Applied Research in Computer Science (M.Sc.)

Master's Program
Department of Computer Science

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BELIEBTESTE HOCHSCHULE in Deutschland
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Hochschule Hof
University of Applied Sciences

Applied Research in Computer Science - What is it all about?

Digitalization is not mainly about converting analog information to a digital format, but includes open innovation, changing business models and providing services around products. In a world where fast time to market is increasingly important, corporations are well advised to listen to their customers for suggestions for improvement or new products and work closely together with universities and research labs to incorporate the latest technologies that help them fulfilling their customers' needs.

If you want to become part of this game and help bringing results from foundational research to practical use with usage scenarios from the local enterprises in upper Franconia and its surrounding, then this Master study program is right for you. Become part of our multi-disciplinary team of experts and start your scientific career, become an entrepreneur or prepare for a job.

What do I gain with this M.Sc.?

With this Master's program, you will be able to

_ identify and analyze current and future challenges in the IT industry,

_ bring together user needs and technological possibilities,

_ develop appropriate solutions and

_ implement and evaluate them in interdisciplinary teams.

In addition, you benefit from

_ a unique Master's degree focusing on applied research,

_ well-trained and structured problem solving skills,

_ development of your intercultural competence,

_ excellent career perspectives, both in industry and in academia or as an entrepreneur.

Further information is available on www.hof-university.de

Fast facts

Degree awarded
Master of Science (M.Sc.)

Duration
3 semesters (including research-based Master‘s thesis)

Language of instruction
Fully taught in English

Tuiton fees
No tuition fees; just an administrative fee of approx. € 125 per semester

Services and support for international students

_ organisational support before and during your studies at Hof University

_ assistance in finding accommodation

_ Orientation Week prior to the start of your studies

_ social integration

_ career-promoting activities such as intercultural trainings, field trips, and company visits

_ free public transportation in the city of Hof

Special features

Applied research

The study program consists of work in research projects of the research groups at the Institute of Information Systems (iisys), special lectures in research methodology as well as lectures in computer science subjects, organization science and business law. There will be a good mixture of practical work like programming, training of social skills in meetings and by giving presentations as well as conceptual work like creating architecture models, doing criteria-based comparisons or literature reviews to find suitable algorithms and research approaches.

Playing with the latest technologies

We are working with the latest technologies like machine learning and artificial intelligence, cyber-physical systems, smart data and data analytics, virtual and augmented reality, autonomous cars and digital mobility as well as digital healthcare and the internet of things. We bring them together into applications that really help people, are easy to use and respect users' privacy requirements. We are both taking up recent trends like usability, speech recognition and natural language processing as well as listening to challenges the industry is facing.

What do we offer?

Being part of our multi-disciplinary team of experts with backgrounds in computer science, electrical engineering, business information systems, information science and business law will enrich your career. You can combine the best of multiple worlds by gaining a Master's degree, having fun with the latest technologies, learning about scientific research methods as well as experiencing the working situation in our partner corporations.

What do I need to bring?

Academic requirements

- _ Bachelor's degree or similar in computer science, media informatics, mobile computing or business information systems or a comparable study program from an accredited university, at least 210 ECTS or equivalent (depending on home country); minimum grade 2,5 according to the German grading system
- _ Above-average grades in object-oriented programming, software engineering, computer networks and databases
- _ Applicants with less than 210 credits (ECTS) can be accepted but have to gain the missing credits by either
  - _ doing an internship (at least 23 weeks) as long as no internship was done during the Bachelor's degree.
  - _ Attending appropriate modules at Hof University (for applicants who already did an internship).
  - _ For both alternatives, please calculate an additional (fourth) semester.

Language requirements

You need to prove your **proficiency in English**. This can be done with either of the following:

- _ TOEFL minimum 90
- _ IELTS 6.5 or above

In addition: **Basic language skills in German**, proven by official test score documents - **minimum level A1**

What do I need to do for the application?

The application process for this research Master consists of a written and an oral part.

