Module title	Module code
Statistics	

Person responsible for the module	Faculty
Prof. Dr. Hans Kiesl	Computer Science and Mathematics
Prof. Dr. Peter Wirtz	Computer Science and Mathematics

Semester taught according to the curriculum	Level of study	Module type	Credit value
3.	2.	mandatory	5

Mandatory requirements
At least 30 credits from the 1st study stage

Recommended previous knowledge
Mathematics 1 and 2 Programming skills

Content
see next page

Assigned submodules

Nr.	Submodule title	Teaching hours	Credit value
1.	Statistics	4 SWS	5

Submodule	Submodule abbreviation
Statistics	ST

Responsible person	Faculty
Prof. Dr. Peter Wirtz Prof. Dr. Hans Kiesl	Computer Science and Mathematics
Lecturer	Availablilty of module
Prof. Dr. Hans Kiesl Prof. Dr. Peter Wirtz	only in winter semester
Teaching method	
Seminar-base teaching (4SWS)	

Semester taught according to the curriculum	Teaching hours	Teaching language	Credit value
3.	4 SWS	english	5

Study hours required

Hours in attendance/lectures	Hours for self-study
60h	90h

Method of assessment
Written exam: 90 minutes

Content
Descriptive statistics (summarizing data, methods based on the empirical cumulative density function, measures of location, measures of dispersion, exploring relationships with scatterplots). Probability Models (the idea of probability: a measure of uncertainty, probability measures, laws of probability, elementary combinatorics, conditional probabilities, Bayes theorem, independence). Random Variables and Distributions (discrete and continuous random variables, expectation and variance, functions of random variables, joint distributions, covariance and correlation). Convergence and Limit theorems (weak and strong laws of large numbers, the central limit theorem) Statistical Inference (estimation of parameters, confidence intervals, testing hypotheses)
Learning objectives: Subject competence
 After successful completion of the submodule, students are able to, • to explain definitions, terms and theorems of probability theory in their own words (1), • to work on questions of probability theory independently and in a planned manner (2), • apply basic procedures of descriptive statistics (2),

- be able to assess the methodology of statistical estimation and testing procedures and apply them to practical problems (3),
- to approach stochastic applications in computer science independently and confidently (3),
- understand and classify additional statistical literature (2),
- carry out simple and more demanding statistical analyses for their own work (seminar, theses, research projects) (3).

Learning objectives: Personal competence

After successful completion of the submodule, students are able to,
- work in a team in a goal-oriented manner (teamwork skills) (1),
- present the results in a factual and target-oriented manner (presentation competence) (2),
- defend their point of view professionally (argumentation competence) (3),
- present their findings to target groups (adaptability) (1),
- defend their own results and opinions in front of different target groups (confidence in their own judgement) (2)
- evaluate challenging questions and work on them in a goal-oriented way (3)

Teaching media

Blackboard, notebook, projector

Literature

- Bosch, Elementare Einführung in die angewandte Statistik, Vieweg 2005
- Hübner, Stochastik: Eine anwendungsorientierte Einführung für Informatiker, Ingenieureund Mathematiker, Vieweg 2009
- Lehn/Wegmann, Einführung in die Statistik, Teubner 2006
- Ross, Statistik für ingenieure und Naturwissenschaftler, Elsevier 2006
- Sachs, Wahrscheinlichkeitsrechnung und Statistik, Hanser 2009
- Teschl und Teschl, „Mathematik für Informatiker Band 2", Springer 2007
- Weitz, "Konkrete Mathematik (nicht nur) für Informatiker", Springer 2018

The numbers in brackets indicate the levels to be reached: 1 - understanding 2 - ability 3 - understand and application