International Programmes in Germany 2017

Autonomous Systems Master's Programme (MSc) • Hochschule Bonn-Rhein-Sieg • Sankt Augustin

INCLUDES ONLINE ELEMENTS

Degree

Master of Science in Autonomous Systems

In cooperation with

B-IT (Bonn-Aachen International Center of Information Technology) and Fraunhofer Institute for Intelligent Analysis and Information Systems (IAIS)

Joint Degree/Double Degree

We have double degree programmes with the University of New Brunswick (Canada) and the German Jordanian University (Jordan). Further information is available upon request.

Course language(s)

The programme is taught entirely in English. The university has a language centre where students can take additional courses in German or other European languages at their own discretion.

Admission semester

Summer and winter semester

Beginning

The academic year is divided into two semesters. The winter semester starts in September and the summer semester in March.

Programme duration

The programme covers four semesters (two years).

Application deadline

There are two semesters per year, summer (starts first week of March) and winter (starts first week of September).

Hochschule Bonn-Rhein-Sieg University of Applied Sciences [http://www.h-brs.de/de/inf/autonomous-systems-msc]

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Facebook [http://www.facebook.com/AutonomousSystemsProgram]

Twitter [http://www.twitter.com/b_it_bots]

Submit application to
We have recently set up an online application system which can be found under the following link: http://www.mas-application.inf.h-brs.de [http://www.mas-application.inf.h-brs.de]

For international students requiring a visa to study in Germany:
For the winter semester: 15 January of the same year in which the semester starts
For the summer semester: 1 July of the year before the semester starts

For students who do not require a visa to study in Germany:
For the winter semester: 15 August of the same year in which the semester starts
For the summer semester: 15 February of the same year in which the semester starts

Course content

Autonomy, adaptability and network integration are characteristic features of complex IT systems. Conventional control systems and architectures are no longer adequate to realise the potential of these technologies completely, nor are they sufficient to master the complexity of such systems. The solution is to design selected components as "autonomous systems" which can act mainly by themselves without external control most of the time. In this context, autonomous mobile and biomimetic robots constitute the forefront of development.

The international programme "Autonomous Systems" offers multifaceted training in the fields of artificial intelligence and robotics, spanning a whole range of issues involved in the field. Topics covered include, but are not restricted to, autonomous agents, robot control architectures, mobile manipulation, navigation and control of mobile robots, learning and adaptivity, computer vision, real-time systems, distributed systems, sensor networks, micro-controller programming, and design and implementation of embedded systems.

The four-semester programme aims to challenge talented, motivated and dedicated students, and involves coursework as well as project work. A large portion of the programme, including the preparation of the Master's thesis, involves research and development projects.

The project work portion takes the form of an R&D project and a final thesis project. The programme's affiliation with the Fraunhofer Institute IAIS, one of the leading research institutes in Germany and the largest organisation for applied sciences in Europe, provides an unparalleled opportunity for students to pursue extensive practical training in cutting-edge projects. These may also be carried out at a number of other research institutes or within externally funded research projects at the university (for example, EU-funded projects RoCKIn, BRICS, XPERO, and RoSta as well as nationally funded projects such as EmoRobot and AICISS). This helps to ensure a high-quality education in the field, and also offers problem-oriented training in soft skills such as project management and

presentation. Students have the opportunity to carry out research work associated with industrial entities such as Fraunhofer IAIS and IPA, KUKA, GPS, BGIA, Infineon, Philips, Siemens, General Electric and Bertrand.

Presentations by leading international guest speakers are scheduled regularly and help to further expose students to the state of the art in a wide variety of robotics-related fields. The number of places per semester is limited to 25 candidates only, thus guaranteeing a high-quality education for admitted students. An extraordinary level of commitment, pro-activeness, self-discipline, and the ability to work well under pressure are expected of candidates.

Educational organisation

The Master's programme in Autonomous Systems is offered by the Applied Sciences Institute at the Bonn-Aachen International Center for Information Technology (B-IT), which is based on a cooperation between two renowned German Centres of Excellence: the Fraunhofer Institute for Intelligent Analysis and Information Systems (IAIS) and the Department of Computer Science at Hochschule Bonn-Rhein Sieg, University of Applied Sciences (H-BRS), both of which are located in the vicinity of Sankt Augustin, near Bonn.

The programme covers four semesters (two years), during which a total of 120 ECTS (European Credit Transfer System) points are accumulated. Individual mentoring characterises the programme, in which students are guided through independent scientific work and through interdisciplinary cooperation in research and development projects.

Students take a number of core courses in the first semester as well as compulsory seminars and practical courses throughout their studies. They choose one of two tracks to specialise in and choose five elective courses from within these tracks. The two tracks are: Robot Systems Design Track (RSDT) and Intelligent Robots Track (IRT).

