Valid from 2024.HS

Module description: Data Science and Data Visualization

Module Code	t.BA.MI.DSD.23HS
ECTS Credits	4
Language of Instruction/Examination	German
Organizational Unit	InIT
Module Coordinator	Daniel Roetenberg
Legal Framework	The module description is part of the legal basis in addition to the general academic regulations. It is binding. During the first week of the semester a written and communicated supplement can specify the module description in more detail.
Module Characteristic	Type 3a 2 lecture lessons per semester week and class+ 2 lab bi-weekly lessons per semester and half-class
Module Description	The module offers a comprehensive introduction to the fundamental concepts and techniques of data science, with a focus on applications within the medical and healthcare sectors. Students will learn how to collect, preprocess, and analyze datasets, utilizing statistical methods and basic machine learning algorithms to extract meaningful insights. The course emphasizes practical skills in data visualization, teaching students how to effectively communicate complex data through various graphical representations. Key topics include exploratory data analysis, predictive modeling within Python.
Module Content	• Introduction to the concepts and techniques of data science and visualization: data sources, types of data and processing techniques • Data exploration and visualization: chart types and displaying data in various formats • Data management and data cleaning • Data modeling and prediction • Use cases in medicine
Prerequisite Knowledge	Basic knowledge of programming (Python) and statistics

Learning Objectives (Competences)

Students...	Competencies	Taxonomies
can create and interpret various types of data visualizations to communicate findings effectively	M, F	K3, K4, K5, K6
understand the concepts of data integrity such as outliers, bias and missing data	F, M	K3, K4, K5
can implement several steps of a data processing pipeline in Python	F, M	K3, K4, K5
can perform statistical analysis to extract meaningful insight from medical data	F	K3, K4, K5, K6
understand the possibilities and risks of machine learning algorithms on medical data	M, F	K2, K3, K4

Performance Assessment

End-of-module exam	Assessment	Length (min.)	Weighting	Form
written exam	Grade	90	80	acc. to module agreement

Performance assessment during the semester	Assessment	Length (min.)	Weighting	Form
Exercises	Grade		20	acc. to module agreement

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Classroom Attendance Requirement	None
Learning material	
Comments	