International Programmes in Germany 2018

Medical Systems Engineering • Otto von Guericke University Magdeburg • Magdeburg

Degree
Master of Science in Medical Systems Engineering

Course language(s)
Courses are held in English (100%).

Admission semester
Summer semester only

Beginning
Summer semester - April

Programme duration
Four semesters (two years)

Application deadline
Summer semester: 15 December (international applicants)

Course content
For industrial society, the 21st century is a time of change. Sciences that until now have been divided into classical areas are changing into symbiotically acting interdisciplinary research groups, the manufacturing industry is increasingly giving way to system and service providers, the health and achievement oriented society as well as demographical trends have led to an increase in the health care market.

Medical systems as a main player within this market are a prime example for this development: novel diagnostic and therapeutic solutions arise from research and development in the merged fields of the engineering and natural sciences as well as medicine. The main part of the added value in this sector is achieved in Research & Development as well as in services.

In Germany, as a result of the excellent health care system, medical engineering has an outstanding market position. Furthermore, established and worldwide renowned industrial companies for medical technology prosper in this country. These branches of industry are expanding above average and are providing new, highly qualified jobs. Securing qualified job offers as well as sponsoring research have received political backing and are financially supported.

CONTACT

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Course website [http://www.lmt.ovgu.de/en/MasterMSE.html] »

Submit application to
Otto-von-Guericke-Universität Magdeburg
uni-assist e.V.
11507 Berlin
Germany
received political backing and are financially supported aims (German Federal Report: BMBF 2005).

The Otto-von-Guericke University Magdeburg recognised these developments at an early stage, comprising as it does closely cooperating departments for engineering and computer sciences as well as for medicine and brain science. The university, in collaboration with three renowned research establishments on site (the Max Planck, Fraunhofer, and Leibniz Institutes) form a main research cluster and a centre of knowledge of international reputation, representing an ideal base for medical systems. A key element of medical engineering-related research at the OVGU is the Forschungscampus STIMULATE, focusing on image-guided minimally-invasive methods for therapy and diagnosis. Training and research within the scope of the study course will be carried out by six departments, the Leibniz Neurobiology Institute, and major industrial partners like Siemens and Philips.

The main driving forces of our Master's programme are:

- How can we visualise the inside of the human body up to molecular level?
- What do the future minimally-invasive and image guided interventions look like?
- What do interfaces between the brain and electronics look like?
- Are intelligent systems capable of helping physicians recognise pathologies within the large amount of data?
- Which type of information processing is required for the development of personalised medicine?

The interdisciplinary study course Master of Science Medical Systems represents an ideal blend of teaching, PhD positions, research and contacts to the industry.

The focus areas of the Master's programme are:

- Medical imaging and image processing
- Healthcare systems
- Interventional surgery
- Biomedical engineering
- Infrastructure for medical information technology
- Clinical Decision Support Systems
- Intelligent and Cognitive Systems
- Applications to neurobiology and neurology.

We are glad to welcome you as students and researchers.

Educational organisation

The programme has a modular structure consisting of technical compulsory modules, methodical/social compulsory modules and elective modules.

Compulsory technical and methodical/social modules:

- Anatomy for Engineers
- Statistical Data Analysis
- ...
▶ Statistical Data Analysis
▶ Medical Physics and Diagnostics
▶ Medical Measurement Technology
▶ Medical Physics
▶ Microsystems- and Nano-Technologies for Medical Solutions
▶ Human Computer Interfaces in Medicine
▶ Mathematical Foundations
▶ Digital Information Processing

Optional compulsory modules:
▶ Scientific Working
▶ Solution Design in Medical Engineering

Elective modules:
▶ Imaging and Interventions (Computed Tomography; Methods of MRI; Nuclear Medicine; Computer Aided and Image Guided Interventions)
▶ Biomedical Signals (Digital Information Processing Lab; EMC of Medical Systems; Tomographic Imaging in Medicine; Functional Safety for Medical and Technical System)
▶ Medical Microsystems (Development of Bio-MEMS for Medical Engineering; MEMS-Packaging for Medical Solutions)
▶ Biomechanics and Hemodynamics (Computational Biomechanics; Rheology and Rheometry; Computational Fluid Dynamics)
▶ Medical Computer Science (Advanced Security Issued in Medical Systems; Bayesian Networks; Image Coding; Machine Learning for Medical Systems; Medical Visualisation; Selected Topics in Image Understanding)
▶ Neuro-Biology (Theoretical Neuroscience I; Theoretical Neuroscience II)
▶ Mathematical Modelling of Physiological Systems
▶ Brain Computer Interfaces

Students with outstanding academic achievements (undergraduate degree/GPA better than 1.5 in the German academic grading system) and a long-term commitment to the medical engineering-related research at the OVGU can receive a scholarship. Further details can be found on the course website.

