

Data Science (Research Master)

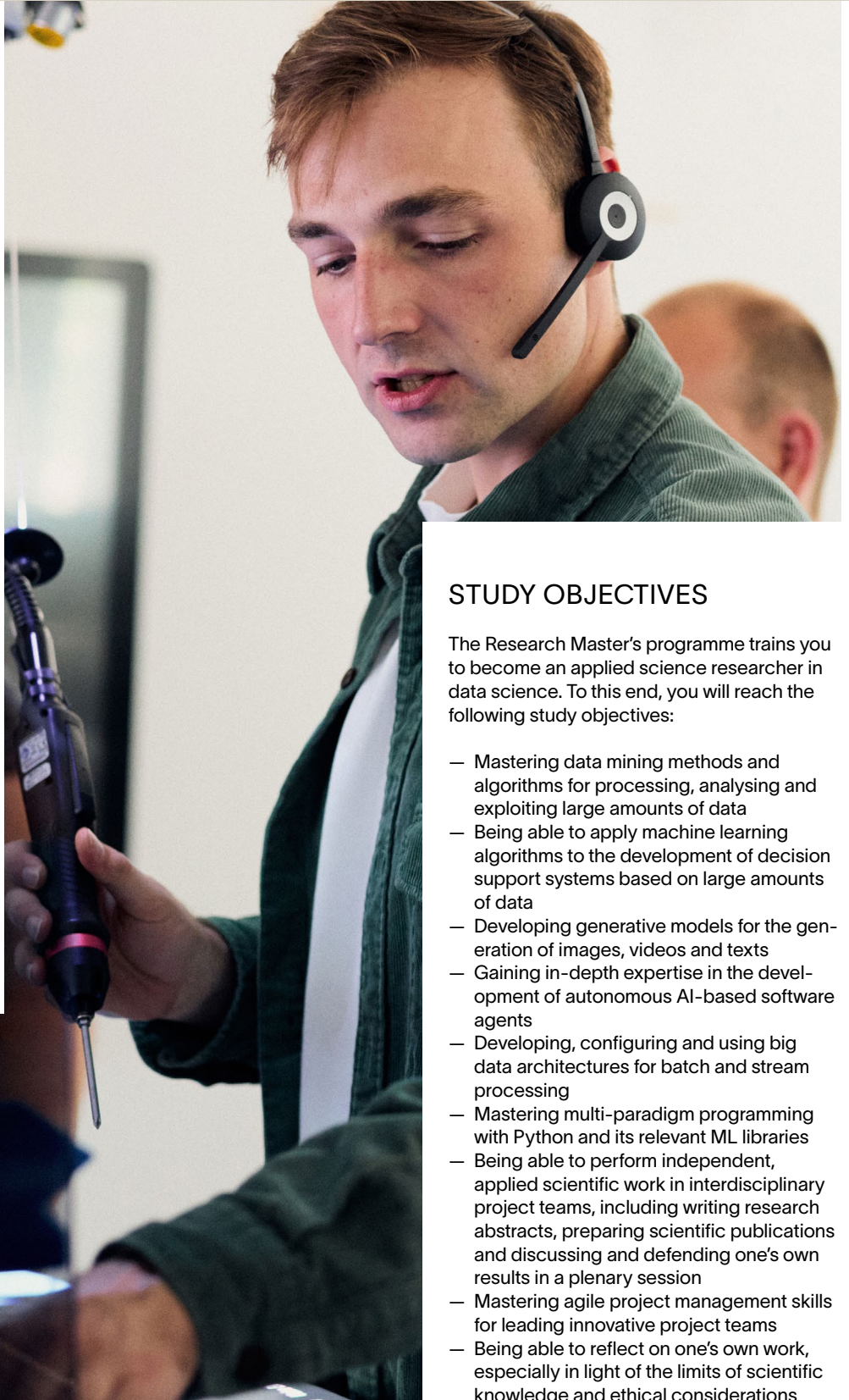
Master

CONCEPT

In this innovative project-based master programme, you will be trained as a data scientist working in applied research. Before the start of the programme, you will apply for a research project and subsequently work on it under the close supervision of proven experts throughout the entire master's programme. This will enable you to put the basic knowledge you have acquired to practice and thus internalise it in the long term. The Research Master in Data Science trains engineers for a career in applied science and for a professional future in industry alike. In this unique programme, they become scientists as part of their master's degree and publish their work at international conferences all over the world. After their graduation, around 50% of graduates begin a doctoral thesis, while 50% go on to work as data scientists in industry.

MOTIVATION

Data science is one of the most important disciplines of the digital age. Almost all objects and processes in the physical world are gradually being mapped in the digital world. More and more digital twins are being created that store and make available unimaginable amounts of data, while new groundbreaking developments in the field of artificial intelligence are using these data and thus change the way we work, learn and live. As a data scientist, you will not just passively experience this digital revolution, but actively contribute to shaping it.



