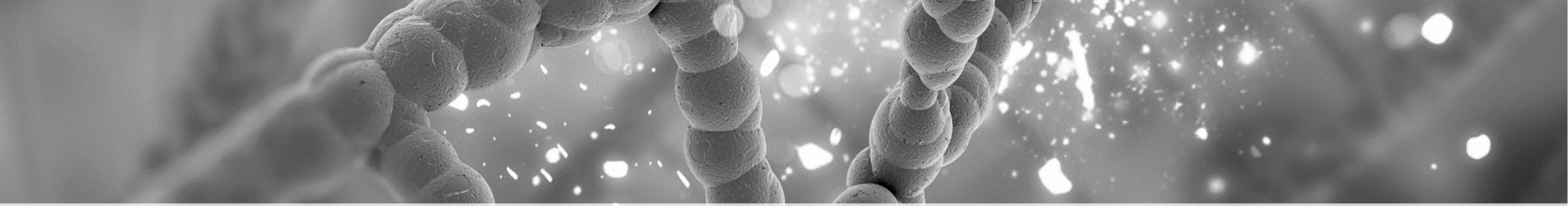

M.Sc. Data Science (from winter semester 2025/26)

Course of studies: Start of studies in winter semester, full-time

Specialization: Computational Life Sciences

The following course of study shows you in which semesters which modules are offered, if you decide to specialize in Computational Life Sciences. Compulsory modules must be completed during your studies. For all other modules, you can choose which modules you would like to complete. It is recommended that you complete a total of 30 ECTS* through modules or courses per semester (totalling 120 ECTS in four semesters).

Courses are usually offered on an annual rhythm, i.e. they cannot be completed in every semester, but either annually in the winter semester or annually in the summer semester.

The course of study includes the entire range of courses and modules offered by the Master's degree programme:

- the compulsory area (incl. Master's Thesis) (at least 66 ECTS)
- the compulsory elective area "Machine Learning and Statistics" (at least 18 ECTS)
- the compulsory elective area "Specialization: Computational Life Sciences" (at least 42 ECTS)

*ECTS and credit points (CP) or in German Leistungspunkte (LP) are the same thing: a measure of the workload during your course of study. According to the European Credit Transfer System (ECTS), one ECTS/CP corresponds to 25 to 30 hours of work (course attendance, preparation and follow-up time as well as studying for exams or writing assignments or papers). Approximately 30 ECTS/CP should be completed in one semester of full-time studies - i.e. 60 ECTS/CP in one academic year of full-time studies.

1st semester: winter semester					
Module code	Module title	CHs	ECTS	Category	ECTS per semester
DAT-M-MML	Modern Machine Learning	2+2	6	compulsory	In total: 18 ECTS in the compulsory and compulsory elective area
DAT-M-FREE	Free Elective		12	compulsory	
DAT-M-UNIV	Studium Universale		12	compulsory	
DAT-M-MLS-SML	Statistical Machine Learning	2 + 2	9	Machine Learning and Statistics	
DAT-M-MLS-AS2	Advanced Statistics II	2 + 2	6	Machine Learning and Statistics	
DAT-M-MLS-MATH	Lectures in Mathematics		3-18	Machine Learning and Statistics	
DAT-M-MLS-AXAI	Advanced Explainable AI	2 + 2	6	Machine Learning and Statistics	
DAT-M-MLS-ENG	Advanced Data Engineering	2 + 2	6	Machine Learning and Statistics	
FIDS-WI-MSc-IB-M05	Neural networks: An application-oriented introduction	2 + 2	6	Machine Learning and Statistics	
INF-M-BINF-BIOL	Biology for Computer and Data Scientists	2 + 2	6	compulsory in Computational Life Sciences	In total: 12 ECTS in Computational Life Sciences
DAT-M-CLS-STATBIO	Statistical Bioinformatics	2 + 2	6	compulsory in Computational Life Sciences	
INF-M-BIN-OPT	Optimization	2 + 2	6	Computational Life Sciences	

2nd semester: summer semester					
Module code	Module title	CHs	ECTS	Category	ECTS per semester
DAT-M-FREE	Free Elective		12	compulsory	
DAT-M-UNIV	Studium Universale		12	compulsory	
DAT-M-MLS-AS1	Advanced Statistics I	2 + 2	9	Machine Learning and Statistics	
DAT-M-MLS-MATH	Lectures in Mathematics		3-18	Machine Learning and Statistics	
DAT-M-MLS-DIPAI	Digital Image Processing – AI-based Approaches	2 + 2	6	Machine Learning and Statistics	
INF-M-CCS-ALGBIO	Algorithmic Bioinformatics	2 + 2	6	Computational Life Sciences	In total: 12 ECTS in Computational Life Sciences
DAT-M-CLS-HIGHDIM	Analysis of high-dimensional data	2 + 2	6	Computational Life Sciences	
INF-M-BINF-SEM	Current Topics in Bioinformatics	2	6	Computational Life Sciences	

3rd semester: winter semester					
Module code	Module title	CHs	ECTS	Category	ECTS per semester
DAT-M-FREE	Free Elective		12	compulsory	In total: 12 ECTS in the compulsory and compulsory elective area
DAT-M-UNIV	Studium Universale		12	compulsory	
DAT-M-SEM	Current Topics in Data Science	2	6	compulsory	
DAT-M-MLS-SML	Statistical Machine Learning	2 + 2	9	Machine Learning and Statistics	
DAT-M-MLS-AS2	Advanced Statistics II	2 + 2	6	Machine Learning and Statistics	

DAT-M-MLS-MATH	Lectures in Mathematics		3-18	Machine Learning and Statistics	
DAT-M-MLS-AXAI	Advanced Explainable AI	2 + 2	6	Machine Learning and Statistics	
DAT-M-MLS-ENG	Advanced Data Engineering	2 + 2	6	Machine Learning and Statistics	
FIDS-WI-MSc-IB-M05	Neural networks: An application-oriented introduction	2 + 2	6	Machine Learning and Statistics	
INF-M-BINF-RSRCH	Research Project in Bioinformatics	3	18	compulsory in Computational Life Sciences	In total: 18 ECTS in Computational Life Sciences
INF-M-BINF-OPT	Optimization	2 + 2	6	Computational Life Sciences	
INF-M-BINF-SEM	Current Topics in Bioinformatics	2	6	Computational Life Sciences	

4th semester: summer semester					
Module code	Module title	CHs	ECTS	Category	ECTS per semester
DAT-M-THESIS	Master's Thesis	2	30	compulsory	30 ECTS Master's Thesis module