

## Application and selection process

To be eligible for this double-degree programme, students from Passau must be enrolled in the M.Sc. Computational Mathematics programme (or have gained a favourable result in the selection process) and have had their application approved by Professor Tobias Kaiser. HSE Nizhny Novgorod candidates are nominated by Professor Ivan D. Remizov at the Department of Fundamental Mathematics. Students are selected and admitted to the double-degree programme in a two-step process that takes into account their academic profile and their motivation for joining the programme.

Approved applicants have to conclude a Learning Agreement, which includes details on the courses to be completed at the host university and their acceptance for credit at the home university. All courses in this programme are taught in English at both institutions. It is therefore necessary that applicants submit an English-language certificate at level B2 of the Common European Framework of Reference for Languages (CEFR). For additional information, please contact the University of Passau's International Coordinator at the Faculty of Computer Science and Mathematics (masters@fim.uni-passau.de).

Programme	Double Master's Programme
Degrees awarded	M.Sc. Computational Mathematics M.Sc. Mathematics
Duration and ECTS	4 semesters; 120 ECTS credits



## Further information and contact details

### Programme pages on the web

University of Passau: [www.uni-passau.de/en/msc-comp-maths](http://www.uni-passau.de/en/msc-comp-maths)  
HSE Nizhny Novgorod: [www.nnov.hse.ru/en/ma/math](http://www.nnov.hse.ru/en/ma/math)

### University of Passau Programme Convenor

Professor Tobias Kaiser  
Chair of Pure Mathematics  
[tobias.kaiser@uni-passau.de](mailto:tobias.kaiser@uni-passau.de)

### HSE Nizhny Novgorod Programme Coordinator

Professor Ivan D. Remizov  
Dept. of Fundamental Mathematics  
[iremizov@hse.ru](mailto:iremizov@hse.ru)

### Information about the University

[www.uni-passau.de/en/university/about-the-university](http://www.uni-passau.de/en/university/about-the-university)

### Faculty of Computer Science and Mathematics

#### International Coordinator

Primary contact for prospective international students seeking advice on study options, entry requirements and admissions-related matters  
[masters@fim.uni-passau.de](mailto:masters@fim.uni-passau.de)

#### International Student Assistants

Help with questions related to the visa process, housing, insurance, academics, course subscription, exam enrolment and student life in Passau  
[master-help@fim.uni-passau.de](mailto:master-help@fim.uni-passau.de)

#### International Office

Assists international students with the immigration formalities and with getting settled in Passau  
[www.uni-passau.de/en/international](http://www.uni-passau.de/en/international)

#### Language Centre

Offers a wide range of language courses  
[www.sprachenzentrum.uni-passau.de/en](http://www.sprachenzentrum.uni-passau.de/en)

#### Centre for Careers and Competencies

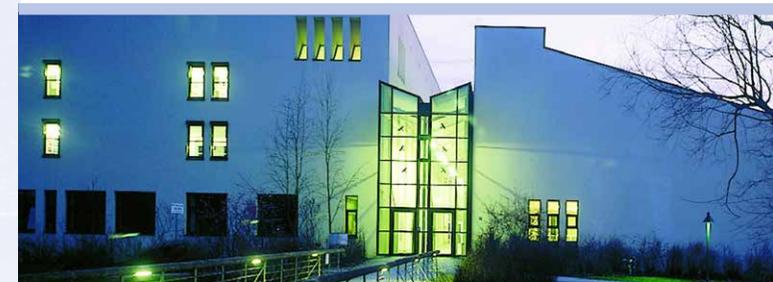
Helps students seeking internships or career entry positions and offers transferable skills courses  
[www.uni-passau.de/en/zkk](http://www.uni-passau.de/en/zkk)

#### Funding and scholarships

[www.uni-passau.de/en/costs-funding](http://www.uni-passau.de/en/costs-funding)



## German-Russian Double Master's Programme M.Sc. Computational Mathematics – M.Sc. Mathematics



### English-taught degree programme

University of Passau –  
National Research University  
HSE Nizhny Novgorod



NATIONAL RESEARCH  
UNIVERSITY  
NIZHNY NOVGOROD



## Join the international double master's programme between the University of Passau and HSE Nizhny Novgorod!

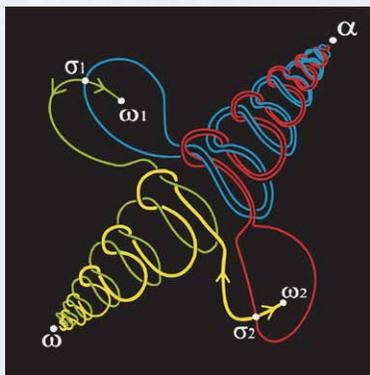
Students enrolled in the German-Russian double master's programme have the opportunity to gain two degrees: a Master of Science in Computational Mathematics from the University of Passau and a Master of Science in Mathematics from the National Research University – Higher School of Economics (HSE) in Nizhny Novgorod. The University of Passau gives credit for courses completed in Nizhny Novgorod and vice-versa.

