Program of Studies:	Master Program Bioinformatics
Name of the module:	Special Lecture Bioinformatics: Processing of Biological Data
Abbreviation:	BI-BM-1
Subtitle:	-
Modules:	Lecture: 2 h (weekly) Tutorial: 1 h (2 h biweekly)
Semester:	1st – 3rd semester; every third semester
Responsible lecturer:	Prof. Dr. Volkhard Helms
Lecturer:	Prof. Dr. Volkhard Helms
Language:	English
Level of the unit/ Mandatory or not:	Graduate course / mandatory elective
Total workload:	150 h = 48 h of classes and 102 h private study and assignments
Credits:	5
Entrance requirements:	intermediate programming skills in Python
Aims/Competences to be developed:	Preprocessing of data is an essential part of data analysis, but is often not properly described in the methods section of scientific articles. The course teaches popular techniques in this area. Via the assignments, the students are trained to implement and apply these techniques and to critically reflect on the strengths and weakness of various approaches. Students are also trained to anticipate potential pitfalls during data analysis.
Content:	- clustering of data - principal component analysis - differential expression analysis - removal and correction of data outliers; prediction of missing values - processing of proteomics data; imputation of missing values - peak assignment - shape detection - functional annotation - protein structure data (Protein DataBank); thermal mobility; titration states; hydration sites; PDBcheck - molecular dynamics simulations; time correlation of snapshots - multi-variate analysis - analysis of multi-dimensional data; data integration

Assessment/Exams:	There will be about six bi-weekly graded assignments and tutorial sessions. Students need to get at least 50% of the points from the assignments to be admitted to the final exam.
Grade:	Written exam
Literature:	will be indicated during the lecture