For the **written part**, you hand in a certification about an internship or practical work in the computer industry that lasted at least 18 weeks as well as a scientific work that you produced on your own (e.g. your Bachelor‘s thesis or a seminar paper).

You further have to choose a topic from the iisys research groups and do a two-page literature review covering important scientific publications in the chosen topic.

If the written part is passed with a grade of at least 2.3, you are admitted to the **oral part**, which can be done in a video chat. To prepare for the oral part, you get a case study concerning a challenge in the chosen topic from the written part. You present your solutions for the case study and answer additional questions in a 30 minutes oral exam in English language. If you pass the oral exam with a grade of at least 2.3, you will be admitted to the Master‘s program.

Timeline

Online application
You register in our online portal Primuss and fill in the application form with your personal details. You also upload all required documents in the portal and send your application directly to Hof University.

Application period	**Winter semester:** April 15 - May 31 **SuSe:** November 5 - November 30
Get your invitation to the oral exam	**WS:** middle of June **SuSe:** beginning of December
Oral exam	**WS:** end of June **SuSe:** middle of December
Get your admission letter to Hof University	**WS:** start of July **SuSe:** before Christmas
Online enrolment	**WS:** in September **SuSe:** in March
Orientation Week for international students	**WS:** last two weeks of September **SuSe:** first two weeks of March
Start of your studies at Hof University	**WS:** October 01 **SuSe:** March 15

WS: Winter semester **SuSe:** Summer semester

Semesters 1 & 2	**Mandatory modules** _ New Technologies in Computer Science _ Design Science Approaches in Computer Science Research _ Behavioral Approaches in Computer Science Research _ Designing and Developing Business Models _ Project Seminar _ Research Project **Electives (choose two)** _ Security of Information Systems _ Data Engineering and Analysis Methods _ Mixed Media (AR, VR, MR) _ IoT Architectures _ Security Research Seminar _ Information Structuring and Visualization
Sem. 3	**Master's thesis** Based on the work package within a research project, the student elaborates a large scientific paper with substantial scientific pretension according to international standards.

Institute for Information Systems (iisys)

The Institute for Information Systems (iisys) is the central research institution for information technology at Hof University. It is funded by the Bavarian government, the Oberfrankenstiftung (foundation in Upper Franconia) and the European Union. The institute's research activities are focused on integrated information systems for business processes. The following **research groups*** are of special interest for this Master's program:

Cyber-Physical Systems (Prof. Dr. Valentin Plenk)

- _ Industry 4.0 - vertical integration
- _ Condition monitoring and predictive maintenance
- _ Industry 4.0 - processing performance, quality and status data
- _ Application of machine learning approaches in a production environment

Multimedia Information Systems (Prof. Dr. Richard Göbel)

- _ New Database Concepts (NoSQL)
- _ Distributed databases
- _ Management of heterogeneous structured and unstructured data including spatial data and texts
- _ Geographical Information Systems

Intelligent and Learning Systems (Prof. Dr. Christian Groth)

- _ Deep neural networks for vision (scene and object recognition)
- _ Generative AI for image creation
- _ Simulation of cognitive robotic systems
- _ Learning in robotic systems

* For the full list, please see our website.

Systems Integration (Prof. Dr. René Peinl)

_ Customization of Software as a Service (SaaS) applications

_ Model-driven development for low code application platforms

_ Natural user interfaces for IoT applications (speech, VR, AR, gestures, …)

_ Fast inferencing for deep neural networks on embedded systems (image, video, speech)

_ Natural language understanding with deep neural networks

Visual Analytics (Prof. Dr. Claus Atzenbeck)

_ Computer-Supported Cooperative Work (CSCW) from Knowledge Workers‘ Perspectives

_ Human-Computer Interaction (HCI) for Browsing Information Spaces

_ Human Factors in Information Structures

Systems and Network Security (Prof. Dr. Florian Adamsky)

_ Secure distributed systems

_ Distributed Denial of Services (DDoS) amplification

_ Vulnerability analysis

_ Privacy and anonymizing services

What are my career perspectives?

