ADVANCED OPERATIONS MANAGEMENT ELECTIVE PACKAGE

ADVANCED OPERATIONS MANAGEMENT	
Offered by	Department of Industrial Engineering and Innovation Sciences
Language	English
Primarily interesting for	All students, but most relevant with Major Industrial Engineering
Prerequisites	-
Contact person	Dr.ir. R.J.I. Basten (r.j.i.basten@tue.nl)

Content and composition

In this package, you will learn how to model and analyze various business operations and processes, and how to solve the resulting decision problems. It is recommended (but not obligatory) to follow the courses in this package when you plan to enter the Master Operations Management & Logistics. When you consider entering this Master, this package will give you a good idea of the kind of courses you will encounter in that Master. One of the courses is designed to develop your skills in the field of quantitative modeling and analysis: Quantitative modeling & analysis of business processes. The other two are focused on important applications domains: Transportation & distribution and Maintenance and service logistics. It is possible to take Transportation & distribution already in the first year.

Course code	Course name	Level	Additional information
1CK00	Transportation & distribution	Introductory	Q4, moves to Q1 by 2024-2025
1CK20	Quantitative modeling & analysis of business processes	Advanced	Q4
1CK60	Maintenance and service logistics	Advanced	Q3, moves to Q2 by 2025-2026

Course description

Transportation & distribution (1CK00)

This exciting course introduces the student to the world of transport and distribution. We start with discussing the key transport and distribution functions within companies. The important transport activities are reviewed in detail. Special attention is given to the planning and control of the transportation function in the supply chain. Topics include multi-modal transport, vehicle routing, traveling salesman and city logistics. Next to studying basic concepts in logistics, planning and scheduling, a significant part of the course is devoted to the design and implementation (programming) of mathematical models (Integer Linear Programming) for basic transportation problems.

Quantitative modeling & analysis of business processes (1CK20)

In the basic courses students have followed thus far, stylized cases that are relatively far from reality have been used. It was almost always clear in advance which type of model or statistical method had to be applied. In this course, we analyze more realistic business processes using mathematical models and statistical techniques. In order to do so, students need to learn how to extract information from an ample amount of data. Students have to decide themselves and justify which model or method they need from these basic courses to come to a well-founded statement about a company's performance or a group of companies. Students will experience that theory can hardly be applied directly but can function as a good starting point for analyzing processing within and between companies. Having such experience is essential for an industrial engineer to function well.

Maintenance and service logistics (1CK60)

At many companies, processes depend on the availability of certain technical systems. Think of medical equipment, airplanes, and production lines. How does one keep such systems up and running? And how does one do that in an efficient way? One does this via smart maintenance concepts, leading to a reduced number of failures, and via a smart approach to quickly solve the remaining failures. It is further important to ensure that the right spare parts are available to perform the maintenance. We introduce mathematical models for these problems and the tools to analyze and optimize the models.