



# Supply Chain Analytics II: Prescriptive Analytics

For information on how to access the online sessions and further course material, see ILIAS.

## Course Description

Increasing complexity of global supply chains on the one hand and increasing availability of data and processing power on the other hand lead to growing opportunities in the field of data analytics. Supply Chain Analytics II focuses on forward looking issues, that may be clustered in two parts: The first part tackles uncertainty in supply chain processes, and how to evaluate them by means of Monte Carlo Analysis. The second part looks at how to derive recommendations using optimization methods.

The course consists of recorded video lectures, case discussions, 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.

## Course Administration

**Class times** Monday, 14.00-15.30 Hauptgebäude Hörsaal XVIII  
Monday, 16.00-17.30 Hauptgebäude Hörsaal XVIII  
Wednesday, 14:00-15:30 Hauptgebäude Hörsaal XVIII

**Faculty** Andreas Fügener  
E-mail: andreas.fuegener@uni-koeln.de  
Office hours: by appointment

**Secretary** Stephanie Rauscher  
E-mail: Rauscher@wiso.uni-koeln.de

**Teaching assistant** Laura Maria Poreschack  
E-mail: laura.poreschack@uni-koeln.de  
Office hours: by appointment

**Assignments** There are regular homework assignments. Students can earn bonus points by uploading complete solutions to Ilias on time and by presenting them in class. 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%  
Additionally, there will be bonus points.

**Exam** TBD

**Project Deadline** 10<sup>th</sup> February 2025



<b>Language</b>	The lectures and discussion sessions are taught in English.
<b>Prerequisites</b>	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. Successful participation in Supply Chain Analytics I: Predictive Analytics is strongly recommended.

## Course Overview

1. Plenum  
The plenum sessions will take place on Mondays. During these sessions, students will present their solutions and we will discuss them. Each session will last up to 90 minutes.
2. Self-learning phases  
During the self-learning phases, you should read and understand the material in Ilias (videos, slides, practice questions). If you want to better understand the mathematical background of some of the concepts we refer to literature in the lectures. Students prepare the project in a group. We further encourage students to discuss the case studies with each other. The students are responsible for their time management.

## Submissions

1. Assignments  
To earn bonus points you have to upload your complete solutions before the plenum takes place on Ilias. By uploading your solutions you agree to presenting your solutions in the plenum. You can only receive the bonus point if you actively take part in the plenum session. For each submission you can get one bonus point. Please use the Jupyter Notebooks that are provided in Ilias and add your code.
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 in Ilias. You should work on the project in groups of up to four members.



## Course Agenda

For details see the course calendar below.

	Monday	Tuesday	Wednesday	Thursday	Friday
December	25	26	27	28	29
	Plenum: Welcome  Self-learning: Understanding Uncertainty		Tutorial (Python)		
	02	03	04	05	06
	Plenum: Understanding Uncertainty  Self-learning: Monte-Carlo Simulation		Tutorial (Python)		
	09	10	11	12	13
	Plenum: Monte Carlo Simulation  Self-learning: Linear Optimisation		Tutorial (Gurobi)		
	16	17	18	19	20
	Plenum: Linear Optimisation  Self-learning: Mixed Integer Optimisation		Tutorial (Modelling)		
	23	24	25	26	27
	<i>Christmas Vacation</i>		<i>Christmas Vacation</i>		
January	30	31	01	02	03
	<i>Christmas Vacation</i>		<i>Christmas Vacation</i>		
	06	07	08	09	11
	<i>Christmas Vacation</i>		Tutorial (Modelling)		
	13	14	15	16	17
Plenum: Mixed Integer Optimisation  Self-learning: Logical Operators in Modelling		Gastvorlesung TBD			



	20	21	22	23	24
	Plenum: Logical Operators in Modelling  Self-learning: Stochastic Optimisation		Project Q & A		
	27	28	29	30	31
	Plenum: Stochastic Optimisation		Summary		

PRELIMINARY