



Welcome to Data Science @ TU Braunschweig!

tu-braunschweig.de/data-science

https://www.youtube.com/watch?v=vh0_IOrw3Fw

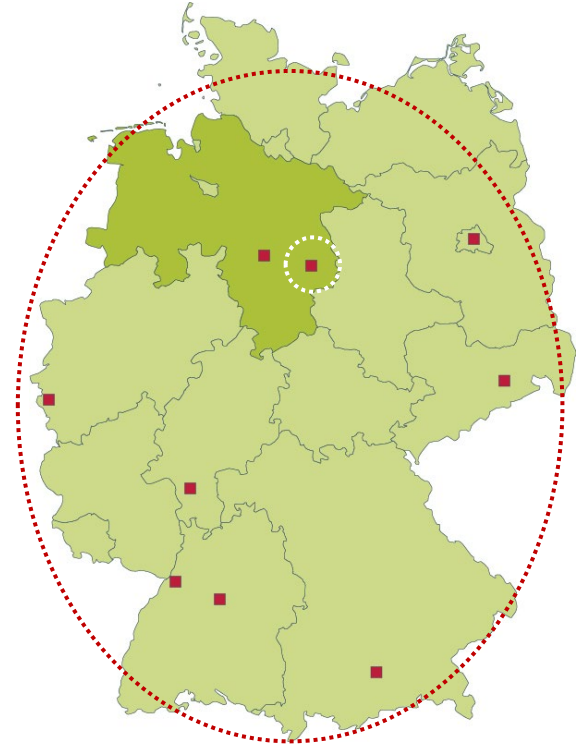
Technische Universität Braunschweig

111	Degree Programms
1.858	First Year Students
15.051	Students
120	Institutes
2.016	Researchers
244	Professors
3.799	Total Staff



cf. <https://www.tu-braunschweig.de/en/tu-braunschweig/our-profile/facts-figures/translate-to-english-tu-braunschweig-in-zahlen>

