Deutscher Akademischer Austauschdienst
German Academic Exchange Service



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Master's degree

Advanced and Computational Mathematics

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Overview

Degree	Master of Science in Mathematics
Teaching language	• English
Languages	Courses are held in English (100%). Participants can choose to write their Master's theses in English or German. Chemnitz University of Technology offers German language courses for students from abroad. Upon successful completion of these courses, students are awarded a certificate.
Full-time / part-time	• full-time
Programme duration	4 semesters
Beginning	Winter and summer semester
Application deadline	The application deadlines are as follows: 15 July for the following winter semester 15 January for the following summer semester All documents (see course website) have to be submitted by the deadline via uni-assist. Please start your application as early as possible. International applicants are very welcome!
Tuition fees per semester in EUR	None
Combined Master's degree / PhD programme	No
Joint degree / double degree programme	No
Description/content	The aim of this four-semester Master's programme is to train highly qualified graduates in mathematics who are capable of successfully dealing with challenges encountered in academic

and practical working fields. Based on a Bachelor's degree in mathematics, the programme deepens knowledge and skills in both theoretical and applied mathematics and prepares students for professional careers in business, industry or research.

Three fields of specialisation are offered, which are:

- Advanced Pure Mathematics
- Computational Mathematics
- Data Sciences

Depending on the chosen field of specialisation, starting in the second semester, students gain specialised expertise from a broad selection of courses, such as:

- Advanced Pure Mathematics: Algebraic Geometry; Algebraic Topology; Complex Geometry; Differential Geometry; Dirichlet Forms, Markov Processes and Semigroups; Fourier Analysis; Fractals; Functional Analysis II; Geometric Analysis; Graph Theory; Harmonic Analysis; Hilbert Space Methods; Mathematical Foundation of Learning Theory; Stochastic Analysis; Stochastic Processes; Times Series Analysis
- Computational Mathematics: Discrete Optimisation; Game Theory; Introduction to Insurance Mathematics and Mathematical Finance; Introduction to Wavelet Theory; Inverse Problems; Mathematical Foundation of Learning Theory; Numerical Methods for ODEs; Numerical Methods for PDEs; Numerical Linear Algebra; Numerical Optimisation; Optimisation in Machine Learning; Variational Methods
- Data Science: Introduction to Data Science; Mathematical Foundations of Big Data Analytics; Mathematical Foundations of Learning Theory; Mathematical Methods for Uncertainty Quantification; Matrix Methods in Data Science; Statistics in Data Science; Times Series Analysis

A few mandatory German language classes (as well as optional classes in other languages) are part of the programme.

Upon completion of the Master's degree, particularly qualified students can enter the PhD programme of the Faculty of Mathematics.

For more information, please visit the programme website.

Course Details

Course organisation

Throughout the programme, current topics in applied mathematics and pure mathematics are taught in comprehensive lecture series by internationally renowned scientists. All lecture topics are discussed in depth in tutorial classes so that students get continuous feedback regarding their academic performance.

During the four-semester programme, 120 ECTS have to be acquired: During the first semester students gain a solid foundation in advanced mathematics (29 ECTS covered by four courses). According to personal interest, starting in the second semester, students select one of the following fields of specialisation: "Advanced Pure Mathematics", "Computational Mathematics" or "Data Science". In their chosen specialisations, students achieve state-of-the-art expertise and earn at least 38 ECTS. In preparation for the Master's thesis, students will participate in a seminar (8 ECTS) during the third semester. Finally, during the fourth semester, students write their Master's theses (30 ECTS) on a subject from their field of specialisation.

In addition to courses in mathematics, students may earn up to 15 ECTS in language courses (5 ECTS per course). Upon completion of the programme, students are required to have German knowledge of level A2, which, depending on each student's personal background, requires students to achieve up to 10 ECTS in German courses.

The degree of Master of Science (MSc) is awarded upon successful completion of the programme. During the programme, oral exams are taken at the end of each semester.

