

## **Business Analytics and Machine Learning (Lecture)** **Summer Term 2025** **Dr. Bernhard Lutz**

### **Course Description:**

This course bridges the gap between data science and business applications, providing students with hands-on experience in statistical modeling, machine learning, and optimization techniques. The course consists of a weekly lecture that details the theoretical concepts and practical exercises ("bring your own device"), where students gain hands-on experience in transforming raw data into actionable knowledge.

The course follows the general data analytics pipeline, starting with an introduction into databases and SQL, followed by data preprocessing, data cleaning, as well as exploratory data analysis and data visualization. Subsequently, the course details predictive and explanatory models to extract patterns from the preprocessed data. Finally, the course outlines optimization techniques to arrive at concrete decisions.

Programming skills in Python are useful but not required. The exercises will introduce students step-by-step into programming with Jupyter notebooks.

### **Credit Points:**

The course can be taken by all students within M.Sc. VWL, M.Sc. BWL, M.Sc. Economics (all profiles, i.e., "Digital Markets", "Finance", and "Economics & Politics"), Erasmus and EUCOR programs.

The course is offered as 6 ECTS only.

### **Communication:**

All announcements and materials will be communicated via ILIAS.

### **Registration:**

Please, register for the lecture via HisInOne. The password will be announced during the first lecture. For questions about the registration, refer to [bernhard.lutz@is.uni-freiburg.de](mailto:bernhard.lutz@is.uni-freiburg.de)

### **Lecture:**

Thursdays 4:15pm – 5:45pm, Room: HS 1098, KG1  
Start: April 24, 2025

### **Exercises:**

Tuesdays 12:30 – 2pm, Room: HS 3118, KG3  
Start: April 29, 2025

## Final Exam:

The exam lasts for 90 minutes. Students are allowed to use a dictionary in book form. Checkout the official exam schedule for the exact date!

## Accompanying Literature:

The lecture is partially based on the following books. However, students do not have to purchase any of the books. All necessary information is provided on lecture slides and exercise sheets.

- *Practical Business Analytics Using R and Python: Solve Business Problems Using a Data-driven Approach*, Second Edition. U. Hodeghatta & U. Nayak, Apress, 2023.
- *Modern Business Analytics: Increasing the Value of Your Data with Python and R*, D. Larson, O'Reilly, 2025.

## Chair:

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