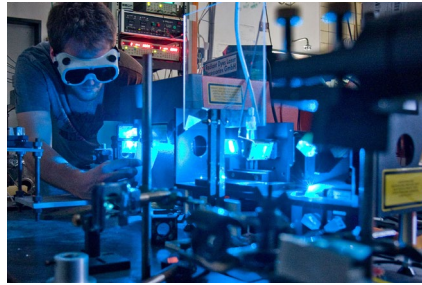
Europe's Most Active Research Region



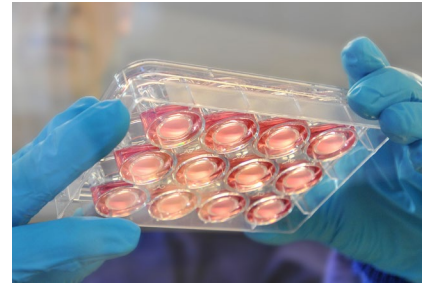
Core Research Areas @ TU Braunschweig



Mobility



Metrology



**Infections &
Therapeutics**



Future Cities

Skills and Competencies

Graduates as **Master of Data Science** can

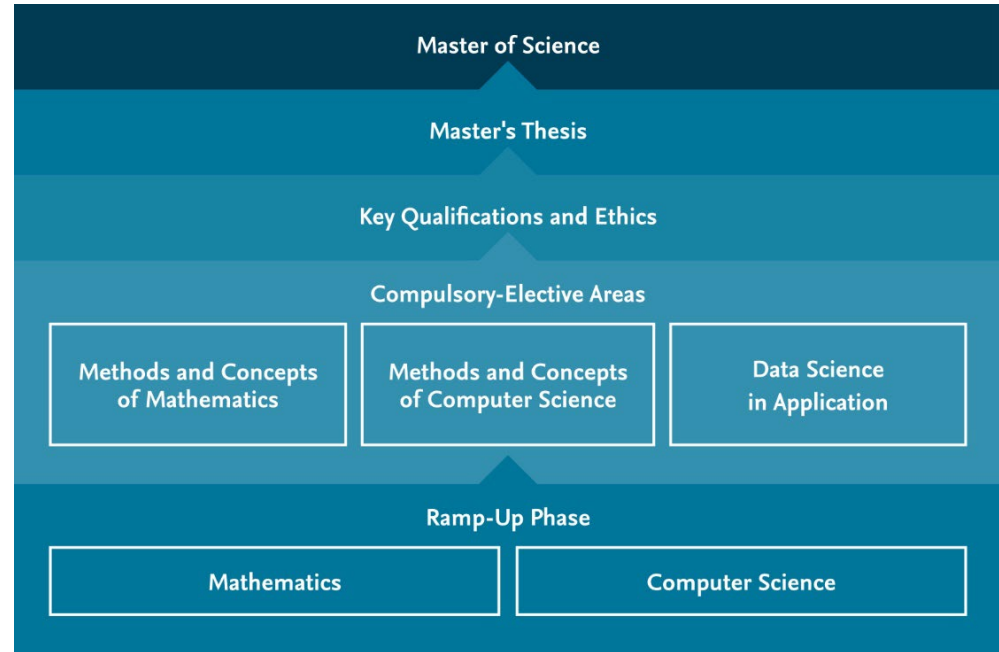
- Use Methods of Data Acquisition, Data Integration and Data Management efficiently
- Select Analysis Methods competently and adapt it to the Special Requirements of an Application
- Evaluate and assess the Expressiveness of Analysis Methods and Results
- Lead Data Projects in Companies and effectively manage Corporate Decision Processes



Data Science = Mathematics + Computer Science + Applications

Design and Structure of the Study Program (120 Credits)

- Core Areas:
 - **Mathematics** (25 CP)
 - **Computer Science** (25 CP)
 - **Applications** (15-20 CP)
+
 - **Key Qualifications** (10-15 CP)
- Predefined Application Areas:
 - **Biology, Chemistry, Pharmacy**
 - **Medicine**
 - **Engineering**
 - **Image and Signal Processing**
 - **Business and Economics**
- Mandatory seminar
- Optional research project



Modularization of the Degree Program

The course contents taught in the individual areas are combined into modules. A module consists of courses with related content.

Example "Approximation Algorithms":
Excerpt from the module guide for the
Examination Regulations

(see on the study program webpage [Documents](#)
"Module Guide")

Technische Universität Braunschweig | Module Guide: Data Science (Master)

Title		Approximation Algorithms	
Number	4227270	Module version	V2
Shorttext	INF-ALG-27	Language	
Frequency of offer	every 2 years in the summer term	Teaching unit	Carl-Friedrich-Gauß-Fakultät
Module duration		Institution	
Hours per Week / ECTS	4 / 5,0	Module owner	Sándor Fekete
Workload (h)	150		
Class attendance (h)	56	Self studying (h)	94
Compulsory requirements			
Recommended requirements			
Expected performance/ Type of examination	graded work: written exam (120 minutes) or oral exam (30 minutes) minutes) or Take-Home-Exam. The form of the examination depends on the number of participants and will be announced at the beginning of the lecture.		
Course achievement	non-graded work: 50% of the exercises must be passed		
Module grade composition			
Contents			
- A basic introduction to NP-completeness and approximation - Approximation for vertex and set cover - Packing problems - Tour problems and variations - Current research problems In the context of various problems, a wide spectrum of techniques and concepts will be provided.			
Objective qualification			
Participants know the necessity and role of approximation algorithms. They can master the most important techniques for analysis and complexity of approximation algorithms for designing, including the validity of upper and lower bounds.			
Literature			
- Vijay V. Vazirani: Approximation Algorithms. 1st edition. Springer Verlag, 2001. - Dorit Hochbaur: Approximation Algorithms for NP-hard Problems. Course Technology Inc, 1996.			

Assigned to the following degree programs				
Degree program	Area	Compulsory form	Semester	ECTS
Master Data Science PO 2	Methoden und Konzepte der Informatik			

↑

Modules in Mathematics Core

Applied Analysis and Algebra

- Inverse Problems
- Computer Algebra
- Machine Learning with Neural Networks
- Introduction to Quantum Information Theory
- Mathematical Foundations of Data Science
- The Mathematics of Data Science
- ...

Statistics

- Statistical and Machine Learning
- Time Series Analysis
- Introduction into Statistical Learning Theory
- ...

