



Deutscher Akademischer Austauschdienst
German Academic Exchange Service



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Master's degree



Master of Science in Mathematical Physics

Leipzig University • Leipzig

Overview

Degree	Master of Science
In cooperation with	Max Planck Institute for Mathematics in the Sciences
Teaching language	<ul style="list-style-type: none">English
Languages	Courses are held in English (100%).
Programme duration	4 semesters
Beginning	Winter semester
Application deadline	31 May for the following winter semester (uni-assist) The application period starts approximately eight weeks before the deadline.
Tuition fees per semester in EUR	None
Combined Master's degree / PhD programme	No
Joint degree / double degree programme	No

Description/content

Physics and mathematics are indispensable for understanding the world and developing technical innovations. Following in the footsteps of famous former professors such as W. Heisenberg, F. Klein or F. Bloch, you will learn general principles of mathematics and theoretical physics, gain in-depth knowledge on selected topics and conduct independent research under the guidance of a professor. By solving complex problems and transferring concepts to related fields, you will prepare for a job in academia or industry.

Special features:

- International – English as course language
- Interdisciplinary – joint initiative of Mathematics and Physics departments
- Develop analytic skills – learn to solve complex problems and to transfer concepts to related fields
- Forefront research – supported by the local Max Planck Institute for Mathematics in the Sciences

You will learn the general principles of mathematics and theoretical physics in two fundamental courses on mathematical physics. Basing on your knowledge in analysis, algebra and theoretical

physics obtained during your Bachelor's courses, you will deepen your expertise on topics like symmetries, geometry, field theory and quantum mechanics. You will gain in-depth knowledge on selected fields by taking elective courses. The course structure allows for multiple individual choices. Shape the programme along your own preferences and take courses on:

- Dynamical Systems
- Differential Geometry
- Stochastic Processes
- Gravity and Cosmology
- Condensed and Soft Matter
- Partial Differential Equations
- Particles and Quantum Fields

Other key benefits:

- Study in a vibrant place with long-standing tradition in mathematical physics.
- Enjoy small courses led by dedicated lecturers.
- Contribute to current projects in research groups at Leipzig University or MPI MiS.
- Profit from a high flexibility and chose the courses according to your own preferences.
- Have the option to continue your carrier in the prestigious graduate school IMPRS MiS.
- Live in a vibrant city with a rich cultural scene, affordable housing, a lot of green spaces.

Job Perspectives:

Owing to the importance of mathematics and physics in modern society, you can follow many avenues for employment in academia and industry. Many graduates earn a PhD and benefit from excellent local opportunities at our institutes of mathematics and theoretical physics and at the MPI for Mathematics in the Sciences, e.g. as a member of our graduate school IMPRS MiS.

Due to the skills shortage in the field of mathematicians, IT specialists, natural scientists and technicians in Germany, you will have excellent opportunities to pursue a wide range of careers in industry and business (e.g., in mechanical engineering, electrical engineering, medical technology, software development, finance and insurance, communication systems, energy, transport or logistics). Other job opportunities exist in the service sector (e.g., business consulting, technology consulting) or in scientific research institutions and in administration (e.g., material testing offices, quality assurance, validation, IT security).

Course Details

Course organisation

In the Master's programme, you will:

- learn general principles of mathematical physics and in-depth knowledge on selected topics
- apply this knowledge to describe, analyse and solve complex problems
- transfer concepts to related questions in other or interdisciplinary fields
- train to read and understand current international specialist literature
- perform independent research in a one year research phase under the guidance of a professor or senior scientist
- prepare for a job in academia or industry and economy

The Master's programme consists of two one-year periods. The corner stone in the first phase are the two courses on mathematical physics. They will build on your fundamental knowledge in mathematics and theoretical physics and set the background for the advanced specialised courses you take later on.

In the research phase, you will learn to do independent research under the supervision of a professor or senior scientist, become a part of a research group and contribute to research problems of current interest.

The course structure allows individual choices and thus a wide range of specialisation options. It consists of compulsory modules (rectangular boxes), elective modules (boxes with rounded corners) and compulsory elective modules (octagonal boxes).

In addition to the wide variety of topics in mathematics and theoretical physics mentioned above, you can also make use of the extended selection of elective modules, e.g., meteorology (data assimilation or numerical weather prediction and climate modelling) or informatics (neuro-inspired information processing, artificial neural networks and machine learning, visualisation, graphs and biological nets).

