



Deutscher Akademischer Austauschdienst  
German Academic Exchange Service



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# Master's degree



## MSc Computational and Applied Mathematics (CAM)

FAU Erlangen-Nürnberg • Erlangen

### Overview

Degree	Master of Science
Teaching language	<ul style="list-style-type: none"><li>English</li></ul>
Languages	All mandatory and mandatory elective courses of the programme are taught in English. Up to 12% of the courses are elective courses which can be chosen from a portfolio containing German and English courses.
Full-time / part-time	<ul style="list-style-type: none"><li>full-time</li></ul>
Programme duration	4 semesters
Beginning	Winter and summer semester
Additional information on beginning, duration and mode of study	<p>We recommend to start the programme in the winter semester.</p> <p>Lectures are generally conducted in person, but lecturers may also provide online material.</p>
Application deadline	<p>15 July for the following winter semester</p> <p>15 January for the following summer semester</p>
Tuition fees per semester in EUR	None
Combined Master's degree / PhD programme	No
Joint degree / double degree programme	No
Description/content	<p>This degree programme is tailored to the current needs in applied mathematics and scientific computing. It is designed for students who appreciate using rigorous mathematical analysis or scientific computing for the prediction of phenomena or for the optimisation of processes in the sciences or in engineering. Initially, the students acquire a firm grounding in mathematical modelling and applied analysis as well as in high performance computing. They learn to derive mathematical models and to reflect upon the properties and limitations of models. Starting in the second semester, the students are free to choose from a large variety of courses in order to specialise in two of the three following fields:</p> <ul style="list-style-type: none"><li>Modelling and Applied Analysis</li></ul>

- Numerical Analysis and Simulation
- Optimisation

The subjects of these mandatory elective courses (which all are taught in English) reflect the mathematical research pursued at Friedrich Alexander University Erlangen-Nuremberg (FAU). They range from modelling, PDE analysis and numerical simulation in mathematical continuum mechanics (transport processes in complex multiphase flow, fluid-structure interactions) to multiscale analysis and mathematics in the life sciences. They also include various fields of mathematical optimisation, including shape optimisation, optimisation with PDE, and discrete optimisation.

In addition, the study plan permits students to attend a number of modules chosen from the entire portfolio of the university's Master's level classes to follow their interests beyond mathematics or in other fields of mathematics.

See also: <https://meinstudium.fau.de/en/studiengang/computational-and-applied-mathematics-msc-en/>

For details, see course website: <https://studium.math.fau.de/cam>

#### Current information

Normally, participating in the programme (lectures, exams) requires students to be on-site. Nevertheless, lecturers might provide some online material.

## Course Details

#### Course organisation

- First and second semester: all participants attend the following:
  - two courses in modelling and analysis in continuum mechanics (15 ECTS)
  - two courses on programming techniques/architectures for/of supercomputers (15 ECTS)
  - a practical course on modelling, simulation and optimisation (5 ECTS)
- First, second and third semester: The students choose among the mandatory elective courses especially designed for CAM (40 ECTS). In addition, they are free to choose courses from the university's entire Master's level portfolio (15 ECTS).
- Fourth semester: The Master's phase (30 ECTS): Within six months, after becoming acquainted with the subject in a Master's seminar, the students write the Master's thesis on an individual research project under the guidance of a professor. They present their results in a Master's colloquium.

The teaching concept of FAU provides every student with a lecturer from the Department of Mathematics who serves as a mentor. This mentor designs an individual study plan in accordance with the student's individual interests.

You can find a detailed module catalogue on the course website: <https://studium.math.fau.de/cam>

#### A Diploma supplement will be issued

Yes

#### International elements

- International guest lecturers
- Projects with partners in Germany and abroad

#### Course-specific, integrated German language courses

No

#### Course-specific, integrated English language courses

No

## Costs / Funding

<b>Tuition fees per semester in EUR</b>	None
<b>Semester contribution</b>	FAU does not charge tuition fees. However, each semester students must pay a fee of 144 EUR for student services and for the "basic ticket" for public transportation valid on weekends and at night.
<b>Costs of living</b>	<p>According to a study by the German National Association for Student Affairs, students in former West Germany who no longer live with their parents have an average amount of more than 930 EUR per month at their disposal. However, monthly expenditures for personal lifestyle vary a lot. The study shows that approx. 25 per cent of the students asked have less than 700 EUR while 10 per cent have more than 1,300 EUR per month. For former West Germany, the study revealed the following details regarding average expenditures:</p> <ul style="list-style-type: none"><li>• Rent, including bills (in the Erlangen-Nuremberg area): 325 EUR (250 to 600 EUR)</li><li>• Food: 168 EUR</li><li>• Clothing: 42 EUR</li><li>• Transport (public transport and/or car): 94 EUR</li><li>• Learning materials (depending on the subject): 20 EUR</li><li>• Health insurance, doctors, medicine: 80 EUR</li><li>• Telecommunications: 31 EUR</li><li>• Leisure activities, culture, sports: 61 EUR</li></ul>
<b>Funding opportunities within the university</b>	Yes
<b>Description of the above-mentioned funding opportunities within the university</b>	<p>There is a wide range of scholarships available for outstanding students. In addition to requiring applicants to have excellent grades, most scholarship programmes have additional conditions regarding cultural, political, religious, or social involvement. If you have any questions about the application procedure or selection criteria, you can contact the Student Advice and Career Service (IBZ) or speak directly to FAU's liaison officer for the scholarship organisation you wish to apply to.</p> <p><a href="https://www.fau.eu/study/prospective-students/financing-your-studies">https://www.fau.eu/study/prospective-students/financing-your-studies</a></p>