STUDY OBJECTIVES

The Research Master's programme trains you to become an applied science researcher in data science. To this end, you will reach the following study objectives:

- Mastering data mining methods and algorithms for processing, analysing and exploiting large amounts of data
- Being able to apply machine learning algorithms to the development of decision support systems based on large amounts of data
- Developing generative models for the generation of images, videos and texts
- Gaining in-depth expertise in the development of autonomous AI-based software agents
- Developing, configuring and using big data architectures for batch and stream processing
- Mastering multi-paradigm programming with Python and its relevant ML libraries
- Being able to perform independent, applied scientific work in interdisciplinary project teams, including writing research abstracts, preparing scientific publications and discussing and defending one's own results in a plenary session
- Mastering agile project management skills for leading innovative project teams
- Being able to reflect on one's own work, especially in light of the limits of scientific knowledge and ethical considerations

PROGRAMME CONTENT

All courses are taught in English.

1st semester

- Project Phase I (12 ECTS)
- Introduction to Applied Research (6 ECTS)
- Compulsory Elective Subject Data Science (6 ECTS)
- Scientific Interchange (1 ECTS)
- Project-Specific Elective Module (5 ECTS)

2nd semester

- Project Phase II (7 ECTS)
- Agile Research Project Management (6 ECTS)
- Compulsory Elective Subject Data Science (6 ECTS)
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- Project-Specific Elective Module (5 ECTS)

3rd semester

- Project Phase III (12 ECTS)
- Social Implications of Data Science (6 ECTS)
- Compulsory Elective Subject Data Science (6 ECTS)
- Scientific Interchange (1 ECTS)
- Project-Specific Elective Module (5 ECTS)

4th semester

- Master Thesis (24 ECTS)
- Colloquium (6 ECTS)

Compulsory Elective Subjects Data Science

- Introduction to Data Science
- Big Data Architectures
- Data Mining & Machine Learning
- Artificial Intelligence
- Advanced Machine Learning
- Artificial Intelligence for Robotics

PROFESSIONAL FIELDS

As a data science professional, you will be highly sought after by employers and able to choose one anywhere in the world! After completing your studies, you can pursue a range of different career paths, including:

- **Career in applied science:**
Work as a research associate in applied research at universities, universities of applied sciences or public research institutes and earn your doctorate by writing an application-oriented doctoral thesis; this can also be done in cooperation with a company.
- **Career in industry:**
As a data scientist, you can help shape the digitalisation of your company. Work in research and development and take a leading role in creating the company's new digital service with your team.
- **Start up your own company:**
Based on the results of the research conducted during your studies, launch your own digital company together with your fellow students with optional support from the university.

AREAS OF APPLICATION

The digital revolution touches all areas of life and work. The possible areas of application are accordingly diverse. Through your research project, you can gain in-depth knowledge of the field during your studies, often already in collaboration with renowned companies from the strong industrial region of East Westphalia-Lippe (known as OWL in German). Possible business areas include automotive, engineering, banking and insurance, retail, IT, management and organisational consulting, market research, social media, telecommunications, online retail and network management, bio, pharmaceutical, chemical and medical industries, healthcare and logistics.



STUDY BENEFITS

- Study a unique programme with highly effective practical learning through permanent project orientation and active advancement of the current state of research
- Collaborate in exciting research projects in interdisciplinary teams of experts
- Produce first publications and present your own research at international conferences
- Conduct research on topics that are relevant to the numerous renowned companies and "hidden champions" in the OWL region
- Prepare for (project-based) professional work under ideal conditions thanks to the programme's project-based approach
- Profit from an optimal learning environment that offers individual supervision during the project phases and teaching in small groups of approximately 20 students in the other modules
- Profit from uniquely close supervision and support by HSBI's professors throughout the programme
- Prepare for a subsequent doctorate in applied research in the best possible way
- Take part in lively exchange across the semesters with lecturers, fellow (international) students and peers in project colloquia, research seminars, courses and forums on the online platform ILIAS
- Start your studies flexibly in the winter or summer semester

FACTS

Admission requirements

Successfully completed bachelor's degree (180 ECTS) with specialisation in mathematics/statistics and computer science; e.g.: Biotechnology and Instrumentation Engineering, Digital Logistics, Digital Technologies, Electrical Engineering, Computer Science, Engineering Computer Sciences, Applied Mathematics, Mechatronics, Mechatronics/Automation, Business Information Systems. The previous degree must have been completed with an overall grade of at least 2.5.

Duration of Study

4 semesters (120 ECTS)

Degree

Master of Science (M.Sc.)

Application/Start

The programme begins in the summer and winter semesters. The projects are published at the end of the lecture period of the previous semester. After that, please apply for a project including a letter of motivation.

Entrance examination

After reviewing your documents, we will invite you to the entrance examination. If you are successful, you will draw up a Learning Agreement together with the responsible lecturer. Subsequently, we will fully enrol you.

Further Information

➤ www.hsbi.de/en/academics/academic-programs/data-science

Study Location

Hochschule Bielefeld –
University of Applied Sciences and Arts (HSBI)
Faculty of Engineering and Mathematics
Gütersloh Campus
– Gleis 13, Haus III
Langer Weg 9 a
33332 Gütersloh
– Flöttmanngebäude
Schulstraße 10
33330 Gütersloh
➤ www.hsbi.de/guetersloh

CONTACT

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