Deutscher Akademischer Austauschdienst
German Academic Exchange Service



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Master's degree **2**

MSc Computational Mathematics • University of Passau • Passau 2

Master's degree

MSc Computational Mathematics

University of Passau • Passau

Overview

Degree	Master of Science in Computational Mathematics
Teaching language	• English
Languages	All modules are taught in English (100%). The Language Centre offers a wide range of language courses (in 13 different languages) free of charge to enrolled students.
Full-time / part-time	• full-time
Programme duration	4 semesters
Beginning	Winter and summer semester
Application deadline	The application round for the April intake starts in mid-November the previous year; for the October intake, the application round starts in early April. As the application deadlines can change on short notice, we ask that you check our application pages closer to the time for the specific dates (and what documents you need to submit).
Tuition fees per semester in EUR	None
Combined Master's degree / PhD programme	No
Joint degree / double degree programme	Yes
Description/content	In addition to being a science in its own right, mathematics plays a fundamental role in the quantitative areas of practically all other academic disciplines, particularly in the natural sciences, engineering, business administration, economics, medicine and psychology. Mathematical results permeate nearly all facets of life and 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 the students' ability to formalise given problems in a way that facilitates algorithmic processing. Also, they are enabled 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.

Course Details

Course organisation

The **core modules** consist of two mathematics seminars and the presentation of your Master's thesis.

The **compulsory elective modules** are divided into eight module groups:

1. Algebra, Geometry and Cryptography
   This module group imparts advanced results in the areas of algebra and geometry, which constitute the foundation for algorithmic calculations, particularly in cryptography, but also in many other mathematical areas.
2. Mathematical Logic and Discrete Mathematics
3. The theoretical possibilities and limitations of algorithm-based solutions are treated in this module group.
4. Analysis, Numerics and Approximation Theory
   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.
5. Dynamical Systems and Optimisation
   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.
6. Stochastics, Statistics
   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.
7. Data Analysis and Data Management and Programming
   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.
8. Applications
   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.
9. Key Competencies and Language Training
   In this module group, 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 participate in internships. This will serve to complement your technical expertise gained during your degree studies and will help to prepare you for your professional life after the university.

Your performance throughout the programme is evaluated by way of module assessments. In order to obtain the degree, you must pass a certain number of prescribed modules. However, you will be given the freedom to decide at which point in your degree programme you wish to complete specific modules.
This also means that you need to rely on your organisational skills, as you will have to put together your own timetable every semester, avoiding scheduling conflicts between modules that may be administered by different faculties. Nonetheless, the student committees and other units of the university will be on hand to advise you on timetabling issues and module selections.

A Diploma supplement will be issued	Yes

International elements

- Specialist literature in other languages
- Language training provided

- Study trips
- Training in intercultural skills
- Projects with partners in Germany and abroad

Integrated internships	There is no formal internship requirement for this degree programme. Nevertheless, we recommend that you go to the effort of completing one or more voluntary internships as you study towards your degree.
Course-specific, integrated German language courses	Yes
Course-specific, integrated English language courses	Yes

Costs / Funding

Tuition fees per semester in EUR	None
Semester contribution	The semester contribution fee is 104 EUR per semester. This covers the student services association and bus pass fees.
Costs of living	You should budget a minimum of 934 EUR per month for your living expenses. If you need a visa to come to Germany, this is the amount you must have available to you (e.g. paid into a blocked account) for each month. Nevertheless, your actual cost of living will vary depending on your lifestyle, and so you should treat this figure as an absolute minimum.
Funding opportunities within the university	Yes
Description of the above-mentioned funding opportunities within the university	The International Office awards a small number of scholarships to international degree-seeking students who have been enrolled in a Bachelor's programme for at least two semesters or in a Master's programme for at least one semester. You may also apply for a Deutschlandstipendium scholarship, which is open to students of all nationalities. This scholarship has a stipend of 300 EUR per month and runs for one year. You may reapply in subsequent years. Finally, there is a one-off emergency hardship grant available to international students in exceptional cases of unexpected financial difficulties.

Requirements / Registration

Academic admission requirements	You are eligible for this degree programme if you have an undergraduate university degree in mathematics or a closely related degree with a mathematics component of at least 110 ECTS credits and a final grade of 2.7 (German grading system) or the equivalent grade in a foreign grading system. Applicants who have not attained this minimum grade may still apply if they are among the best 70% of graduates of their cohort.
Language requirements	Unless **English** was the language of instruction of your prior university or secondary education, you should provide a language certificate at level **B2 of the Common European Framework of Reference for Languages (CEFR).**

	Similarly, unless **German** was the language of instruction of your prior university or secondary education, you should provide proof of German language skills at level **A1 CEFR (i.e., introductory level).** If you do not have German language skills at the time of application or enrolment, you will complete a compulsory, free-of-charge German language course during the first two semesters of the programme.
Application deadline	The application round for the April intake starts in mid-November the previous year; for the October intake, the application round starts in early April. As the application deadlines can change on short notice, we ask that you check our application pages closer to the time for the specific dates (and what documents you need to submit).
Submit application to	Please visit our application pages for details on how to apply and what documents to submit.