Optimization

- Discrete Optimization
- Dynamic Optimization
- Nonnegativity and Polynomial Optimization
- Optimization in Machine Learning and Data Analysis 1
- Algorithms and Complexity for Quantum Computing
- ...

Numerics

- Model Order Reduction
- Numerical Linear Algebra in Data Science
- Numerical Methods and Learning from Data
- ...

Modules in Computer Science Core

Algorithmics

- Online Algorithms
- Approximation Algorithms
- Computational Geometry
- Graphs Geometry and Algorithms

Machine Learning

- Machine Learning for Data Science
- Pattern Recognition
- Deep Learning Lab
- Advanced Artificial Intelligence 1

Computer Graphics

- Visualization Techniques
- Image Aspects

Software Engineering

- Software Product Lines
- Python Lab
- Constraint Solving
- AI Engineering

Databases and Information Systems

- Data Warehousing and Data Mining
- Information Retrieval and Web Search Engines
- Distributed Data Management

Application Areas

Biology, Chemistry and Pharmacy

- Network Biology
- Immunometabolism
- Biophysical Chemistry
- Machine Learning in Computational Chemistry
- Elucidation and Modelling of Biological Structures
- Coastal Engineering
- Theoretical Spectroscopy
- ...

Medicine

- Biomedical Data Analysis
- Accident Informatics
- Health-Enabling Technologies
- Biomedical Image and Signal Analysis
- Medical Methodology
- Selected Topics of Representation and Analysis of Medical Data
- ...

Engineering

- Deep Learning in Remote Sensing
- Machine Learning
- Fundamentals of Turbulence Modeling
- Data-driven Material Modeling
- Introduction to Finite Element Methods, ...

Image and Signal Processing

- Mathematical Image Processing
- Digital Signal Processing
- Computer Vision and Machine Learning
- Deep Learning for Imaging in Nano and Quantum Science
- Computer Lab Pattern Recognition, ...

BUSINESS AND ECONOMICS

- Computational Methods for Communication Science
- Data Privacy & Data Governance
- Empirical Economics Research
- Data Driven Decision Making
- Advanced Multivariate Data Analysis
- Business Model Innovation: Concepts and Applications

Key Qualifications (10-15 CP)

1st Compulsory Module

4411516 Ethics and Epistemology (5 CP)

Only available in winter semester

Provides students with interdisciplinary qualifications

- Future Data Scientists must be able to reflect on the ethical implications of their actions and must be able to recognize and interpret social and technical problems.*

2nd Compulsory Module

4217000000 Scientific and Method-Oriented Working (SciMo) (5 CP)

Every semester

Additional credit points can be selected from the course catalogue or Language Centre (max. 5 CP)



TU Braunschweig

What are you looking for?

STUD.IP

Online seminar: Ethics and Epistemology - Details

Registration for this event follows special rules. Read the information text.

General information

Event name	Online seminar: Ethics and Epistemology
Event number	4411516
semester	Winter semester 2025/26
Current number of participants	17
maximum number of participants	150
Home facility	Institute of Philosophy
Event type	Online seminar in the category Teaching

TU Braunschweig

What are you looking for?

STUD.IP

Internship: Scientific and Method-Oriented Working ~...

Registration for this event follows special rules. Read the information text.

General information

Event name	Internship: Scientific and Method-Oriented Working
Event number	4217000000-V1
semester	Summer semester 2025
Current number of participants	24
expected number of participants	30
Home facility	Department of Computer Science
participating institutions	Peter L. Reichertz Institute for Medical Informatics
Event type	Internship in the teaching category

The Examination Regulations: Your Rights and Obligations

- The general and program-specific examination regulations for the Data Science M.Sc. program are available on the homepage.
- Please read these rules carefully so that there won't be any "unpleasant surprises" later.
- Where can I find the Examination Regulations?
Data Science homepage → Documents

- **Examination Regulations**



Examination Regulations, Entry and Admission Regulations and Module Manuals

Master Data Science

Examination Regulations

General Examination Regulations (APO) for the Bachelor's, Master's, Diploma, and Magister Degree Programmes at Technische Universität Braunschweig

- General part of the examination regulations for the Bachelor's and Master's degree programmes at TU Braunschweig (Status: 24.03.2026) [↓ PDF](#)

Programme-Specific Examination Regulation for the Master's Study Programme 'Data Science' at TU Braunschweig (MPO)

- [↓ PO3](#) [valid from the winter semester of 2026/27]
- [↓ PO2](#) [valid from the winter semester 2024/25]
- [↓ PO1](#) [for students starting up to and including the summer semester 2024]

Duration of Study and Credit Points

Duration of study

- at least 4 semesters

Credit point system

- 1 Credit point = 25-30 hours workload
- 30 CP should be achieved per semester



The Ramp-Up course should be completed within the first 50 credit points.

