Valid from 2024.HS

Module description: Basics of Statistics

Module Code	t.BA.XX.GSTAT.20HS
ECTS Credits	4
Language of Instruction/Examination	German
Organizational Unit	IDP
Module Coordinator	Christoph Hofer
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 2a 4 consecutive lecture lessons per semester week and class
Module Description	Basics of Statistics introduces students to the fundamentals of statistical inference, i.e. techniques that allow inferences to be drawn about a population from a sample. Special emphasis is put on computational methods that allow the theoretical concepts to be applied in practice.
Module Content	• Students learn to distinguish between theoretical models and their parameters on the hand, and empirical data (samples) and quantities calculated from these on the other. Fundamental concepts and techniques for point and interval estimation and hypothesis testing are introduced. In addition to classical (analytical) solutions, the module emphasises modern computational techniques (numerical techniques, resampling) that allow for the methods to be widely applied in more complicated practical situations. The lessons are divided into the following blocks: **Sampling and estimation: sampling distributions statistics and estimators properties of estimators different approaches to point estimation confidence intervals and their properties** • Statistical hypothesis tests: Basic principles of hypothesis tests (null and alternative hypotheses, errors of the first and second kind, level and power of a test) Special parametric and non-parametric tests for one- and two-sample problems **Students learn to apply the concepts and techniques in practical exercises using the R environment for statistical computing.**
Prerequisite Knowledge	
Learning Objectives (Competences)	

Students...	Competencies	Taxonomies
Students know and understand the fundamental concepts of applied statistical inference.	F, M	K1, K2
Students know and understand fundamental concepts of statistical hypothesis tests and are able to apply suitable tests to practical problems.	F, M	K2, K3
Students know different approaches to point and interval estimation and can apply these to a sample to make inferences about unknown population parameters and assess statistical accuracy of the estimates.	M, F	K2, K3

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Performance Assessment

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

Performance assessment during the semester	Assessment	Length (min.)	Weighting	Form
	Grade		10	acc. to module agreement

Classroom Attendance Requirement

None

Learning material

- Rice, J.A. (2007). Mathematical Statistics and Data Analysis . 3rd edition. Brooks/Cole
- Fahrmeir, L., Künstler, R., Pigeot, I., Tutz, G. (1997). Statistik. Der Weg zur Datenanalyse. Springer.
- Genschel, U., Becker, C. (2005). Schliessende Statistik. Grundlegende Methoden. Springer.

Comments