A Diploma supplement will be issued	Yes
International elements	• International guest lecturers
Description of other international elements	• Possibility to take part in the exchange programmes / scientific cooperation programmes of the faculty (maximum one semester) • International programmes like summer schools are embedded in the programme. • Heterogeneous groups of students • Embedded in the university's international networks and programmes www.tu-chemnitz.de/international/index.php.en
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	All students have to pay a semester contribution of approx. 280 EUR. This fee also covers the semester ticket, which permits you to use buses and trams in Chemnitz during the semester. International students will receive the bank account details after admission with which they can transfer the semester contribution. However, the fee can also be paid after arrival in Chemnitz (by German bank card or transfer).
Costs of living	Approx. 934 EUR per month to cover personal expenses
Funding opportunities within the university	Yes
Description of the above-mentioned funding opportunities within the university	Incoming students can apply for different funding opportunities via the International Office of Chemnitz University of Technology. https://www.tu-chemnitz.de/international/incoming/stipendien/index.php.en

Requirements / Registration

Academic admission requirements	BSc degree in Mathematics
Language requirements	English: Accepted certificate: • IELTS min. 5.5 • TOEFL iBT (Internet Based Test): min. 72 points

- TOEFL PBT: min. 543 points
- TOEFL ITP Level 1: min. 543 points
- Cambridge Preliminary English Test + Result Distinction (PET)
- Cambridge First Certificate in English: Grade B or C (FCE)
- Cambridge English: Business Vantage (BEC Vantage), Legal (ILEC), Financial (ICFE)
- Cambridge IGCSE: 1st or 2nd Language on average B2
- Pearson PTE Academic: min. 59 points
- TOEIC: Listening and Reading Test min. 785 points, Speaking Test min. 160 points, Writing Test min. 150 points
- telc B2
- UNIcert II
- Study in English studies
- completed degree with English as the language of instruction
- proof of professional qualification as interpreter/translator

Applicants from countries with English as official/educational or native language are not required to submit a proof of English language proficiency with their application.

German: Although not compulsory, basic knowledge in German is recommended at the beginning of the programme. Courses to obtain the required level of German language (A2) are included within the curriculum for non-native speakers. Students providing a certificate of A2 level (CEFR) may choose advanced language courses or subject studies.

Application deadline

The application deadlines are as follows:
15 July for the following winter semester
15 January for the following summer semester

All documents (see course website) have to be submitted by the deadline via uni-assist. Please start your application as early as possible.

International applicants are very welcome!

Submit application to

Technische Universität Chemnitz
c/o uni-assist e.V.
11507 Berlin
Germany

Applications may be submitted online at https://www.uni-assist.de/en/

However, please note that it is mandatory to submit officially attested application documents of your educational certificates by post to uni-assist by the application deadline.

Services

Possibility of finding part-time employment

Students can find offers for part-time jobs, work placements etc. on the job portal offered by the Career Service of Chemnitz University of Technology: https://www.tu-chemnitz.de/career-service/jobboerse/.

Accommodation

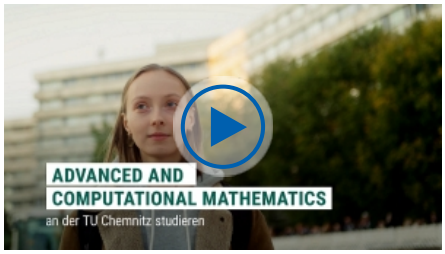
The "Studentenwerk" Chemnitz-Zwickau runs several student residences. International students can apply for a single room in one of the residences. The prices depend on the size and furnishings of the room and vary between 210 EUR and 320 EUR: https://www.swcz.de/en/student-housing/our-halls-of-residence/.

Career advisory service

The Career Service of Chemnitz University of Technology supports students during their studies as well as graduates entering their professional life. The Career Service provides a platform for companies and institutions to present themselves: https://www.tu-chemnitz.de/career-

service/index.php.en.

