Curriculum BSc Data Science & Artificial Intelligence

Free choice of modules in the module group

You must achieve the minimum number of credits in each module group;
in addition, you are free to choose which module group(s) you want to deepen.

Level | None | Basic | Intermediate | Advanced

Mathematical Competency
Min. Credits **12**
Total Credits of 18

- Optimization for Machine Learning — 3
- Advanced Calculus — 3
- Applications of Linear Algebra — 3
- Foundation in Mathematics — 3
- Foundation in Linear Algebra — 3
- Foundation in Calculus — 3

Data Analysis
Min. Credits **15**
Total Credits of 22

- Stochastic Processes and Time Series — 3
- Bayesian Data Analysis — 2
- Statistical Learning — 4
- Multiple Linear Regression — 3
- Linear and Logistic Regression — 3
- Probability Modelling — 3
- Exploratory Data Analysis — 4

Computer Science and Programming
Min. Credits **10**
Total Credits of 19

- Webtechnology — 2
- Software Construction — 3
- Efficient Algorithms — 3
- Object-Oriented & Functional Progr. — 2
- AI-Supported Programming — 3
- Programming in R — 3
- Foundation in Programming — 3

Data Processing & Infrastructure
Min. Credits **12**
Total Credits of 29

- High Performance Computing in Practice — 3
- High Performance Computing — 4
- Cloud Infrastructure & Computing — 3
- Foundation in Image & Signal Porcessing — 3
- Data Collection IoT — 3
- Web Data Collection — 2
- Database Design & Implementation — 3
- Data Wrangling — 4
- Foundation in Information Technology — 2
- Foundation in Databases — 3

Machine Learning
Min. Credits **7**
Total Credits of 17

- Explainable AI — 3
- Reinforcement Learning — 2
- Advanced Deep Learning — 3
- Deep Learning — 3
- Foundation in Machine Learning — 6

Applied Data Science
Min. Credits **11**
Total Credits of 27

- Deep Learning on Image & Signal — 3
- Natural Language Processing — 4
- Sustainable design of data-driven systems — 3
- Modeling and simulation of complex systems — 3
- Applied Machine Learning — 4
- Social Network Analysis — 4
- Recommender Systems — 4
- Foundation in DS — 2

Data Visualisation
Min. Credits **4**
Total Credits of 7

- Visual Analytics — 2
- Interactive Visualisation — 2
- Foundation in Data Visualisation — 3

Communication
Min. Credits **9**
Total Credits of 15

- Advanced Writing — 3
- Data Storytelling — 2
- Digital Communication — 2
- Effective Argumentation — 2
- Presenting — 3
- Foundation in Writing — 3
- Tutorial Communication English — 0
- Tutorial Communication German — 0

Humanities & Economics
Min. Credits **14**
Total Credits of 33

- Social Embedding of a Data Science Challenge — 3
- Digital Entrepreneurship & Innovation — 4
- Introduction to Business Administration — 3
- Knowledge Management — 2
- Politics, History, Culture — 2
- Data Law — 2
- Ethical Implementation — 2
- Ethical Reflection — 2
- Social Impact of AI Design — 3
- Design Thinking for Data Scientists — 2
- Data-Driven Business Models — 2
- Scientific Methods — 2
- Information Technology Law — 2
- Information Literacy — 2

World of Work
Min. Credits **10**
Total Credits of 22

- Actively Shaping your Career Path — 2
- Leadership — 2
- Personal Knowledge Management — 2
- Intercultural Competency — 2
- CoLab — 2
- Collaboration in Teams — 3
- Digital Portfolio — 3
- Participative Events — 2
- Selfmanagement — 2
- Learning Workshop — 2

Challenges & Projects
Min. Credits **42**
maximum 75

- Various Challenges — E. g. Natural Language Processing, Computer Vision, Deep Learning, Graph Machine Learning — 6
- Climate and Equality Challenge — Offered as a block module — 3
- Various Challenges — E. g. Technology & Society, Webengineering or Machine Learning — 6
- Various Challenges — E. g. Data Analysis or Data Communication — 6

- Bachelor-Thesis — 12
- Challenge X6 — Formulate and solve your own Challenge — 6
- Challenge X5 — Formulate and solve your own Challenge — 6
- Challenge X4 — Formulate and solve your own Challenge — 6
- Challenge X3 — Formulate and solve your own Challenge — 6
- On-The-Job Project 2 — Projects from your daily work — 6
- On-The-Job Project 1 — Projects from your daily work — 6

- Project 5 Data Science — 6
- Project 4 Data Science — 6
- Project 3 Data Science — 6
- Project 4 interdisciplinary — 6
- Project 3 interdisciplinary — 6
- Project 2 Data Science — 6
- Project 1 Data Science — 6

Free modules
Min. Credits **0**
maximum 8