Curriculum Degree programme Data Science & AI for Sustainability

Free choice of modules within each module group plus additional modules

You must achieve the minimum number of credits in each module group; in addition, you are free to choose which module group you would like to explore in more depth.

Level · None · Basic · Intermediate · Advanced

Mathematical Competency	Data Analysis	Computer Science and Programming	Data Processing & Infrastructure	Machine Learning	Applied Data Science	Data Visualisation	Communication	Humanities & Business	World of Work	Challenges & Projects	Free modules
Min. Credits **12** of 18	**15** of 22	**10** of 19	**12** of 29	**7** of 17	**11** of 27	**4** of 7	**9** of 15	**14** of 33	**10** of 22	**42** maximum 75	**0** maximum 8

Module entries:

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

Data Processing & Infrastructure
- 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 — 3
- Database Design & Implementation — 3
- Data Wrangling — 4
- Foundation in Information Technology — 2
- Foundation in Databases — 3

Machine Learning
- Open-Learning — Includes 2 competencies of 1.5 credits each — 3
- Explainable AI — 3
- Reinforcement Learning — 3
- Advanced Deep Learning — 3
- Deep Learning — 3
- Foundation in Machine Learning — 6

Applied Data Science
- Deep Learning on Image & Signal — 3
- Natural Language Processing — 4
- Sustainable Design of Data-Driven Systems — 3
- Modeling and Simulation of Complex Systems — 3
- Ecological System Modelling — 3
- Applied Machine Learning — 4
- Social Network Analysis — 4
- Recommender Systems — 3
- Foundation in DS — 2

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

Communication
- Open-Learning — Includes 2 competencies of 1.5 credits each — 3
- Advanced Writing — 3
- Data Storytelling — 2
- Digital Communication — 3
- Effective Argum... Pre... — 3
- Fundamentals of Ecology — 3
- Foundation in Writing — 3
- Tutorial Communication English — 0
- Tutorial Communication German — 0

Humanities & Business
- Social Embedding of a Data Science Challenge — 3
- Digital Entrepreneurship & Innovation — 4
- Introduction to Business Administration — 3
- Knowledge Management — 3
- Open-Learning — Includes 2 competencies of 1.5 credits each — 3
- Poli... Cul... —
- Dat... —
- Ethical Implementation — 3
- Ethical Reflection — 3
- Social Impact of AI Design — 3
- Design Thinking for Data Scientists — 3
- Data-Driven Business Models — 2
- Scientific Methods — 3
- Information Technology Law — 2
- Information Literacy — 2

World of Work
- Actively Shaping your Career Path — 3
- 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
- Bachelor-Thesis — 12
- Various Challenges — E. g. Natural Language Processing, Computer Vision, Deep Learning, Graph Machine Learning — 6
- Challenge X6 — Formulate and solve your own Challenge — 6
- Climate and Equality Challenge — Offered as a block module — 3
- Open-Learning — Includes 2 competencies of 1.5 credits each — 3
- Various Challenges — E. g. Technology & Society, Webengineering or Machine Learning — 6
- Challenge X4 — Formulate and solve your own Challenge — 6
- Challenge X3 — Formulate and solve your own Challenge — 6
- Various Challenges — E. g. Data Analysis or Data Communication — 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
- The United Nations Sustainability Development Goals