Services

Possibility of finding part-time employment	For international students, a dedicated career adviser is on hand: the "iStudi Coach" will help you with all your questions about finding work or placements in Germany. Please note that students from non-EU countries must apply for a work permit at the national job centre if they work more than 240 half-days per year. Students from EU member countries do not require a work permit.
Accommodation	The International Office has set up an accommodation service, which assists international students in finding accommodation. Rooms in the **halls of residence** cost between **270 EUR and 525 EUR per month** and are fully furnished. Kitchen and bathroom facilities are usually shared, although some rooms have en-suite bathroom facilities. However, please note that the demand for the rooms in the student halls is very high, and there is no guarantee that you will be able to rent one. Luckily, there is a large number of flats and flatshares available on the open housing market. On average, you should expect to pay somewhere in the vicinity of **350 EUR to 550 EUR a month** for these. Landlords usually require a two-month or three-month **deposit** when you move in, which will be returned to you at the end of the rental period, provided you leave your accommodation in good condition. • Further details on housing in Passau • Accommodation service for international students
Career advisory service	The university provides advice on job hunting, jobs and career-entry positions at German and international companies, here and abroad. These include personal interviews and advice, training courses on how to apply as well as intercultural and soft skills training. **International students** have access to a dedicated career adviser – the "iStudi Coach" – who helps students find internships and apply for student jobs and career-entry positions at German companies. The iStudi Coach also coaches international students on German labour market practices, how to write applications, and so on. Related links: • Future: Careers and Competencies Section • iStudi Coach
Support for international	• Welcome event

students and doctoral candidates	• Buddy programme • Tutors • Accompanying programme • Specialist counselling • Cultural and linguistic preparation • Visa matters



Information video for the MSc Computational Mathematics offered by the University of Passau

Professor Tobias Kaiser introduces the MSc Computational Mathematics degree programme.

» more: https://www.youtube.com/watch?v=LEzOY959STo

University of Passau



View of the main entrance of the central library

© University of Passau

The University of Passau

More than 10,500 students from more than 100 countries are currently studying towards their degrees on our bright, modern campus next to the Inn River and a stone's throw from the town centre and the historical Old Town.

The four faculties of the university offer degrees at the undergraduate, Master's and doctoral levels. Currently, five Master's programmes – MSc Artificial Intelligence Engineering, MSc Computational Mathematics, MSc Computer Science, MA Development Studies and MSc International Economics and Business – can be studied entirely in English.

A cosmopolitan university

No other Bavarian university has more of its students spending part of their programme abroad – to study, conduct research or gain work experience – than the University of Passau.

The range and depth of language tuition offered by our language centre probably has a role to play in this. Another reason is that our programmes are very international in their outlook – and with more than 250 international partner universities to choose from, it is difficult not to be tempted to go abroad for a semester or two or even to complete one of our 20 double degree programmes offered in cooperation with our global partner universities.

An unparalleled student experience

Passau's students benefit from a good staff-to-student ratio and from studying on an urban campus of manageable size that is located very close to the town centre.

The facilities on campus are of a high standard: There are bright, sunny seminar rooms, lecture theatres equipped with the latest technology, numerous computer rooms, Wi-Fi access exists throughout the campus, and our well-stocked university library stays open until midnight on most days.

Student satisfaction at the University of Passau is particularly high and our sought-after graduates typically occupy executive posts in business, social, and academic organisations in Germany, Europe, and indeed all over the world.

Student life

Throughout the semester, there are plenty of events of all sorts on campus and around town, often organised by our very active student societies. Our sports centre has some 40 sports clubs, offering everything from acrobatics to Zumba.

UNIVERSITY OF PASSAU

University location

An ideal student town

Passau is situated near the Bavarian Forest at the confluence of the Danube, Inn and Ilz rivers, and it is considered one of the most beautiful cities in Germany. After two fires that destroyed much of the town in the 17th century, the Old Town was rebuilt in the baroque style by Italian master builders, which is why you will notice a distinct Italian flair as you stroll through "Bavarian Venice", another name by which Passau is known.

With students accounting for one-quarter of its population, Passau is very much a student town with many galleries, art studios, bars, cafés, clubs and, of course, beer gardens; naturally, there is a modern multiplex cinema. A shopping centre and the nearby pedestrian zone offer a lot of excellent eateries and shops, just a short five-minute walk from campus.

Passau is home to a number of cultural institutions, such as the theatre and the "Scharfrichterhaus" – a restaurant, cinema and political cabaret/stand-up stage where many of Germany's most popular contemporary comedians started out. Both have productions and acts running throughout the year.

In addition to this, Passau plays host to numerous annual cultural events, including "Europäische Wochen Passau" – a cultural festival which brings international symphonic orchestras, classical ensembles, theatre companies and artists to Passau for about six weeks every year; the Eulenspiegel Festival with predominantly German comedy acts and rock bands; two Oktoberfest-style festivals in spring and autumn; and no list of festivals would be complete without the traditional Christmas Market in front of St. Stephen's Cathedral every December. Incidentally, did you know that St. Stephen's is home to the world's largest cathedral organ?

Outdoor enthusiasts will be delighted at the many opportunities for hiking, climbing, cycling, and alpine and cross-country skiing in the nearby Bavarian Forest. Additionally, Passau is not far from the Austrian and Bavarian Alps, with their famous skiing areas as well as their mountain biking and hiking trails.

Contact

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https://www.facebook.com/universitaetpassau

https://twitter.com/unipassau

https://www.linkedin.com/school/university-of-passau

https://www.instagram.com/universitaet.passau

https://www.youtube.com/channel/UCD9RBpW2Uaf0c0dJkGcoD5g

Last update 29.03.2024 06:09:11

International Programmes in Germany - Database

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Editor
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The data used for this database was collected and analysed in good faith and with due diligence. The DAAD and the Content5 AG accept no liability for the correctness of the data contained in the "International Programmes in Germany" and “Language and Short Courses in Germany”.

The publication is funded by the German Federal Ministry of Education and Research and by contributions of the participating German institutions of higher education.