## Computational Mathematics at the University of Passau

Mathematics plays a fundamental role in the quantitative areas of most academic disciplines, particularly in the natural sciences, engineering, business administration, economics, medicine and psychology. Mathematical results are a necessary prerequisite for the vast majority of modern technologies – and as our IT systems become increasingly powerful, we are able to mathematically handle enormous amounts of data and solve ever more complex problems.

Special emphasis is placed on developing students' ability to formalise given problems in a way that facilitates algorithmic processing as well as enabling them to choose or develop, and subsequently apply, suitable algorithms to solve problems in an appropriate manner. The degree programme is theoretical in its orientation, with strongly application-oriented components. Studying this programme, you can gain advanced knowledge in the mathematical areas of Cryptography, Computer Algebra, Algorithmic Algebra and Geometry, Image and Signals Processing, Statistics and Stochastic Simulation, Dynamical Systems and Control Theory as well as expert knowledge in Computer Science fields such as Data Management, Machine Learning and Data Mining.

Furthermore, you will have the chance to learn how to apply your knowledge to tackle problems in areas as diverse as Marketing, Predictive Analytics, Computational Finance, Digital Humanities, IT Security and Robotics.



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## Career prospects

Mathematicians are highly sought after wherever high-level analytical thinking skills are a requirement. Outside of academic and research organisations, mathematicians find employment in nearly all private- and public-sector organisations. Nowadays, mathematicians' work typically makes heavy use of computing technology.

Traditionally, mathematicians are employed in the pharmaceutical industry, in the financial industry, insurance companies, consulting and business intelligence, market research, logistics, information technology and in the research and development departments of high-tech companies.

## Duration and Cost

The standard duration of study is 4 semesters. Participants may place their year abroad flexibly at the beginning, in the middle or at the end of the programme. However, the double master's application procedure is carried out only once a year. The move to the other university usually takes place in the fall.

Students enrolled in the double master's programme are exempt from paying tuition fees at the host institution. They will, however, have to cover their cost of living, health insurance premiums, the costs involved in gaining a visa and residence permit, travel expenses etc. For an estimate of students' expenses throughout their studies and a selection of potential scholarship opportunities, please go to [www.uni-passau.de/en/costs-and-funding](http://www.uni-passau.de/en/costs-and-funding). Receiving institutions will provide assistance for student housing.

## University of Passau programme syllabus

The core modules consist of two mathematics seminars and the presentation of your master's thesis. Programme participants can choose whether to write the master's thesis in Passau or Nizhny Novgorod and where to complete their seminars.

There are **eight groups of compulsory elective modules**:

- 1) Algebra, Geometry and Cryptography
- 2) Mathematical Logic and Discrete Mathematics
- 3) Analysis, Numerics and Approximation Theory
- 4) Dynamical Systems and Optimisation
- 5) Stochastics, Statistics
- 6) Data Analysis and Data Management and Programming
- 7) Applications
- 8) Key Competencies and Language Training

1) This module group imparts advanced results in the areas of algebra and geometry, which constitute the fundament for algorithmic calculations, particularly in cryptography but also in many other mathematical areas.

2) The theoretical possibilities and limitations of algorithm-based solutions are treated in this module group.

3) Methods from the fields of mathematical analysis, applied harmonic analysis and approximation theory for modelling and approximating continuous and discrete data and systems as well as efficient numerical implementation and evaluation of these methods are the scope of this module group.

4) Dynamical systems theory deals with the description of change over time. This module group is concerned with methods used for the modelling, analysis, optimisation and design of dynamical systems, as well as the numerical implementation of such techniques.

5) This module group deals with methods for modelling and analysing complex random phenomena as well as the construction, analysis and optimisation of stochastic algorithms and techniques used in statistical data analysis.

6) This module group examines the core methods used in computer science for the analysis of data of heterogeneous modalities (e.g. multimedia data, social networks and sensor data) and for the realisation of data analysis systems.

7) In this module group, you will practise applying the mathematical methods learned in module groups 1 to 6 to real-world applications such as Marketing, Predictive Analytics and Computational Finance.

8) You will choose seminars that develop your non-subject-specific skills, such as public speaking and academic writing and other soft skills; you may also undertake internships to help to prepare you for your professional life after university.