## Requirements / Registration

<b>Academic admission requirements</b>	<p>The requirement for admission to the Master's degree programme is a good Bachelor's degree in a mathematical programme or in a closely related field with a substantial content of mathematical courses (at least 45 ECTS). Qualification or aptitude for the Master's degree programme is examined in the qualification assessment process. Applicants with a degree that is not in mathematics but in a related field can only be admitted after passing an oral exam. The criteria of this oral exam are: basic knowledge in functional analysis or in the theory of differential equations, basic knowledge in numerics or in optimisation, ability to discuss mathematics in English, e.g., on the applicant's Bachelor's thesis.</p>
<b>Language requirements</b>	<p>Applicants must provide proof of their English language skills, including one of the following:</p> <ul style="list-style-type: none"><li>- English level B2 CEFR (vantage or upper intermediate)</li><li>- university entrance qualification or a university degree acquired in English</li><li>- six years of English study at a German grammar school ("Gymnasium")</li></ul> <p>Additionally, applicants must provide the following proof of their German language skills:</p> <ul style="list-style-type: none"><li>• German Level A1 CEFR (breakthrough or beginner), to be proven no later than one year into</li></ul>

the programme  
(The university offers German language courses for enrolled students free of charge.)

**Application deadline** 15 July for the following winter semester  
15 January for the following summer semester

**Submit application to** The application procedure is fully online at [www.campo.fau.eu](http://www.campo.fau.eu).  
  
Before application, register at IdM (Identity Management System of the FAU) on the same page. During the application, documents have to be uploaded. See instructions on the required documents and certification/translation requirements on the website.

## Services

**Accommodation** The cities of Erlangen, Fürth, and Nuremberg offer a very good standard of living. They are popular places to live, meaning that accommodation is in high demand but often in short supply. This is particularly the case during the period before the start of a new semester. We therefore recommend that you start looking for accommodation as soon as possible. If you are flexible and also look in the surrounding area, you will have a better chance of finding somewhere affordable to live. The region has an excellent public transport system, so you should not have any problems getting to your place of study or work.

It is worth checking the available accommodation on the Internet every day, as new accommodation becomes available on a day-to-day basis. It pays to be flexible when it comes to the price, location, and available facilities of your accommodation.

Student Services Erlangen-Nürnberg runs its own [student accommodation](#) in Erlangen and Nuremberg. You will be informed about how to apply for a room in Student Services accommodation while you are in the process of applying to be admitted to FAU.

**Support for international students and doctoral candidates**

- Welcome event
- Buddy programme
- Tutors

# FAU Erlangen-Nürnberg

Founded in 1743, FAU has a rich history. It is a strong research university with an international perspective and one of the largest universities in Germany with 39,657 students, [272 degree programmes](#), 4,000 academic staff (including over 624 professors), [243 million EUR third-party funding](#), and partnerships with universities all over the world. Teaching at the university is closely linked to research and focuses on training students in both theory and practice to enable them to think critically and work independently. The research itself also strikes the perfect balance between a theoretical approach and practical application.

FAU's outstanding research and teaching is reflected in top positions in both [national and international rankings](#) as well as the high amount of [DFG funding](#) that its researchers are able to secure.



## University location

FAU's two main sites, the cities of Erlangen and Nuremberg, are located at the heart of the Nuremberg Metropolitan Region. Both Erlangen, a city of 100,000 inhabitants that was the former home of the Huguenots and is a key location for Siemens, and Nuremberg, a city with a metropolitan flair and a population of half a million, have their own unique charms. The opera, theatre, and museums, along with a lively pub scene and nightlife, offer plenty of opportunities to relax after a day in the lecture theatre, lab, or library. The highlights of the cultural calendar in Erlangen include the Hörkunstfestival (acoustic art festival), International Comic Salon, figuren.theater.festival (puppet theatre festival), Poetenfest (poetry festival), and the "ARENA... of the young arts" theatre and performance festival. A wide range of cultural institutions open their doors to visitors during the Blue Night in Nuremberg, and once every two years, the Long Night of Sciences gives the public a chance to take a look inside research institutions in Erlangen, Nuremberg, and Fürth. In summary, the mixture of academia, innovative companies, art, and culture makes the region the perfect place for creative minds. There is also plenty on offer for keen athletes and nature lovers. Fränkische Schweiz, a paradise for climbers and walkers, is located to the north of Erlangen and is at FAU's doorstep. Water sports enthusiasts will love the Franconian lakes and the university's water sports centre, which is located just south of Nuremberg.

## Contact

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# International Programmes in Germany - Database

[www.daad.de/international-programmes](http://www.daad.de/international-programmes)  
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