The second and third semesters contain both coursework and project work. In both semesters, about half of the ECTS points are awarded to the research and development project and accompanying research-oriented seminars. The project is presented and documented in a report by each student. The other half of the ECTS points are awarded for coursework.

In the fourth semester, students research and write their Master's theses. A final defence of the thesis completes the 120-credit requirement.

Examinations and proof of academic achievement take place during the study programme. Examinations may be conducted in German or English at the student's request. It is important to stress that other than on public holidays, there are no "semester breaks", but rather lecture-free time during which students are

expected to work full-time on their R&D project work.

Study abroad unit(s)

Study abroad is possible and encouraged, for the duration of one or two semesters. This requires prior application to, coordination with, and permission from the Examination Committee. Based on this Master of Autonomous Systems programme, we have double degree programmes with the University of New Brunswick (Canada) and the German Jordanian University (Jordan). Further information is available upon request.

Internships

The Master's degree in Autonomous Systems is a "Master's by Research", which means that half of all credits are earned in research internships at research partners such as Fraunhofer IAIS. Students spend around 50% of their time in the second and third semesters on an R&D project and all of their time in the fourth semester on the Master's thesis project.

Forms of assessment

Assessment for coursework is usually a mixture of homework assignments and/or project work during the lecture period (up to 40%), and a written or oral exam at the end of the semester.

Assessment for seminars, R&D project work, the Master's thesis and Master's colloquium require a report and a presentation.

ECTS credits

120

Diploma supplement

Yes

General promotion / funding

Other Programme

Course-related German language courses

Yes

Course-related English language courses

Yes

Course objectives

The goal of this course of studies is to provide students who have an initial university degree with the opportunity to learn scientifically founded concepts, methods and techniques to enable them both to develop these further and to apply them towards the solution of practical problems. The focus of the course of studies is on the problems and the principles of the design of distributed, interacting autonomous systems.

Digital Course Module(s)

Wikis
Most courses use the e-Learning platform LEA (ILIAS).

Description

The university uses a system-wide e-learning platform called LEA (based on the ILIAS system). Practically all courses are present in LEA and provide lecture material (slides, sometimes video casts), exercise sheets, and background material. In addition, facilities like discussion forum, newsgroups, and wikis are supported. Homework submission is done in most courses via electronic upload of files to LEA.

Digital modules are compulsory elements of the study programme

Yes

ECTS Points for digital element(s)

Yes

Tuition fees

None

Enrolment fees

Each semester, a contribution fee of around 264 EUR is due. The semester contribution fee is mandatory and includes a student administration office fee, a student union fee and a public transport fee that allows for free use of the public transport system in the Bonn metropolitan area and the entire state of North Rhine-Westphalia.

Costs of living

Living expenses per month for university students in Germany will be about 700-770 EUR. This includes accommodation/rent (student dormitory), meals, medical insurance, social welfare, registration fee,

transport, books, stationary, and so on.

Job opportunities

Both the university's Department of Computer Science and Fraunhofer IAIS offer numerous research and teaching assistantships. Usually, these are available only after the first semester has been successfully completed. Further information is available upon request.
Many companies in the vicinity of Sankt Augustin, Bonn, and Cologne also offer student jobs. However, please be advised that student visas restrict the number of hours that a student may work.

Language requirements

As the programme is taught entirely in English, the TOEFL or IELTS for English language proficiency is required (for all those who do not have English as the de facto language in their country). This means that all citizens from countries other than Australia, Bahamas, Canada, New Zealand, UK, and USA, must present proof of English language proficiency. A minimum TOEFL score of 557 paper-based, of 220 computer-based, or of 83 Internet-based (or equivalent) is accepted. The TOEFL code for the university is 7977 ("Fachhochschule Bonn-Rhein-Sieg"). Alternatively, a minimum IELTS score of 6.5 is accepted. No German language skills are required for the programme.

Academic requirements

For admission to the programme, a professional academic degree (Bachelor's or equivalent) is required in the areas of computer science, mathematics, natural sciences, or engineering.

Another requirement is sufficient knowledge of concepts, methods and tools in the field of computer science. Such knowledge is usually acquired in a four-year computer science course with at least 65% computer science content. Programme applicants who have already graduated from a first-level degree course in mathematical/scientific subjects or engineering can be admitted to the programme provided that the course had a computer science content of, as a rule, at least 50%. They may also have to perform additional assignments, to be specified on an individual basis, worth up to 12 ECTS credits.

Admission is based solely on credentials and academic excellence.

Where to apply

We have recently set up an online application system which can be found under the following link: http://www.mas-application.inf.h-brs.de [http://www.mas-application.inf.h-brs.de]

Arrival support

Help is given to students as soon as they are admitted by means of a welcome pack and a study buddy. The study buddy programme aims to facilitate the move and to guide incoming students through their first weeks here at the university by matching each incoming student with a current student in the programme.

