Syllabus: Foundations in Statistics (AQM5041)

Prof. Dr. Kirsten Wüst

Hochschule Pforzheim / Pforzheim University

Course:	AQM5041 – Foundations in Statistics

Assessment/ Examination:	Exam

Workload:	2 ECTS Credits (30 Contact hours)

Prerequisites:	none

Validity Period:	Winter term 2020/2021

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Time Schedule:	See LSF

Overview:

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.

Learning Objectives:

The students…
▪ understand the meaning of simple statistical concepts in the economic environment,
▪ are able to calculate and interpret descriptive univariate key figures of a data set,
▪ have the skills to correctly apply and interpret bivariate techniques of correlation and regression,
▪ can interpret graphical results correctly,
▪ can recognize and avoid statistical erroneous sources and attempts of manipulation,
▪ can descriptively evaluate smaller data sets per hand and eventually per SPSS,
▪ have a first idea about hypothesis testing

Content:

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

Contribution to the Learning Goals of Hochschule Pforzheim

Goal	Contribution
1 Know-How	- univariate and bivariate analyses of a given data set - basic idea of testing
2.1 use of information technologies	- Use of SPSS and/or excel to calculate descriptive key figures - Use of SPSS for basic hypothesis testing

3 critical thinking	- Critical interpretation of the results of statistical analyses (how can these be used to create a certain impression?)
4 ethical awareness	- see "3 – Critical thinking": awareness of means to manipulate the results of empirical analyses graphically and/or by stressing certain parameters
5 communication	- Discussion about results, interpretation in class
6 teamwork	- SPSS analyses are done in groups and presented in front of the class

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!

Textbooks

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

Interactive Online Material
- http://davidmlane.com/hyperstat/
- http://www.sjsu.edu/faculty/gerstman/StatPrimer/

Student responsibilities and class behaviour

- Effort and endeavour are crucial for studying. To read and study with the help of literature has to be self-evident for a Pforzheim University graduate. You find further literature sources in the mentioned textbook.
- In the course itself I expect interest for the topic, mutual respect and confidence, fairness, punctuality, continuity, engagement and willingness to perform.
- Please be fair to others. This implies that you are punctual for class, that you do not leave earlier and that other topics not relevant for the course are dealt with in the break (e.g. telephone calls, send SMS). Your mobile phone is off.
- Please always bring the relevant course material.
- I expect that each student takes part in class and that the subject matter is being prepared and reworked. The complexity of the topic demands a continuous "keeping at it".
- It is self-evident and favoured that content relevant questions can be asked in each class. This is useful for you to see the comprehension progress and for the professor to estimate the

knowledge level of students, so that specific topics can be more emphasised or be taught slower.
- Please ask questions directly during class or in the following lecture. In case you cannot do this or do not want to do it, please contact me after class.
- It would be ideal that self-studying (preparing work and rework, emphasise according to interests and focus of study) be amended by a learning group.
- I welcome helpful suggestions and constructive criticism as well as comments that support the understanding and learning progress.

- Winter term 2020/2021: Due to COVID-19, the lecture might - totally or in parts – be held online.

My 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.

Grading/Examination

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.