

# Prescriptive Analytics for Production Systems

Prescriptive Business Analytics helps to optimize design and control decisions such as order releases and the control of the material flow within modern production systems. The complex interdependencies and inherent randomness within the production system make decision-making a challenge. This course introduces modeling concepts and prescriptive analytics tools based on Machine Learning and Operations Research to cope with stochastic variability and uncertainty. The course provides an overview of techniques for data-driven design and control of intelligent production systems, including:

- Robust Optimization,
- Stochastic Dynamic Programming, and
- Reinforcement Learning.

All exercise classes will be given in a computer lab, where students will implement the methods in case studies in the context of Industry 4.0 and use them to support decision-making in production systems.

## Learning Goals

- Students know the basic principles of different prescriptive analytics approaches.
- Students learn to select suitable approaches and use them to derive decisions from realistic data sets.

## Prerequisites:

Basic knowledge in programming with Python, e.g. obtained in Predictive Analytics for Production Systems

## Dates and Times:

This course will be taught in the summer term 2025 at the following times:

**Lecture:** Monday 16:00 (c.t.) - 18:00, Room H14

**Exercise:** Tuesday 12:00 (c.t.) - 14:00, Room CIP-Pool (RWL U01 rechts) **OR**  
Thursday 10:00 (c.t.) - 12:00, Room CIP-Pool (RWL U01 rechts)

## General Information\*



Lecturer	Prof. Dr. Justus Arne Schwarz
Course Format	Lecture and exercise in the lab
Credit Points	6 ECTS
Language	English
Exam	Group assignments and final written exam (45 min)
Applicability	SPMG Industrial Management, SPMG Business Analytics and Operations Management, Electives Module
Term	Summer Term
Registration	Via SPUR by April 30 <sup>th</sup> , 2025