As a graduate, you...

_ are qualified for many different jobs in a scientific career but also in a private company, depending on the research group that you choose

_ get direct support from our digital startup center Einstein1 in building your own company right away

_ will get an opportunity to proceed with PhD studies if you have excellent grades.

... Entry positions?

You are ready to work as

_ Scientific assistant

_ IT project manager

_ Software architect

_ Requirements engineer

_ Business analyst

_ Backend application developer

_ Data scientist

_ Data engineer

_ Specialist for industrial internet of things

_ Consultant for digital transformation

„The hardness of the admission process and acceptance ratio of the ARC course is directly proportional to the learning curve of the students who opt for it.“

Gowtham Buvalli Chikkathammaiah from India
Graduate Master Applied Research in Computer Science, now working as a researcher at iisys

Why do you think so?

„ARC is structured in such a way that students undergo complete autonomous learning and decide their interests for projects (intensive coding). Along with 4 mandatory subjects, students focus on writing scientific papers for the first year. And the 3rd semester is where learning from the previous year is completely utilized in the Master‘s thesis.“

What specialization did you choose?

„I opted for Computer vision and Virtual reality, studied ARC with good grades and now work as a Computer vision researcher (Wissenschaftlicher Mitarbeiter) with the same iisys lab and research group I started my journey with.“

So the program fulfilled your expectations?

„With the tremendous growth in academics thanks to Hof University faculty, and the naturistic, peaceful, cold, small but cute city life of Hof, this is all I wished for when I opted for my Master‘s program in Germany. I seriously recommend it as it is a public-funded course with grueling but intense 3 semesters of learning.“

Why choose Hof University?

At Hof University, you can expect

_ a first-class, hands-on education,

_ a safe, friendly and open-minded study environment, especially for international students,

_ extensive personal support by our Welcome Center, International Office and Career Service.

In addition, you benefit from

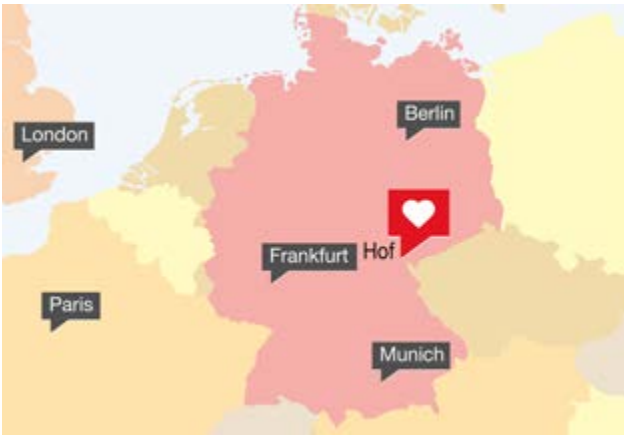
_ assistance in finding accommodation,

_ orientation sessions prior to the start of your studies,

_ additional activities such as intercultural trainings, field trips and company visits,

_ 24-hours access to computer labs and library,

_ free wifi on campus.



About Hof University

Founded in 1994 as a Bavarian state university, Hof University of Applied Sciences offers a very attractive study environment with its modern architecture and state-of-the art facilities. Practice-orientation, internationalisation and graduate employability are at the heart of teaching and research at Hof University.

German students and international students from more than 60 countries learn together on our open-minded, intercultural campus. Exciting student initiatives (e.g. eSports, Fairtrade Group or Formula Student) make student life even more interesting.

All professors and lecturers have a strong academic background as well as practical experience in the industry. In addition, all our professors hold a PhD. As a result, graduates of Hof University are ideally prepared for the domestic and international labor markets.

Located at the top of Bavaria, Hof is a safe and cozy town in the heart of Europe with all amenities of a university town. Its green surroundings are ideal for all outdoor activities, and major cities like Berlin or Munich are within easy reach.

Who can I contact with further questions?

Head of M.Sc. Program

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