**Forms of assessment**

Master's thesis with colloquium (30 credit points)

**ECTS credits**

120

**Diploma supplement**

Yes

**Course-related German language courses**

Yes
Course objectives

Occupational fields:

- Development engineer in the medical engineering industry
- Computer scientist in a hospital, in the healthcare system, in the medical industry
- Developer of intelligent human-machine interfaces, amongst others multimodal device handling, user-adaptive control
- Scientist in industrial, academic and clinical research in the field of medicine and brain science
- Consultant for embedded medical systems and machines
- Product management and sales of medical systems and machines
- Freelance work in the field of medical engineering and medical informatics

Tuition fees

None

Enrolment fees

Currently 105.70 EUR per semester
The semester fee covers services offered by the "Studentenwerk" (Student Union) and the student representatives. Enrolled students receive a semester ticket for free use of public transport, student discounts in the campus cafeteria, etc.

Costs of living

A minimum of 720 EUR per month must be budgeted for accommodation, costs of living, health insurance, books, and miscellaneous expenses.

Job opportunities

Part-time research/student assistant (maximum: 80 hours per month)

Funding opportunities within the university

Scholarships cannot be provided for new students. The university provides a limited number of excellence scholarships. Eligible candidates are students in advanced semesters who clearly show above-average results.

Language requirements

TOEFL (Test of English as a Foreign Language): 80 (Internet-based)
IELTS (International English Language Testing System): minimum overall band score: 6.0
Cambridge Proficiency in English (A, B and C)
UNIcert II (European level B2)
University Bachelor's degree or German Diploma ("Diplom") of at least "good" in the German academic grading system in the following fields: electrical engineering, information technology, computer engineering, mechanical engineering, or other relevant areas

Where to apply
Otto-von-Guericke-Universität Magdeburg  
uni-assist e.V.  
11507 Berlin  
Germany

Arrival support
Before arrival, a welcome package with relevant information will be sent to prospective students. There is a pick-up service if desired. Please inform the student group IKUS (http://www.ikus.ovgu.de) of your arrival in advance. IKUS will meet you at the station in Magdeburg. Furthermore, there is a "Welcome & Orientation Week" at the beginning of the semester.

Services and support for international students
The International Office and the programme coordinators assist students in any way possible. To integrate new students into the university and into the student community, both the university and the faculty offer a "Welcome & Orientation Week" right before studies start in October. The university offers German language courses and lots of social and cultural events organised by the IKUS or by other student initiatives at the faculty or on campus.

Accommodation
The "Studentenwerk" (Student Union) Magdeburg manages the on-campus halls of residence (mostly one- to four-room apartments). Currently, the monthly rent ranges from 220 to 350 EUR per room (approx. 12 to 35 square metres), depending on size and furnishing. Rooms in the halls of residence are limited in number. The accommodation request can be found here:  
https://tl1host.eu/SWMD/#admission

The Student Union assists all new students in finding adequate accommodation, either on or off campus. Private accommodation is available on the Magdeburg accommodation market. However, fully furnished units are in relatively short supply.

Course website
www.lmt.ovgu.de/en/MasterMSE.html
About the university

Founded in 1993, Otto von Guericke University Magdeburg is one of Germany's newest universities. It was formed by a merger of the existing technical university, the teacher training college, and the medical school.

The university now comprises nine faculties and about 14,200 students. It is becoming increasingly more important as a centre for education and research. It plays an important role in the regional capital of Magdeburg, which is developing into a centre for business, scholarship, and culture.

The university is a member of many organisations and committees.

The university is named after Otto von Guericke (1602-1686), Magdeburg's famous citizen, whose pioneering research into the vacuum brought him renown well beyond Germany's borders. The university aspires to teach and research in the tradition of this great scientist, philosopher, and engineer and to continue with his humanist work.

At the University of Magdeburg, students can choose from 92 degree courses in various areas of study and specialisation. In addition to these, a range of postgraduate courses are offered. There are also many possibilities to combine different subjects across the faculties. The conditions for students are ideal, with modern laboratories, experimental workshops, and clinics equipped with high-performance computers and an excellent staff-student ratio. The offer of a sound, thorough education combining a high level of theoretical expertise with practical experience makes Magdeburg an attractive choice. Magdeburg also attracts students because it can offer single or double rooms in its halls of residence.

In recent years, research at the university has gone through a decisive change, from applied research to innovative, fundamental research. Among the many areas represented, the neurosciences, immunology, non-linear systems, new materials, processes and products, computational visualistics, social transformation, communication, and culture deserve a special mention. The university hopes to make a significant contribution to economic and social development in Magdeburg and the surrounding area through its research. Equally, more recently established disciplines such as the humanities, economics, and management have already made their mark on our research profile.

Special emphasis is placed on close cooperation between teaching staff and students.

Total number of students

14,200
Total percentage of international students
17 %

About the city
As the capital of the state of Saxony-Anhalt, Magdeburg is the seat of the state parliament and administration. Magdeburg is more than 1,200 years old and has about 230,000 inhabitants. Its excellent location on the River Elbe and its proximity to Berlin, Hanover, and Leipzig have proven to be a significant asset for the city. In the 19th century, the town developed into an important industrial and trade centre. Nowadays, another quite distinctive feature of Magdeburg is its considerable research and innovation potential at the university, the Max Planck and the Fraunhofer research institutes, and the university of applied sciences, which are all located in close proximity to each other. Magdeburg offers an extensive park and garden landscape, a rich cultural and sports life, and an ideal atmosphere for study. Please visit the website:

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