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Advanced Computational Methods in Civil Engineering • RWTH Aachen University • Aachen .......... 2
Master's degree

Advanced Computational Methods in Civil Engineering

RWTH Aachen University • Aachen

Overview

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<th>Degree</th>
<th>Master of Science</th>
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<tr>
<td>Teaching language</td>
<td>English</td>
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<tr>
<td>Languages</td>
<td>The language of the programme is English. Participants can attend elective subjects taught in German.</td>
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<tr>
<td>Programme duration</td>
<td>4 semesters</td>
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<td>Beginning</td>
<td>Winter and summer semester</td>
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</table>
| Application deadline        | EU/EEA applicants: 15 July for the following winter semester and 15 January for the following summer semester  
Non-EU / non-EEA applicants: 1 March for the following winter semester and 1 September for the following summer semester |
| Tuition fees per semester in EUR | None |
| Combined Master's degree / PhD programme | No |
| Joint degree / double degree programme | No |
| Description/content         | Over the last few decades, computational methods in civil engineering have grown to become an essential tool for engineers. Nowadays, nearly every engineering problem can be solved solely with this tool. As a reaction to the ever-growing importance of computational methods for the modern civil engineer, the Faculty of Civil Engineering at RWTH Aachen University has developed the new specialisation Advanced Computational Methods in Civil Engineering (AdCom) for the Civil Engineering Master’s degree programme. Taught completely in English, this specialisation lends itself not only to the tendencies of present-day engineering but also to the future of civil engineering. AdCom graduates are able to apply and develop numerical methods and simulations for the realisation of innovative civil engineering structures. The curriculum is interdisciplinary with courses from the faculties of Civil Engineering, Mechanical Engineering and Mathematics. This allows students to obtain a deeper understanding of the key skills in structural mechanics, fluid mechanics, and numerical mathematics. |
Students will learn to master challenges such as those which arise from the use of new resource-conserving materials and advanced composite materials as well as those that arise from the trend towards extremely light load-bearing structures. The development of state-of-the-art lightweight structures, which are subject to dynamic loads such as wind and traffic, will be just one of many expertises that our students possess. The knowledge and use of numerical methods, mechanical principles and the development of software code account for just a fraction of skills that make up our students’ repertoire, which enables them to assess the strength and limits of numerical modelling in civil engineering.

The curriculum of Advanced Computational Methods in Civil Engineering is highly scientific and research-oriented and thus prepares graduates for a PhD programme and ultimately a scientific career in research or in industry. To prepare students for such a future, a new research module and a scientific mini-thesis are a part of the curriculum in addition to the Master’s thesis.

Future opportunities

The Master’s programme has a strong focus on research that is accompanied by an excellent international reputation. This is especially present in the second year, where students work side by side with university researchers, thus gaining unique insights and experience in modern scientific methodologies. Engineers with expertise in computational methods are multidisciplinarily trained professionals. They are able to pursue a successful career not only in academics but also in an industrial environment, which could range from classic civil engineering to the various areas of mechanical engineering.

Course organisation

The faculty of Civil Engineering offers a Master’s programme with nine areas of specialisation. While seven of them are only offered in German, the Master’s programme Advanced Computational Methods in Civil Engineering (AdCom) is offered in English.

The AdCom Master’s programme is organised by the Chair of Structural Analysis and Dynamics (LBB) and the Institute of Applied Mechanics (IFAM).

LBB website: www.lbb.rwth-aachen.de  
IFAM website: www.ifam.rwth-aachen.de

Example of a study plan

First semester:
- Plates and Shells
- Mechanics of Materials
- Structural Steel III
- Finite Elements in Fluids

Second semester:
- Brittle-Matrix-Composite Structures: Modelling and Design Methods
- Continuum Mechanics
- Nonlinear Structural Analysis
- Finite Element Technology

Third semester:
- Research Module: Numerical Methods in Structural Mechanics and Dynamics
- Selected Topics of Inelasticity Theory
- Advanced Structural Analysis
- Numerical Methods for Fluid-Structure Interaction

Fourth semester:
- Master’s Thesis
Types of assessment
This programme includes written examinations, oral examinations, homework, and seminar papers.

A Diploma supplement will be issued
Yes

International elements
- Language training provided
- Study trips
- Projects with partners in Germany and abroad
- International comparisons and thematic reference to the international context

Course-specific, integrated German language courses
No

Course-specific, integrated English language courses
No

The course of study can be taken entirely online
No

Digital learning and teaching modules
- Video learning

Description of e-learning elements
Faculty members provide audio slidecasts.

Participation in the e-learning course elements is compulsory
No

Can ECTS points be acquired by taking the online programmes?
No

Can the e-learning elements be taken without signing up for the course of study?
No

Costs / Funding

Tuition fees per semester in EUR
None

Semester contribution
All RWTH students must pay a social contribution to student services, which amounts to approx. 291 EUR per semester. This is not a tuition fee. Please visit our website for further information on how the fee is spent: http://www.rwth-aachen.de/re-enrollment/?idr=1

Costs of living
The cost of living is approx. 800 EUR per month (plus the social contribution fee each semester).
Requirements / Registration

Academic admission requirements
One of the prerequisites for studying this Master’s degree programme is a first university degree, which proves the necessary background education.

Applicants must have a profound knowledge in mathematical and mechanical subjects as well as in statistics and hydromechanics.