120 CPs are required for graduating the study program.

Field of application: Medicine

M.Sc. Data Science - Application Area: Medicine					
	1. Semester (Winter)	2. Semester (Summer)	3. Semester (Winter)	4. Semester (Summer)	
Computer Science	Elective Course Computer Science 5 ECTS	Elective Course Computer Science 5 ECTS	Seminar Computer Science 5 ECTS	Master Thesis 30 ECTS	55 ECTS
	Elective Course Computer Science 5 ECTS				
	Elective Course Computer Science 5 ECTS				
Mathematics	RampUp Mathematics 10 ECTS	Elective Course 1 Mathematics 10 ECTS	Elective Course 1 Mathematics 10 ECTS Practical Course Mathematics 5 ECTS		35 ECTS
Application Area	Medical-methodological specialisation module 1 5 ECTS	Accident Informatics 5 ECTS Medical-methodological Course 2 5 ECTS	Biomed. Image and Signal Analysis 5 ECTS		20 ECTS
Ethics and Compulsary Courses		Scientific and Method-oriented working 5 ECTS	Ethics and Epistemology 5 ECTS		10 ECTS
Total	30 ECTS	30 ECTS	30 ECTS	30 ECTS	120 ECTS
Compulsory modules Elective modules					

Field of application: Engineering

M.Sc. Data Science - Application Area: Engineering					
	1. Semester (Summer)	2. Semester (Winter)	3. Semester (Summer)	4. Semester (Winter)	
Computer Science	RampUp Computer Science 10 ECTS	Elective Course Computer Science 5 ECTS Elective Course Computer Science 5 ECTS	Seminar Computer Science 5 ECTS Elective Course Computer Science 5 ECTS Elective Course Computer Science 5 ECTS		35 ECTS
Mathematics	Elective Course 1 Mathematics 10 ECTS Elective Course 1 Mathematics 10 ECTS	Practical Course Mathematics 5 ECTS		Master Thesis 30 ECTS	55 ECTS
Application Area		Machine Learning 5 ECTS Introduction to Finite Elements 5 ECTS	Deep Learning in Remote Sensing 5 ECTS Fundamentals of Turbulence Modeling 5 ECTS		20 ECTS
Ethics and Compulsory Courses		Ethics and Epistemology 5 ECTS	Scientific and Method-Oriented Working 5 ECTS		10 ECTS
Total	30 ECTS	30 ECTS	30 ECTS	30 ECTS	120 ECTS
Compulsory modules Elective modules					

Field of application: Business and Economics

M.Sc. Data Science - Application Area: Business and Economics					
	1. Semester (Winter)	2. Semester (Summer)	3. Semester (Winter)	4. Semester (Summer)	
Computer Science	Elective Course Computer Science 5 ECTS Elective Course Computer Science 5 ECTS Elective Course Computer Science 5 ECTS	Elective Course Computer Science 5 ECTS	Seminar Computer Science 5 ECTS	Master Thesis 30 ECTS	55 ECTS
Mathematics	RampUp Mathematics 10 ECTS	Elective Course 1 Mathematics 10 ECTS	Elective Course 1 Mathematics 10 ECTS Practical Course Mathematics 5 ECTS		35 ECTS
Application Area		Empirical Economic Research 5 ECTS Data Driven Decision Making 5 ECTS	Data Privacy & Data Governance 5 ECTS Advanced Multivariate Data Analysis 5 ECTS		20 ECTS
Ethics and Compulsary Courses	Ethics and Epistemology 5 ECTS	Scientific and Method-oriented working 5 ECTS			10 ECTS
Total	30 ECTS	30 ECTS	30 ECTS	30 ECTS	120 ECTS
Compulsory modules Elective modules					

What do I have to consider at the beginning of my studies? 1/2

Mentoring and Study Planning

At the beginning of the program, the Data Science Examination Board assigns a mentor to each student from the department of Computer Science or Mathematics.

