Data:	STADS MA. 3221 / Examination number: 12306	Version: 27.04.2026	Start Year: WiSe 2026
Module Name:	**Statistical Foundations of Data Science**		
(English):	Statistical Foundations of Data Science		
Responsible:	Sprungk, Björn / Prof. Dr.		
Lecturer(s):	Sprungk, Björn / Prof. Dr.		
Institute(s):	Institute of Stochastics		
Duration:	1 Semester(s)		
Competencies:	Students understand fundamental concepts of probability, can translate real-world problems into probabilistic models, and make probabilistic predictions. They are able to describe and interpret key statistical quantities and apply core statistical methods to analyze data. Furthermore, they understand statistical models and can critically apply methods of statistical inference using scientific software.		
Contents:	• Fundamentals of probability theory (e.g., random variables, conditioning, distributions, limit theorems) • Descriptive statistics (empirical characteristics and statistical graphics) • Statistical inference (parameter estimation, hypothesis testing) • Linear models and regression analysis		
Literature:	• D. Montgomery, G. C. Runger: *Introduction to Probability and Statistics for Data Science*. Cambridge University Press, 2025. • S. Ross: *A First Course in Probability*, Pearson, 2019. • M. Kaptein , E. van den Heuvel: *Statistics for Data Scientists*, Springer, 2022		
Types of Teaching:	S1 (WS): Lectures (2 SWS) S1 (WS): Exercises (1 SWS)		
Pre-requisites:			
Frequency:	yearly in the winter semester		
Requirements for Credit Points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: KA: Written exam [120 min] PVL: Programming Project PVL have to be satisfied before the examination.		
	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: KA: Klausur [120 min] PVL: Programmierprojekt PVL müssen vor Prüfungsantritt erfüllt sein bzw. nachgewiesen werden.		
Credit Points:	5		
Grade:	The Grade is generated from the examination result(s) with the following weights (w): KA: Written exam [w: 1]		
Workload:	The workload is 150h. It is the result of 45h attendance and 105h self-studies.		