

Machine Learning Methods for Biomedical Data (D012554)

Course size (nominal values; actual values may depend on programme)

Credits	5.0	Study time	150 h	Contact hrs	55.0 h
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Course offerings and teaching methods in academic year 2020-2021

A (semester 2)	English	lecture	15.0 h
		project	15.0 h
		microteaching	10.0 h
		seminar: practical PC	15.0 h
		room classes	

Lecturers in academic year 2020-2021

Degreeve, Sven	GE31	lecturer-in-charge
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Offered in the following programmes in 2020-2021

Master of Science in Biomedical Sciences	crdts	offering
	5	A

Teaching languages

English

Keywords

Python, computational analysis of large amounts of data, data visualization, Machine Learning, data mining.

Position of the course

This course will be taught in the first Master Biomedical Sciences in the form of colleges, microteaching and associated practicals. The student will also independently carry out a project assignment which consists of a representative data analysis problem, and this project and its outcome will be presented to the other students. This course builds on the Advanced Bio-informatics course from first Master Biomedical Sciences.

Contents

- Non-linear data projections
- Knowledge discovery - data clustering
 - k-means clustering
 - Hierarchical clustering
- Predictive models
 - Classification
 - Regression
 - Feature selection
 - Model evaluation
- Applications of predictive models

Initial competences

Successfully have completed the Biomedical Analysis I, Biomedical Analysis II, Statistics, Data Analysis I, Informatics I, and Informatics II courses, or have acquired the required competences for these courses through another means.
Successfully have completed the bachelor in Biomedical Sciences or have acquired the acquired competences of this bachelor curriculum through another means.

Final competences

- 1 Gain insight in the practical treatment and processing of large amounts of data, obtained from the broader life sciences.
- 2 The student is capable of formulating data analysis tasks.

- 3 Gain insight in the available Machine Learning algorithms.
- 4 Gain insight into the most important parameters in Machine Learning analyses.
- 5 The student is capable of clearly visualizing the results obtained from a data analysis.
- 6 The student is capable of independently starting and successfully completing a Machine Learning based data analysis.
- 7 The student is capable of interacting at high level with data analysis specialists.
- 8 The student is capable of understanding the specific literature on Machine Learning based data analysis
- 9 The student is capable of critical evaluation of published results from Machine Learning analyses.
- 10 The student is capable of writing Machine Learning applications in Python.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Lecture, microteaching, project, seminar: practical PC room classes

Learning materials and price

Course in English; estimated price 15 euro

References

Course content-related study coaching

Support during and after colleges and practicals, and via Minerva

Evaluation methods

end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Written examination with open questions, written examination with multiple choice questions

Examination methods in case of periodic evaluation during the second examination period

Written examination with open questions, written examination with multiple choice questions

Examination methods in case of permanent evaluation

Assignment

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible in modified form

Extra information on the examination methods

Continuous evaluation:

Presentation to the group of students and teachers of a scientific paper (15% of total score). Presentation to the group of students and teachers of an independently carried out project assignment (35% of total score).

Period-specific evaluation

Closed-book, written exam on 50% of the total score, concerning the subject matter described in the course material and the colleges. The exam consists of both open and MCQ.

Calculation of the examination mark

Continuous evaluation

Presentation to the group of a scientific paper (15% of total score). Presentation of independently executed project assignment (35% of total score).

Period-specific evaluation

Written exam on 50% of the total score.