



Deutscher Akademischer Austauschdienst
German Academic Exchange Service



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Master's degree



INDUSTRIAL MATHEMATICS
AND DATA ANALYSIS (IMDA)

Industrial Mathematics and Data Analysis

University of Bremen • Bremen



Overview

Degree	Master of Science
Teaching language	<ul style="list-style-type: none">English
Languages	The programme is offered in English. You may also attend any suitable courses or seminars that are offered in German and you can choose to write your Master's thesis in English or in another language upon request.
Full-time / part-time	<ul style="list-style-type: none">full-time
Programme duration	4 semesters
Beginning	Winter and summer semester
Application deadline	<ul style="list-style-type: none">Application period for the following winter semester: 1 March – 30 AprilApplication period for the following summer semester: 1 August – 15 October
Tuition fees per semester in EUR	None
Combined Master's degree / PhD programme	No
Joint degree / double degree programme	No
Description/content	<p>Industrial mathematics, as a young discipline of applied mathematics, focuses on using modern mathematical methods to solve problems from science, engineering, and industry. Recently, mathematical foundations and algorithms for analysing big data have become a key part of this.</p> <p>In four semesters, our newly established international Master's programme provides a broad variety of lectures, seminars, and projects. Students can choose from topics such as machine learning, inverse problems, optimal control, applied statistics, and finite element methods. Central to our Master's programme is the so-called "modelling project": teams of students are assigned real-world problems in cooperation with our partners from industry and institutes, and they use mathematical modelling and analysis combined with numerical simulations to solve these</p>

problems. Finally, with his or her Master's thesis, each student will join an area of current mathematical research. Our Master's programme can be succeeded with a PhD qualification.

Course Details

Course organisation

This Master's programme consists of lectures and seminars on topics regarding industrial mathematics and data analysis. Typically, lectures are accompanied by problem sessions with weekly exercises. For seminars, every participating student works out one topic and presents it to the audience.

The specific topics for lectures and seminars vary from semester to semester, the students make their own choices and create individual course plans, according to their personal interests.

The common starting point in the first semester are two lectures (mandatory) on "mathematical methods for data analysis and image processing" and on "numerical methods for PDE". Based on these lectures, each student chooses either data analysis or industrial mathematics as a specialisation. In the following semesters, elective courses, i.e. lectures and seminars, are taken in order to specialise and for broadening regarding the other branch, respectively. Possible topics include the following: machine learning, inverse problems, applied statistics, parameter identification (data analysis branch) and optimal control, discrete optimisation, adaptive FEM (industrial mathematics branch).

In the heart of this Master's programme is the "modelling project". Teams of students are assigned real-world problems – not from the literature but actual problems from collaborations with engineering institutes or companies. They utilise mathematical modelling, analysis and optimisation techniques to tackle their problems in order to find answers for the customer, i.e., the institute or company that has assigned the problem. In particular, students design, analyse and perform algorithms for numerical simulations and they visualise their results appropriately.

The mathematical part of the programme is accompanied by courses from an area of technical applications. Each student chooses either electrical engineering, mechanical engineering, geosciences, applied physics, or computer science as minor subject. They attend Master's courses on this, offered by the corresponding department. For this, basic knowledge on the chosen subject from Bachelor's studies is indispensable.

Last but not least, the complete final semester is designated for the Master's thesis. This is an individual project on a recent research topic, worked out by the student and guided by an expert in this field, i.e. a professor or postdoc.

This is summarised in the following study plans. The workload each course entails is implied by the given numbers of ECTS credit points (CP).

» [PDF Download](#)

A Diploma supplement will be issued

Yes

International elements

- Integrated study abroad unit(s)

Integrated study abroad unit(s)

Participants may study abroad at one of the partner universities of the department for one or two semesters, e.g. via the [Erasmus exchange programme](#), [PROMOS](#) or through [YUFE](#) – "Young Universities for the Future of Europe".

