of the EP HE, students also master other disciplines and / or practices that contribute to the achievement of the planned results of mastering the discipline "History and methodology of mathematics".

Table 3.1. The list of the higher education programme components/disciplines that contribute to the achievement of the expected learning outcomes as the course study results

Code	Competence	Previous disciplines/modules, practices	Subsequent disciplines/modules, practices*
GC-6	Able to determine and implement the priorities of their own activities and ways to improve it based on self-assessment	-	State examination, Research work
GPC-1	Able to formulate and solve actual and important problems of mathematics	-	Additional chapters of PDE, Nonlinear evolution equations, State examination

4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

The total labor intensity of the discipline "History and methodology of mathematics " is 3 credits.

*Table 4.1. Types of academic activities during the periods of higher education programme mastering (**full-time training**)**

Type of study work		TOTAL, a.h.	Semester			
			1	2	3	4
Contact work, academic hours		*36*	*36*			
Lectures (LC)						
Lab work (LW)						
Seminars (workshops/tutorials) (S)		36	36			
Self-studies		*72*	*72*			
Evaluation and assessment (exam/passing/failing grade)						
Course workload	a.h.	**108**	**108**			
	credits	**3**	**3**			

5. COURSE CONTENTS

Table 5.1. Course contents and academic activities types

Course Module Title	Brief Description of the Module Content	Type of study work
Section 1. Main stages and milestones of the development of	Topic 1.1. General survey of the historical development of mathematics	Seminar

mathematics	Topic 1.2. History of discovery of the non-Euclidean geometry	Seminar
	Topic 1.3. History of solving algebraic equations of the 5th order	Seminar
	Topic 1.4. History of foundations of mathematics	Seminar

6. CLASSROOM EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

Table 6.1. Classroom equipment and technology support requirements

Classroom type	Classroom equipment	Specialized educational/laboratory equipment, software and materials for mastering the discipline
Seminar	An auditorium for conducting seminar-type classes, group and individual consultations, current control and intermediate certification, equipped with a set of specialized furniture and technical means for multimedia presentations.	-
For independent work of students	An auditorium for conducting seminar-type classes, group and individual consultations, current control and intermediate certification, equipped with a set of specialized furniture and technical means for multimedia presentations.	-

7. RESOURCES RECOMMENDED FOR COURSE STUDY

Main literature:

1. Kesselman V.S. Marvelous history of mathematics. “Enas-kniga”, 2014.
2. Alekseev V.B. Abel Theorem in problems and solutions. M.: MTsNMO, 2017.
3. Prasolov V.V., Tikhomirov V.M. Geometry. Electronic edition. M.: MTsNMO, 2014.

Additional literature:

1. Ed. Yushkevich A.P. History of mathematics from antiquity till the beginning of the XIXth century. V. 1–3. M., «Nauka», 1970
2. Struik D.J. Concise history of mathematics, any edition.
3. Gindikin S.G. Stories about physicists and mathematicians, any edition.
4. Prasolov V.V . Geometric problems of the ancient world. M.: Phasis, 1997.

5. Kagan V.F. Foundations of geometry, part I. Lobachevsky geometry and its prehistory. M.-L.: 1949.
6. Fraenkel A., Bar-Hillel I. Foundations of set theory, any edition.
7. The case of Academician Nikolay Nikolayevitch Luzin. M., 1999.
8. Vereshchagin N.K., Shen A.H. Elements of set theory. M.: MTsNMO, 2006.
9. Prasolov V.V. Lobachevsky geometry. M.: MTsNMO, any edition.
10. Yefimov N.V. Higher geometry, any edition.

Resources of the information and telecommunications network "Internet":

1. RUDN ELS and third-party ELS, to which university students have access on the basis of concluded agreements:
- RUDN Electronic Library System - RUDN EBS http://lib.rudn.ru/MegaPro/Web
- ELS "University Library Online" http://www.biblioclub.ru
- EBS Yurayt http://www.biblio-online.ru
- ELS "Student Consultant" www.studentlibrary.ru
- EBS "Lan" http://e.lanbook.com/
- EBS "Trinity Bridge"

2. Databases and search engines:
- electronic fund of legal and normative-technical documentation http://docs.cntd.ru/
- Yandex search engine https://www.yandex.ru/
- Google search engine https://www.google.ru/
- abstract database SCOPUS http://www.elsevierscience.ru/products/scopus/

8. ASSESSMENT TOOLKIT AND GRADING SYSTEM* FOR EVALUATION OF STUDENTS' COMPETENCES LEVEL UPON COURSE COMPLETION

Evaluation materials and a point-rating system* for evaluating the level of formation of competencies (parts of competencies) based on the results of mastering the discipline "Non-Euclidean geometries and their applications" are presented in the Appendix to this Work Program of the discipline

Developer:

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