



UNIVERSITÄT
HOHENHEIM

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 2025

"Statistical Learning" (5200-510)

Master in International Business and Economics

Master in Economics

Schedule:

- **Lecture: Tuesday 14:15 – 15:45, PC Raum 3, starting 1.4.2025**
- **Practical class: Thursday, 16:15 – 17:45, HS 11 starting 10.4.2025**

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 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. This class aims 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 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.

A facultative prediction competition can earn up to 10 points (out of 100) toward the course grade. Details will be announced during the course.

Prerequisites and recommendation:

This course assumes a solid working knowledge of R and R-Studio. 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.