On our [programme website](#) and in the study documents, you will find all details on modules, structure and content. Additionally, five study plans of methodologically complementary courses (“tracks”) are given as a guide for you:

- Gravitation / Differential Geometry
- Dynamical Systems / Stochastics
- Stochastics / Condensed Matter
- Quantum Field Theory / Functional Analysis
- Field Theory / Dynamical Systems

» [PDF Download](#)

A Diploma supplement will be issued	Yes
International elements	<ul style="list-style-type: none"> • Projects with partners in Germany and abroad
Integrated internships	<p>There are options for internships at:</p> <ul style="list-style-type: none"> • Max Planck Institute for Mathematics in the Sciences • Leibniz Institute of Surface Engineering • Helmholtz Centre for Environmental Research - UFZ • Helmholtz Centre Dresden Rossendorf (HZDR) Research Site Leipzig • Leibniz Institute for Tropospheric Research
Course-specific, integrated German language courses	No
Course-specific, integrated English language courses	No

Costs / Funding

Tuition fees per semester in EUR	None
Semester contribution	255.50 EUR
Costs of living	About 900 to 1,000 EUR per month
Funding opportunities within the university	No

Requirements / Registration

Academic admission requirements	<p>The prerequisite to the admission is as follows:</p> <ul style="list-style-type: none"> • A Bachelor's degree in mathematics, physics or informatics at university level • Alternatively, Bachelor's degrees of related subjects might be accepted, subject to approval by the aptitude commission, provided the following criteria are met: <ul style="list-style-type: none"> ◦ 30 CP (ECTS) of basic mathematics with at least 20 ECTS covering algebra and analysis; ◦ 20 CP (ECTS) of knowledge in theoretical physics or equivalent subjects as regards content <p>The application procedure is described here: https://www.uni-leipzig.de/en/international/studying-at-leipzig-university/prospective-students/masters-programmes/</p>
Language requirements	<p>English language proficiency equivalent to the B2 level of the Common European Framework of Reference for Languages is required.</p> <p>Applicants need to submit one of the following forms of proof/certificates:</p> <ul style="list-style-type: none"> • Certificate of European B2 Level in English Language • TOEFL scores (minimum): PBT: 543, CBT: 207, iBT: 72 • IELTS score (minimum): 5.5 • Cambridge FCE (minimum): Grade B or C • TOEIC (minimum): Listening and Reading: 785, Speaking: 160, Writing: 150, all four modules • Pearson PTE Academic (minimum): 59 <p>A certified knowledge of German is not required.</p>
Application deadline	<p>31 May for the following winter semester (uni-assist)</p> <p>The application period starts approximately eight weeks before the deadline.</p>
Submit application to	<p>The application is an online application via uni-assist. Details are provided on the university webpage: Application Procedure.</p> <p>Applicants with a German BSc degree submit their application via AlmaWeb.</p>

Services

Possibility of finding part-time employment	<p>There are work opportunities within the department. The income from typical student jobs is capped at 520 EUR per month. Students might be employed for homework corrections, programming, specific laboratory work, or tutorials.</p>
Accommodation	<p>Student halls of residence run by the "Studentenwerk Leipzig" (https://www.studentenwerk-leipzig.de/en/housing/our-student-halls-residence), shared apartments, accommodation services and estate agencies</p>
Career advisory service	<p>https://www.uni-leipzig.de/studium/beratungs-und-serviceangebote/career-service/</p>
Support for international students and doctoral candidates	<ul style="list-style-type: none"> • Welcome event

**General services and support
for international students
and doctoral candidates**

The guidance and support of our international students is provided centrally by our [International Centre](#)". This includes areas before the studies (application, enrolment, advice on study programmes and the start of studies) and during the studies (e.g. [study abroad](#)).

Our international students also receive comprehensive advice from the "[Studentenwerk Leipzig](#)", which not only covers the area of housing, but fields like psychosocial and social counselling and legal advice.

Contact

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🌐 Course website: <https://www.physgeo.uni-leipzig.de/en/studying/courses-of-study/master-mathematical-physics>

International Centre

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International Programmes in Germany - Database

www.daad.de/international-programmes
www.daad.de/sommerkurse

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Disclaimer

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".

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