- If you have **specific subject-oriented questions** about your studies, please get in touch with your mentor at the beginning of the semester
- Mentors often also offer **group appointments** where you can make contact with other mentees

What do I have to consider at the beginning of my studies? 2/2

The **Joint RampUp Phase** takes place in the first week of the semester.

These events are compulsory. Please make sure you attend!

Monday	19.10.2026	15:00 – 16:30	PK 4.1	Data Science Life Cycle	<i>Prof. Wolf-Tilo Balke & Prof. Tim Kacprowski</i>
Wednesday	21.10.2026	16:45 – 18:15	RR 58.4	Predator-Prey Systems, Ecology and Differential Equations	<i>Prof. Dirk Langemann</i>
Friday	23.10.2026	11:30 – 13:00	PK 11.4	The Mathematics of Diffusion Models	<i>Prof. Nicole Mücke</i>

- <https://campusplan.tu-braunschweig.de/>

Starting from the 2nd week of the semester, the Mathematics and Computer Science RampUp will take place separately.

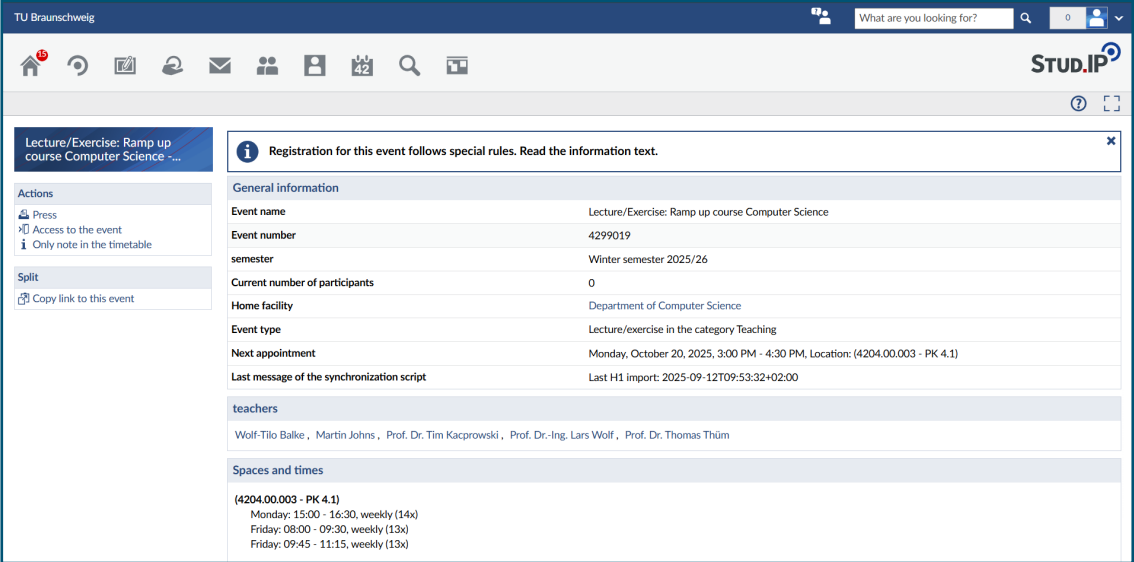
If you are unsure which Ramp Up module you need to complete, please contact the program coordinator for more information.

Further information about the two modules:

- [Computer Science RampUp](#)
- [Mathematics RampUp](#)

Stud.IP – The teaching and learning platform of TU Braunschweig

- Central tool of digital support for all courses
- Course information
- Registration in courses
- Contacting the lecturers
- Information and access to the courses
- Access to the files of the courses
- Communication platform
- Creating your own study groups



