Submodule BIN-107-01 Statistics

Subheading	(BIN-STAT)
Person in Charge	Ahlers, Volker, Prof. Dr.
Language of Instruction	German
Curriculum Allocation	BIN, MDI
Course Type, Contact Hours per Week	Lecture with exercise, 4 SWS
ECTS Credits	6
Contact Hours / Independent Study Hours	68 h / 112 h
Semester	2
Suggestions for Independent Study	see literature
Recommended Prerequisites	BIN-100 Mathematical Foundations of Computer Science (BIN-MAT1) or MDI-100 Mathematical Foundations of Computer Science (MDI-MAT1)
Examination	Written or oral examination, experimental work

Learning Outcomes

Algorithmic and mathematical skills: Getting to know, using, comparing, and evaluating stochastic terms and methods for the description and analysis of large datasets. Interpretation and evaluation of results of stochastic methods and statistical anlysis.
Interdisciplinary skills: Communicative skills (presentation and discussion of solution approaches).

Content

Fundamental terms and methods of probability theory and statistics, such as:
- Descriptive statistics: mean, standard deviation, median, quantile, histogram, regression and correlation analysis
- Combinatorics
- Probability theory: event, probability, Bayes' theorem, random variable, expectation value, variance, discrete and continuous distributions, fundamental theorem of statistics, limit theorems
- Pseudorandom numbers
- Inferential statistics: estimation, tests, significance levels, type I and type II errors The methods are practised using well-established statistics software.

Requirements for Contact Hours

Active participation, solving exercise problems

Requirements for Independent Study Hours

Preparation and review of the lectures, reading literature

Bibliography

Lecture notes
Sachs, M.: Wahrscheinlichkeitsrechnung und Statistik, Hanser
Teschl, G., Teschl, S.: Mathematik für Informatiker, Band 2, Springer