

Supply Chain Analytics I: Predictive Analytics

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1 Course description

Today's supply chains are complex and create a vast amount of data. Supply Chain Analytics I is about extracting valuable information from this data to identify patterns and to make accurate predictions. The course covers the core concepts of statistical or machine learning and its application using Python.

The course consists of lectures and a project. In the project, the concepts that are covered in the lectures are applied to a data set. It prepares students to identify improvement opportunities that exist in actual supply chains, to quantify possible improvements, and to control supply chain performance.

2 Administration

Faculty	Nicolas Fugger Mail: fugger@wiso.uni-koeln.de Office hours: by appointment
Teaching assistant	David Könen Mail: david.koenen@uni-koeln.de Office hours: by appointment
Secretary	Stephanie Rauscher Mail: rauscher@wiso.uni-koeln.de
Assignments	There are regular homework assignments. Students can earn bonus points by uploading complete solutions to Ilias on time. In addition, students have to work on a project assignment and upload their solution to Ilias. The project will be graded.
Grading	Project 40%, Exam 60%
Language	English
Prerequisites	Basic knowledge in statistics and Python. The necessary knowledge about Python can, e.g., be acquired in the free online course Python Basics for Data Science.

3 Session overview

3.1 Plenum

The plenum sessions will take place on Zoom. During these sessions groups will present their solutions and we will discuss the content-related book chapters. Each session will last up to 90 minutes.

3.2 Self-learning phases

During the self-learning phases, you should read and understand the chapters of the book *An Introduction to Statistical Learning*. If you want to better understand the mathematical background of some of the concepts you should also check out the book *Elements of Statistical Learning*.

There are also videos by the authors of the book. You can watch them to better understand the chapters' content. You can access the videos, e.g., by enrolling for a free course on edX or by searching for the book's title on YouTube.

3.3 Group sessions

In the group sessions you should meet in groups of up to four members. You can, e.g., meet online using Skype or any other service.

3.4 Trouble-shooting sessions

Friday, November 6th will be reserved for trouble-shooting. If you have difficulties getting Python to work properly you can make appointments with David Könen on short notice using this link: [Office hours](#)

4 Submissions

4.1 Assignments

To earn bonus points you have to upload your complete solutions 4 hours before the plenum takes place on Ilias. You can work in groups of up to four members. By uploading your solutions each member of a group agrees to present the solutions in the plenum on her or his own. If you are selected, you will only get bonus points if you present your solutions. The presentation of the solutions will not be graded. For each Assignment you can get one bonus point, for each Python Assignment you can get two bonus points.

- **Assignments:** Prepare slides with your solutions and upload them as pdf-files. You can write down your answers in note form. Templates for Latex and PowerPoint are provided at Ilias.

- **Python Assignments:** Use the Jupyter Notebooks that are provided at Ilias and add your code. Save your solution and upload it to Ilias.

4.2 Project

During the semester you will work on a project. You can find the data set and a Jupyter Notebook including a detailed description of your task at Ilias. You can work on the project in groups of up to four members. Save your solution and upload it to Ilias.

5 Resources

5.1 Concepts

5.1.1 Core

- James, G., Witten, D., Hastie, T., & Tibshirani, R. (2017). *An Introduction to Statistical Learning*. New York: Springer

5.1.2 Additional

- Online lectures based on the book on edX
- Hastie, T., Tibshirani, R., & Friedman, J. (2009). *The Elements of Statistical Learning*. New York: Springer

5.2 Programming

- We recommend to download and install Anaconda for running Python.
- We provide notebooks for the Python assignments and the project. You can find out more about it at Jupyter.
- You can find additional information about the Python libraries used in this course at: pandas, statsmodels, NumPy, scikit-learn, graphviz, seaborn, matplotlib