The screenshot displays the Stud.IP web interface for TU Braunschweig. The top navigation bar includes the TU Braunschweig logo, a search bar, and user profile icons. Below the navigation bar, a sidebar on the left contains a list of actions: 'Press', 'Access to the event', 'Only note in the timetable', 'Split', and 'Copy link to this event'. The main content area shows a notification about special registration rules, followed by a table of general information for the course 'Lecture/Exercise: Ramp up course Computer Science'. The table lists details such as event number (4299019), semester (Winter semester 2025/26), current number of participants (0), home facility (Department of Computer Science), event type (Lecture/exercise in the category Teaching), next appointment (Monday, October 20, 2025, 3:00 PM - 4:30 PM), and last message of the synchronization script (Last H1 import: 2025-09-12T09:53:32+02:00). Below the table, the teachers are listed as Wolf-Tilo Balke, Martin Johns, Prof. Dr. Tim Kacprowski, Prof. Dr.-Ing. Lars Wolf, and Prof. Dr. Thomas Thüm. The spaces and times section lists the course schedule: (4204.00.003 - PK 4.1) Monday: 15:00 - 16:30, weekly (14x); Friday: 08:00 - 09:30, weekly (13x); Friday: 09:45 - 11:15, weekly (13x).

General information	
Event name	Lecture/Exercise: Ramp up course Computer Science
Event number	4299019
semester	Winter semester 2025/26
Current number of participants	0
Home facility	Department of Computer Science
Event type	Lecture/exercise in the category Teaching
Next appointment	Monday, October 20, 2025, 3:00 PM - 4:30 PM, Location: (4204.00.003 - PK 4.1)
Last message of the synchronization script	Last H1 import: 2025-09-12T09:53:32+02:00

teachers

Wolf-Tilo Balke , Martin Johns , Prof. Dr. Tim Kacprowski , Prof. Dr.-Ing. Lars Wolf , Prof. Dr. Thomas Thüm

Spaces and times

(4204.00.003 - PK 4.1)
Monday: 15:00 - 16:30, weekly (14x)
Friday: 08:00 - 09:30, weekly (13x)
Friday: 09:45 - 11:15, weekly (13x)

Stud.IP – Support

Our support team is your central address for all questions and problems concerning Stud.IP. We are at your disposal for questions concerning the daily use and support you in the use of tools and plugins as well as in the implementation of didactic concepts.

Support Times

Please refer to the following web link: <https://www.tu-braunschweig.de/en/studip>

Contact

✉ studip@tu-braunschweig.de

☎ +49 531 391-14040

Exam registration

Exam registration

- online: <https://connect.tu-braunschweig.de>
- registration period in winter semester 2026-27: **15 December 2026 – 15 January 2027**
- exam registration using printed form: only for additional exams and other exceptions

Cancelling exam registrations

- written exam: until penultimate workday before exam (Saturday/Sunday = not workday)
- oral exam: until one week before exam (please use deregistration form)
- term paper: until 15 February (winter semester), 15 August (summer semester)
- portfolio exams: possible up to four weeks after the start of the lecture period

Seminar

- registration: day of kick-off event of the seminar The seminar module can only be taken from the 2nd semester onward.
- de-registration: until 2 weeks after beginning of lectures in that semester

Data Science Mailing List

In your studies, it is essential to be able to receive the most important information quickly.

The central information channel for Data Science students is the **mailing list**.

Please make sure that you are registered as a subscriber to the list with your TU email address and that you receive the messages at the beginning of the semester.

You should all have been added to the list by now.

- **Mailinglist Data Science** (ds-studs@lists.tu-braunschweig.de)



Always stay up-to-date (Weblinks)

1. [Program-specific Part to the Examination Regulations Pertaining to the Data Science Master's Degree](#)
2. [Module Guide Winter Semester 2026/27](#)
3. [Timetable Winter Semester 2026-27](#)
4. [TU Connect](#)
5. [StudIP TU Braunschweig](#)
6. [Data Science First-Semester Students](#)
7. [Institutes](#)
8. [Semester Abroad](#)



Contact - Program Coordination and Study Guidance

Marvin Plagge

Carl-Friedrich-Gauß-Fakultät, Room 124 (1st floor)

Rebenring 58A, 38106 Braunschweig

+49-531-391-2831

ds-studium@tu-braunschweig.de

Office hours: By arrangement



Contact - Examination Office

Janine Werner

Carl-Friedrich-Gauß-Fakultät, Room 117 (1st floor)

Rebenring 58A, 38106 Braunschweig

+49-531-391-2851

pa-mathe@tu-braunschweig.de

Office hours: By arrangement



It works like this

Bloom's Taxonomy

