



Prof. Dr. Robert Jung

Econometrics and Statistics (520K)

Prof. Dr. Aderonke Osikominu

Econometrics and Empirical Economics (520B)

Faculty of Business, Economics and Social Sciences

Course Outline Summer Term 2024

"Statistical Learning" (5200-510)

Master in International Business and Economics

Master in Economics

Schedule:

- **Lecture: Tuesday 14:15 – 15:45, PC Raum 3, starting 2.4.2024**
- **Practical class: Thursday, 16:15 – 17:45, HS 11 starting 4.4.2024**

Instructor: Marius Puke (marius.puke@uni-hohenheim.de)

Objectives:

The course presents theory and applications for important statistical learning (supervised and unsupervised) techniques such as linear and logistic regression, classification and regression trees, random forests and lasso regularization. R statistical programming will be used throughout the course.

By the end of the course, a successful student should:

- have a solid understanding of the described statistical learning methods;
- be able to correctly identify the appropriate techniques to be applied to real-world data sets;
- have a good working knowledge of R programming software in order to apply the techniques;
- demonstrate the ability to communicate the results of applying selected statistical learning methods to the data.

Practical class:

A weekly practical class accompanies the lecture. The aim of this class is to repeat concepts discussed in the lecture and demonstrate their practical application using real-world data sets and a statistical software package R. R is a free, open-source software package available from <https://www.r-project.org/>.



Grading:

The final grade will be based on **a paper and pen exam** (90 min).

The exam is a closed book, but you can bring a 'cheat sheet'; specific rules will be announced during the course.

Up to 20 points (out of 100) for the course grade can be earned through the facultative (individual) assignment and a prediction competition. Details will be announced during the course.

Prerequisites and recommendation:

A solid working knowledge of R and R-Studio is assumed for this course. We offer an online tutorial in R, which is available on Ilias upon registration for the course.

Literature:

Efron, B.; Hastie, T. (2021) Computer Age Statistical Learning. Cambridge UP. Student Edition.

The book is available for download from: <https://web.stanford.edu/~hastie/CASI/>

James, G.; Witten, D.; Hastie, T. and Tibshirani, R. (2021). An Introduction to Statistical Learning. Springer. 2nd edition.

The book is available for download from: <https://www.statlearning.com/>

Course material:

All course material is available on ILIAS.

Course content:

1. Introduction
2. Linear Models
3. Classification
4. Resampling Methods
5. Model Selection and Regularization
6. Tree Based Methods
7. Unsupervised Learning

This syllabus may be subject to change.