Thorough knowledge in at least two of the following areas of civil engineering is also required: structural engineering, water management and hydraulic engineering, construction management and geotechnics, or transport engineering.

In addition to the subject-related prerequisites, applicants must show proof of a profound level of the English language (see below).

In addition, proof of the Graduate Record Examination (GRE) General Test is required. Applicants who are nationals of a member state of the European Union or of the European Economic Area as well as applicants who have successfully passed the German “Abitur” (regardless of where they have earned their Bachelor’s degree) are exempt from this requirement.

Language requirements
Applicants must show proof of a profound level of the English language, at least equivalent to the B2 level of the Common European Framework of Reference for Languages (CEFR).

The following language tests are accepted as proof of English language skills:

- Test of English as Foreign Language / TOEFL, Internet-based test iBT, with at least 90 points
- International English Language Testing System, IELTS, with a grade of at least 5.5
- Certificate of Advanced English CAE
- First Certificate in English FCE, with a grade of at least B
- Any official certificate that certifies English language skills at level B2 of the Common European Frame of Reference for Languages, CEFR
- Placement test of the RWTH Aachen Language Center at the B2 level (This language certificate can only be obtained by individuals who are already enrolled as students at RWTH Aachen.)

Application deadline
EU/EEA applicants: 15 July for the following winter semester and 15 January for the following summer semester
Non-EU / non-EEA applicants: 1 March for the following winter semester and 1 September for the following summer semester

Submit application to
Please submit your application online: http://www.rwth-aachen.de/go/id/dqml/lidx/1/

Services
Possibility of finding part-
International students may take up work in the private sector during the semester or in the
time employment

semester breaks for up to three months without having to obtain a work permit. Students may thus take up full-time work for 120 days or part-time positions for 240 days. This regulation is also stated on the residence permit. During the semester, students are allowed to take up jobs with working hours of up to 20 hours a week.

Student assistants are more flexible with regard to working hours.

Accommodation

Availability of university accommodation in Aachen is limited. Therefore, participation in individual allocation procedures is usually required. Because of the demand for university accommodation, it can be necessary to switch to the private accommodation market. Especially family and couples apartments are very high in demand, so that accommodation from the private market is seemingly mandatory. The majority of RWTH Aachen University's students are committed to the private accommodation market.

There are a number of options for finding private accommodation in and around Aachen. Accommodation on the private market is priced between 290 EUR and 550 EUR per month, of course depending on the size and the number of rooms.

For short-term accommodation, there are many hotels, a few youth hostels, and a boardinghouse located in and around Aachen (reservation is recommended).

Please visit https://www.rwth-aachen.de/housing for further information.

Career advisory service

The RWTH Aachen University Career Center offers support by providing opportunities that strengthen your professionalism and exercise your individual skills in the application process. All enrolled RWTH Aachen University students can participate in the seminars at the Career Center.

Please find more information online: https://www.rwth-aachen.de/go/id/sff/?lidx=1

Specific specialist or non-specialist support for international students and doctoral candidates

- Welcome event
- Buddy programme
- Cultural and linguistic preparation
- Visa matters
Civil Engineering
RWTH Aachen
University - All About Transportation

This is the official YouTube channel of the Open Educational Resource Initiative of the Faculty of Civil Engineering at RWTH Aachen University. This channel offers a variety of videos showing the many facets of basic and current research in the area of civil engineering.

» more:
https://www.youtube.com/watch?v=vkzgcJGdUnA&list=PLxQWK4LR7JyMLcOZhy8dxbwW4MbM11Ce4

RWTH Aachen University

With 260 institutes in nine faculties, RWTH Aachen University is one of Europe's leading institutions for science and research. Currently, more than 45,300 students are enrolled in 157 academic programmes. More than 9,500 of them are international students hailing from 125 different countries. The scientific education students receive at RWTH Aachen University is firmly rooted in real-world application. As a result, our graduates are highly sought after by businesses to work as trainees and fill executive positions. National and international rankings show that our graduates have a high aptitude for managing complex tasks, constructively solving problems in teams, and taking on leadership responsibilities. Thus, it should come as no surprise that one in five board members of German corporations is an alumnus of
RWTH Aachen University.

Work conducted in the research centres at RWTH Aachen University is strongly oriented towards the current needs of industry, commerce, and the professions. This has resulted in numerous innovations, patents, and licences. The individual competence centres at RWTH Aachen University collaborate effectively across departments and faculties in interdisciplinary groups and forums, while still maintaining a strong focus on their own department specialisation. For instance, the computer science and biology departments - and even the social sciences - all have a clear connection to the school’s engineering focus. This has been a crucial factor in motivating multinational corporations such as Philips, Microsoft, and Ford to locate their research institutions in the Aachen region.

Excellence in teaching and research constitutes the basis from which RWTH Aachen University works with other leading institutions and technical universities around the world.

University location

As Germany’s westernmost city, Aachen is located on the borders of Belgium and the Netherlands. Its population is about 260,000. Aachen’s historic centre around the distinctive cathedral (UNESCO World Heritage Site) is characterised by a student lifestyle. At the city’s doorstep, the hilly Eifel landscape with its rivers, lakes, and forests offers a picturesque countryside for outdoor recreation.

Aachen benefits from its central location in the heart of Europe!

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Faculty of Civil Engineering

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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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