Support for international students and doctoral candidates	• Buddy programme
Supervisor-student ratio	1:10 - 1:5



Advanced and Computational Mathematics

Study Advanced and Computational Mathematics at Chemnitz University of Technology.

» more: https://www.youtube.com/watch?v=l71i3xEm280

Chemnitz University of Technology

Come study in the **European Capital of Culture 2025**!

Approximately **9,500 students** from about **90 countries** study at Chemnitz University of Technology in eight faculties and at the Centre for Teacher Education. International students are supported by the International Office.

Due to the reasonably priced dormitory rooms directly on campus, the distances between accommodation, lecture buildings, cafeteria and student clubs are short. So if you feel like studying at a cosmopolitan university, apply to study in Chemnitz.

Chemnitz University of Technology is a **cosmopolitan university** with strong regional, national and international networks. It is also home to about **2,300 academic and administrative employees**. It is thus the third largest university in Saxony. In terms of the proportion of foreign students, Chemnitz University of Technology occupies a top position among state universities nationwide. Chemnitz, the **European Capital of Culture 2025**, can point to many years of positive development in gross domestic product and a high proportion of highly qualified employees. It also owes this to its university, as Chemnitz University of Technology is the **intellectual heart of the city** and has developed into an **internationally visible research location for future value creation processes and sustainable future security**

The university combines **engineering and natural sciences** as well as **mathematics** with **humanities, social sciences and economics**. At the junctures, **unique degree programmes** are created alongside pioneering research projects. These include, for example, sensor technology and cognitive psychology, computer science for humanities and social scientists, and the degree programme MINT: Mathematics, Computer Science and Natural Sciences with Applications in Technology. As of the winter semester 2023/2024, the university has a total of **95 degree programmes** offered. A particular hallmark is the high degree of interdisciplinarity.

Chemnitz University of Technology considers **excellent teaching** to be an essential basis for additional lively scientific development of the research landscape as well as for the transfer of new questions, findings and methods to the economy and society. The university has created the necessary framework for this in its **"Teaching Mission Statement"**. Thus, teachers and students jointly shape the teaching and

learning conditions at Chemnitz University of Technology in the context of internationality and regionality. The further development of study programmes is regularly initiated by the **TUCpanel student survey** as well as by **accreditation procedures**. This makes student success factors visible, which ultimately helps **more students to successfully complete their studies in the standard period of study**

With almost **30 percent international students** and numerous international researchers with **cooperative relationships to 130 universities on every continen**t, Chemnitz University of Technology is one of the most internationally oriented universities in Germany. As a result of numerous exchange programmes, you can meet students from Chemnitz all over the world. It has been pursuing this path for many years with increasing dynamism and at a professional level, as evidenced by the **seal of the HRK Re-Audit Internationalisation of Universities**

University location

Chemnitz, European Capital of Culture in 2025, the third largest city in Saxony, looks back proudly on a history of innovation with which few other cities can hope to compete. With the advent of the Industrial Revolution, Chemnitz quickly developed into the leading centre of mechanical engineering in Germany. This great tradition has continued uninterrupted to the present day, even through the period in which the city was known as Karl-Marx-Stadt. Today, Chemnitz (population 245,000) is well on its way to becoming one of the most important high-tech locations in Germany. But Chemnitz has much more to offer than just science and technology. Amongst other things, there is the Opera House (built in 1909), the King Albert Museum with its excellent collection of German Expressionist paintings, the Natural History Museum and the German Board Games Museum, the only one of its kind in Germany. And in the Kassberg Quarter, you can see the largest intact area of Art Nouveau architecture in Germany.

Contact

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Faculty of Mathematics

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https://de-de.facebook.com/TUChemnitz

https://twitter.com/TUChemnitz

https://www.linkedin.com/school/technische-universitat-chemnitz/

https://www.instagram.com/tuchemnitz/

https://www.youtube.com/user/tuchemnitz

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International Programmes in Germany - Database

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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”.

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