

# Syllabus AQM5041E Foundations in Statistics Prof. Dr. Kirsten Wüst Winter Semester 2023/2024

Level	Master	
Credits	2 ECTS	
Student Contact Hours	2 SWS (90 minu	ites per week in class)
Workload	60 hours (15*90	minutes plus preparation and homework)
Prerequisites	none	
Time	Tuesday, 13:45-15:15	
Room	W4.1.06	
Start Date	10.10.2023	
Lecturer	Name	Prof. Dr. Kirsten Wüst
	Office	W2.3.25
	Virtual Office	Per Email
	Office Hours	Wednesday, 13:45-15:15
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## Summary

The ability to process data, to extract value from it, to visualise it and to communicate it has become a hugely important skill in a world full of data. However, understanding data is important not only at the professional level but also at the educational level. Statistical methods provide an important tool for making economic and business decisions. The students will get an overview and many details of methods that are highly relevant in business, economics and the social science. The topics of "Foundations in Statistics" cover methods for describing the drawn sample as well as basic methods for making valid and reliable statements from the drawn sample to the underlying population. The lecture places emphasis on understanding the ideas of univariate and bivariate analysis as well as the basic ideas of hypothesis testing.

## **Outline of the Course**

- 1. Some preliminaries
- 2. Univariate Descriptive Statistics (1): frequency table, bar and pie chart, histogram

3. Univariate Descriptive Statistics (2): summarize the center, the dispersion and the skewness of a distribution

- 4. Data handling
- 5. Bivariate relationships among variables

a) Bivariate relationships among two nominal scaled variables and differences between groups (chi-square, Cramer's V, Phi, Contingency coefficient)

- b) Bivariate relationships among two interval scaled variables (Pearson)
- c) Bivariate relationships among two ordinal scaled variables (Spearman)
- d) Linear regression
- 6. Idea of hypothesis testing

## Course Intended Learning Outcomes and their Contribution to Program Intended Learning Outcomes / Program Goals

Program Intended Learning Outcomes		Course Intended Learning Outcomes	Assessment Method
	After completion of the program the students	After completion of the course the students will be able	Exam
	will be able		100%
			Individual
1	Responsible Leadership in Organizational Contexts		
1.1	to know and explain important leadership principles.	to know and explain basic concepts in descriptive statistics (univariate and bivariate)	х
1.2	to apply leadership concepts to an organ- izational context or a specific case.	to calculate descriptive univariate key figures for real and fictive data sets	х
1.3	to critically reflect on leadership concepts in a certain organizational context or in a specific case.	to critically interpret the results of statistical analyses and to reflect on the appropriateness of the used analyses techniques	х
1.4	to act responsibly from a scientific self-un- derstanding and to act professionally.	$\ldots$ to choose the correct analyses tools for different distributions given the data	х
2	Creative Problem Solving Skills in a Complex Business Environment		
2.1	to identify & classify problems.	to judge which statistical analyses to conduct for a certain given problem	x
2.2	to analyze problems.	to correctly analyze given data sets	х
2.3	to creatively solve problems.	to solve statistical problems	х
2.4	to explain problems and their solutions in a comprehensive manner.	to explain problems of requirements in the data and find solutions for the analyses	х
3	Applied research skills		
3.1	to know the research and analysis meth- ods important in his/her field of study.	to know appropriate statistical research and analysis methods	х
3.2	to appropriately apply the research and analysis methods.	to appropriately apply statistical research methods	x
3.3	to obtain innovative results using relevant research methods.	to obtain results using statistical research methods.	x

## **Teaching and Learning Approach**

The lecture "Foundations in Statistics" integrates classical lectures and computer exercises. I present the subject matter by means of key questions, overviews, examples and exercises and keep it application-oriented. For each topic there is a theoretical introduction, which is always embedded into practical examples. After the theoretical work the software-based implementation with SPSS is shown. In the following students emphasize the topic by solving exercises on the computer. Students can ask the professor individually. There is homework at regular intervals which asks for rework and thus tests the learning progress. An active cooperation and rework is a crucial part of the teaching and learning concept and a good preparation for the final examination at the end of the semester!

### Literature and Course Materials

Slides provided via Moodle

Additional material:

CLEFF, T. (2014). Exploratory Data Analysis in Business and Economics: An Introduction Using SPSS, Stata, and Excel. Springer.

Interactive Online Material

- <u>http://davidmlane.com/hyperstat/</u>
- http://www.sjsu.edu/faculty/gerstman/StatPrimer/

#### Assessment

The course grade consists of a 60 minutes exam at the end of the term.

For the grading I use the following scale:

- `Very good` stands for an outstanding performance far above average.
- `Good` stands for a performance that is above average.
- `Satisfactory` is an average performance that shows weaknesses but still corresponds to the requirements.
- `Sufficient` stands for a below average performance with evident weaknesses.
- `Poor` stands for a non-acceptable performance that does not correspond to the requirements.

### Code of Conduct for online Teaching

Link to the Code of Conduct for online Teaching

### **Teaching Philosophy**

I would like to contribute to a successful learning progress and to an understanding for the practical meaning of learning contents. Comprehension questions should be asked directly in class. Comments that are useful for a better learning progress are welcome. My target is that you pass the course successfully, however the main part of work is on your side. In case you have problems whatsoever with the course do not hesitate to contact me.