Course-specific, integrated German language courses

No

Course-specific, integrated

No

Costs / Funding

Tuition fees per semester in EUR	None
Semester contribution	The semester contribution is an administrative fee of approx. 350 EUR, which is charged once per semester. It includes free use of public transportation ("Semesterticket") in and around Bremen and is valid for six months. With the semester ticket, you can travel free of charge on regional trains to neighbouring cities such as Hamburg, Lübeck, Hannover, Göttingen, Kassel, Hengelo (NL), Münster, Magdeburg and even the North Sea coast for leisure activities.
Costs of living	<p>The cost of living in Bremen amounts to approx. 900 EUR per month. You can find more information, e.g. here and additional information regarding the semester contribution can be found here.</p> <p>It is possible to rent a room for 300 EUR per month. The exact amount depends on the quality and size of the room and whether you share a flat with others. The university offers a student canteen where a wide range of quality food is available at very moderate prices.</p>
Funding opportunities within the university	Yes
Description of the above-mentioned funding opportunities within the university	Funding opportunities offered by the University of Bremen can be found here . Once you are a student at the University of Bremen, you can apply for a Deutschlandstipendium .

Requirements / Registration

Academic admission requirements	<p>The admission requirements are set out in the Admission Regulations for the Master's programme in "Industrial Mathematics and Data Analysis". The main requirements are as follows:</p> <ul style="list-style-type: none"> • a Bachelor's degree or other comparable undergraduate degree, with a minimum of 180 ECTS points • proof, typically via the transcript of records, of at least 90 ECTS points in mathematics during the undergraduate degree programme • proof of at least 24 ECTS points in a technical application subject or in computer science • a letter of motivation, written in English, that explicitly explains the applicant's special interest in industrial mathematics and data analysis and in the University of Bremen; The planned choice of a minor subject (see description of the programme) should be mentioned.
Language requirements	<p>Proof of English language proficiency. A B2 level (CEFR) or higher is required. Having acquired your university entrance qualification or a previous university degree in English also serves as proof of English language proficiency.</p> <p>In addition, proof of German language proficiency at an A1 level (CEFR) or higher must be provided. German exams can be taken at the Goethe-Institut</p>

Application deadline

- Application period for the following winter semester: 1 March – 30 April

- Application period for the following summer semester: 1 August – 15 October

Submit application to

Apply for the study programme via the [application portal](#) of the university.

Further useful information can be found [here](#).

Services

Possibility of finding part-time employment

Numerous student jobs are offered in the city and the surrounding area. There are limited [job opportunities](#) for gifted students as research assistants at the Center for Industrial Mathematics (ZeTeM) at the University of Bremen or as teaching assistants at the department.

Accommodation

Accommodation is available in [student residences](#); we recommend applying early. You can also look for private accommodation.

A wide range of housing options close to campus can be found [here](#).

Career advisory service

Career advisory service is provided during the four semesters of the programme by professors, post-docs, lecturers, supervisors or at the [Career Center](#) of the university.

Support for international students and doctoral candidates

- Welcome event
- Support with registration procedures

General services and support for international students and doctoral candidates

The [Central Student Advisory Service](#) provides information and advice to everyone who has questions about studying at the University of Bremen.



You Know Why

Do you not know why you should study at the University of Bremen yet? Find out now!

» more:

<https://www.youtube.com/watch?v=4cCilWk5RkY>

University of Bremen



The [University of Bremen](#) is a medium-sized German university with around 20,000 students. There are 2,300 academics (43% of which are female), among them 270 professors (32% of which are female), who teach and carry out research in a wide range of disciplines. We have a long-established tradition in interdisciplinary cooperation and excellent research in natural sciences, engineering, the social sciences, and the humanities as well as in teacher training. From 2012 to 2019, the University of Bremen with its "Ambitious and Agile" future concept was one of eleven German universities that held the title "University of Excellence".

The university takes its social responsibility seriously and fosters its activities with many groups and institutions in Bremen, including twelve non-university research institutes within the [U Bremen Research Alliance](#). We are not afraid to be the first to tread new territory. Founded as a reform university, we aim to breathe life into change. Our vision: to further anchor the University of Bremen as a leading European research university and an inspiring place of education. To achieve this, we rely on our strengths, on the potential of all university members, and on the trusting cooperation with our partners.

[Further information](#)



University location

The Hanseatic city on the banks of the Weser River emanates a special charm. Bremen enjoys a reputation for being cosmopolitan and tolerant. It has a lot to offer: ports and ships, universities, colleges, high technology, and picturesque, narrow streets built in centuries past as well as a comprehensive programme of sports and cultural events.

Contact

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🌐 Course website: <https://www.uni-bremen.de/en/fb3/studium-lehre/studienberatung-studienzentrum/studienzentrum-mathematik/bewerbung/application-and-admission>

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Last update 07.07.2024 20:30:00

International Programmes in Germany - Database

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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".

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



Federal Ministry
of Education
and Research