In addition, a special introductory day is devoted to welcoming new students, introducing them to various university procedures and processes, explaining the schedule, and getting them acquainted with the faculty and fellow students.

Services and support for international students

The university's International Office provides assistance in finding accommodation as well as help in all matters concerning immigration and/or local authorities. Besides continuous support from the International Office, students receive guidance and counselling from their faculty advisers (mentoring programme) and individual support from scientists at Fraunhofer IAIS or other partners during their project work.

Accommodation

Student accommodation is available both in Sankt Augustin and in the nearby city of Bonn. Waiting lists exist for some student accommodation facilities, but foreign students are given priority. Students are urged to apply as early as possible.

In addition, it is possible to rent a room or apartment on the private market.

Course website

www.h-brs.de/de/inf/autonomous-systems-msc [http://www.h-brs.de/de/inf/autonomous-systems-msc]

About the university

Hochschule Bonn-Rhein Sieg (H-BRS), University of Applied Sciences, was founded in 1995. It is a dynamic university with around 8,000 students, 152 professors, and 261 research associates who are supported by more than 405 highly qualified lecturers from the fields of academia, business, and industry. An additional 199 employees work in the administration, the library, and the language centre. The university campuses are located in Hennef, Rheinbach, and Sankt Augustin. In Bonn, the Hochschule Bonn-Rhein Sieg runs the B-IT Universities Institute of the Bonn-Aachen International Center for Information Technology jointly with Bonn University and Aachen Technical University (RWTH).

The Department of Computer Science presents a youthful and modern front, just like the whole of the university. The technical equipment, our teaching professors, and research staff meet very high standards. The overall infrastructure of our young university is the best basis for successful completion of your study programme.

A top place in the Germany-wide academic "CHE Ranking" for our department reflects the individual mentoring of our students, the good IT infrastructure, and the excellent overall study conditions.

First-class teaching is linked to internationally successful research projects. In all of our courses both teaching and research are closely connected. In this way, students not only profit from the know-how and expertise of our professors and their various research projects but can also actively participate in them.

Our areas of focus are applied R&D, technology transfer, and an international and interdisciplinary approach. Thus, there is an emphasis on internships and practical applications in industry and research and joint research projects with numerous companies (many of them global players). H-BRS has official cooperation agreements with over 80 universities throughout the world. At present, approx. 8,000 students are enrolled and are instructed by 152 professors and selected assistant lecturers from industry, science, and research.

Students have the opportunity to work with advanced robotic platforms such as the Care-O-bot 3 (Fraunhofer IPA) and youBot (KUKA). Hochschule Bonn-Rhein-Sieg is one of three universities worldwide that has a Care-O-bot 3 service robot. The H-BRS b-it-bots team participates regularly with the Care-O-bot 3 in RoboCup@home competitions (GermanOpen and World Championships) and has always achieved a place on the podium. With the KUKA youBot, a new student team participates in the recently established RoboCup@work league. Various other platforms are also available at the university (e.g., NAO from Aldebaran and VolksBot from Fraunhofer IAIS).

Total number of students

8,000

Total percentage of international students

15 %

About the city

The Bonn-Rhein-Sieg region is itself a dynamic and internationally oriented location for science, research, industry, trade, and the service industries. Sankt Augustin is located at the outskirts of the city of Bonn,

and has the character of a suburb of a major international city. Bonn, with its 320,000 inhabitants, provides great cultural offerings, and is consistently ranked among the top ten cities in Germany in terms of quality of life.

The region has an international background due to the heritage of Bonn's former status as capital of West Germany: thanks to its perfect infrastructure, the city has developed into a centre for international cooperation. Numerous UN organisations and non-governmental organisations have settled here in this cosmopolitan city on the Rhine. Bonn's economic and scientific institutions are also well known around the world.

In addition, the surrounding area of the Hochschule Bonn-Rhein-Sieg offers a beautiful countryside, an interesting range of cultural activities, and a diversity of leisure amenities ensuring a high quality of life. For this reason, it attracts millions of visitors every year. They visit Beethoven's birthplace, savour the theatre performances with productions by contemporary European dramatists at the Bonn Biennial, and enjoy the concerts held during the Beethoven Festival.

The delightful landscape of the Seven Hills, with the Dragon's Rock overlooking the romantic Rhine, has been a favourite with travellers since the 19th century. Hikers and cyclists will find a wealth of places to visit in the Eifel foothills.

The campuses are only a few minutes' walk from a suburban rail link or high speed tram, which provides a fast and direct service to Bonn. The university's proximity to railways and motorways means that cities like Cologne and Düsseldorf are only a stone's throw away. Brussels is an hour and a half by train from Cologne, and Paris and Amsterdam can be reached in less than four hours! The Cologne-Bonn airport connects the region to the whole world.