

Supply Chain Analytics I: Predictive Analytics

Updated on May 13, 2022

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 and inferences. The course covers 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

Class times	Monday, 14:00-15:30 (Hörsaal XVIII) Monday, 16:00-17:30 (Hörsaal XVIII) Wednesday, 14:00-15:30 (Hörsaal XVIII)
Faculty	Nicolas Fugger Mail: fugger@wiso.uni-koeln.de Office hours: by appointment
Teaching assistant	Jeffrey Starck Mail: jeffrey.starck@uni-koeln.de Office hours: by appointment
Student assistant	tba
Secretary	Stephanie Rauscher Mail: rauscher@wiso.uni-koeln.de
Assignments	There are 5 homework assignments covering the theoretical concepts. Students can earn one bonus point per assignment by uploading complete solutions to Ilias on time.
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.
Project	tba
Exam	tba

3 Session overview

3.1 Self-learning phases

During the self-learning phases, you should read and understand the chapters of the book *An Introduction to Statistical Learning*. You will apply this knowledge in the Assignments. Figure tba tells you when to read which chapters.

3.2 Concepts plenum

The concepts plenum sessions will take place on Mondays. In these sessions, we will discuss the concepts you read during the self-learning phases and will answer your questions. Furthermore, students will present their uploaded solutions to the assignments.

Note: For a better learning experience, we will split the course from week

2 onward. The assignment to one of the two groups will be made in the first week.

3.3 Python plenum

The plenum sessions will take place on Wednesdays. In these sessions, we will solve Python exercises. These sessions implement the concepts cover in the concepts plenum and enable you to work on the project.

3.4 Group sessions

We recommend to prepare your assignments and your project in groups of up to four members.

3.5 Python office hour

If you have difficulties getting Python to work properly you can make appointments with Jeff on short notice using this link: [tba](#). During the semester, you can post your questions in the discussion forum on Ilias or make an appointment with Jeff or [tba](#).

4 Submissions

4.1 Assignments

To earn bonus points you have to upload your complete solutions to Ilias on time. Assignments on the theoretical concepts are due Fridays at 18:00. By uploading your solutions you agree to present the solutions in the plenum. If you are (randomly) 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. You can prepare your solutions in groups of up to 4 members but each student has to upload her/his own solutions individually. Prepare slides with your solutions and upload them as a pdf-file. You can write down your answers in note form. Templates for Latex and PowerPoint are provided at 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 and hand in the project in groups of up to four members. Save your solution and upload it to Ilias.

Note: Most of the tools and commands needed to complete the project will be discussed in the Python plenum. However, programming always implies browsing documentations and searching via Google.

5 Resources

5.1 Concepts

5.1.1 Core

- James, G., Witten, D., Hastie, T., & Tibshirani, R. (2021). An Introduction to Statistical Learning. New York: Springer

5.1.2 Additional

- In addition to reading the book you can watch: Online lectures based on the first edition of the book on edX
- If you want to check your understanding of the book and practice, you can find sample questions with solutions here: JakobGM
- If you are interested in the mathematical background of the concepts, chekc out: 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