Summary of Degree Programme 'Mathematics'

Field of Studies

01.04.01 Mathematics

Approved by

протокол №2 заседания Учёного Совета НИУ ВШЭ от 02.03.2018

HSE University Educational Standard

HSE University Educational Standard: Master's Degree (from 2022)(signature) (PDF, 1.05 Mb)

Last Update

15.08.2023

Network Programme

No

Length of Studies, Mode of Studies, Credit Load

2 years

Full-time, 120

Language of instruction

ENG

Instruction in English

Qualification upon graduation

Master

Double-degree Programme

Yes

Use of online learning

With online tools

Tracks

2023/2024 ACADEMIC YEAR

Mathematics

Type: General

Track Supervisor: Pochinka, Olga

Language of instruction: English

Use of online learning: With online tools

Qualification upon graduation: Магистр

2022/2023 ACADEMIC YEAR

Mathematics

Type: General

Track Supervisor: Pochinka, Olga

Language of instruction: English

Use of online learning: With online tools

Qualification upon graduation: Магистр

Competitive Advantages

• The opportunity to study under the program developed jointly with the University of Passau (Germany) and receive two master's degrees in two years of study at once: Majoring in Mathematics at the Higher School of Economics and majoring in Computational Mathematics at the University of Passau.

• Teaching in English and constant use of a foreign language allows each graduate of the program to gain competitive advantages in the global labor market.

• Close cooperation with the International Laboratory of Dynamic Systems and Applications, established within the framework of the Megagrant 220 project of the Government of the Russian Federation in December 2019. Active involvement of undergraduates in the work of the laboratory, participation in various grants.

• Exceptional opportunities for independent research work under the individual scientific supervision of outstanding scientists of Russia and the world. Participation in professional research seminars and international mathematical conferences regularly held by the Department of Fundamental Mathematics and the Faculty of Informatics, Mathematics and Computer Science.

• Modular learning structure that evenly distributes the workload and ensures constant monitoring of students' work.

• High professional level of teachers who work in various fields of mathematics and have high publication activity.

• Constant updating of the content of the educational program taking into account the development of science.

• Personal scientific contacts with domestic and foreign scientists. The team of scientists involved in the work of the Master's degree in Mathematics has personal close scientific ties with the staff of the Moscow campus of the Higher School of Economics and other universities in Russia. In addition, there is active cooperation with world leaders in the field of dynamical systems theory in Germany, Spain, England, France, USA, Holland, Brazil, Mexico, China.

Professional Activities and Competencies of Programme Graduates

The areas of professional activity of masters are:

- research activities in areas using mathematical methods and computer technologies;

- solving various problems using mathematical modeling of processes and objects, as well as software;

- development of effective methods for solving problems of science, technology, economics and management;

- teaching a complex of mathematical disciplines;

- practical work in companies using modern mathematical methods (IT industry, finance, market analysis, etc.)

Professional competencies:

As a result of mastering the master 's program , the graduate should have the following general professional and professional competencies:

GPC-1 is able to formulate and solve significant topical and significant problems of mathematics

GPC-2 is able to build and analyze mathematical models in modern natural science, technology, economics and management

GPC-3 is able to use knowledge in the field of mathematics in the implementation of pedagogical activities

PC-1 is capable of intensive research work

PC-2 is able to use modern mathematical apparatus and computer technologies in scientific work in the chosen specialty

PC-3 is able to work with scientific articles and monographs

PC-4 is able to present and adapt mathematical knowledge in various ways, taking into account the level of the audience

PC-5 is capable of teaching physical and mathematical disciplines and computer science

Key educational outcomes

KEO-1 Able to create mathematical texts, oral messages, lectures, presentations in accordance with the specified requirements of accessibility and rigor

KEO-2 Able to independently find ideas and research methods for solving theoretical and applied problems

KEO-3 Able to apply and develop methods of mathematical and algorithmic modeling to solve theoretical and applied problems

KEO-4 Able to perceive and interpret mathematical and natural science texts, work with modern search engines of scientific information and archives of scientific materials

KEO-5 Able to publicly present his own scientific results

KEO-6 Able to systematize and submit educational material, is able to listen attentively, patiently and impartially to problem solutions and provide methodical assistance in solving problems independently

KEO-7 Capable of educational and educational activities, ready to promote and popularize scientific achievements

KEO-8 Capable of conducting methodical and expert work in the field of mathematics

Programme Modules

The curriculum of 2023 consists of the modules "Key seminars", "Practice",

"Major", "MagoLego", "GIA".

Module	Labor intensity (credits)	Характеристика модуля
Key seminars	28	A mandatory element of the module is a mentor seminar. The module also includes research seminars.
Practice	29	Module consists of two sections. Project practice includes a project on pedagogy, a research project. The research practice includes the preparation of the course work and the preparation of the final qualifying work.
Major	45	Module elements include both compulsory and elective disciplines.
MagoLego	15	Module elements are selected from the university-wide pool of Master's degree disciplines. Disciplines can correspond to any field of training.
State final certification	3	Defense of the final qualifying work

Compulsory subjects of the OP include the following subjects:

• Mathematical methods of natural science

• Modern theory of dynamical systems

• Analysis of nonlinear dynamical systems

• Ergodic theory

• Systems with regular dynamics

and other disciplines

The variable part of the program is represented by the following disciplines:

• Introduction to Numerical Analysis

• Elements of the theory of solitons

The module "Key Seminars" includes a mentor seminar and research seminars, such as

• Modern theory of dynamic chaos

• Theory of bifurcations of multidimensional systems

• Introduction to Knot Theory

• Dynamics of endomorphisms

Options for Students with Disabilities

This degree programme of HSE University is adapted for students with special educational needs (SEN) and disabilities. Special assistive technology and teaching aids are used for collective and individual learning of students with SEN and disabilities. The specific adaptive features of the programme are listed in each subject's full syllabus and are available to students through the online Learning Management System.

Programme Documentation

All documents of the degree programme are stored electronically on this website. Curricula, calendar plans, and syllabi are developed and approved electronically in corporate information systems. Their current versions are automatically published on the website of the degree programme. Up-to-date teaching and learning guides, assessment tools, and other relevant documents are stored on the website of the degree programme in accordance with the local regulatory acts of HSE University.

I hereby confirm that the degree programme documents posted on this website are fully up-to-date.

Vice Rector Sergey Yu. Roshchin

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