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## 2SC7510 – Managing and optimising industrial flows

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**Instructors:** Guillaume LAMÉ

**Department:** DÉPARTEMENT GÉNIE INDUSTRIEL ET OPÉRATIONS

**Language of instruction:** FRANCAIS

**Campus:** CAMPUS DE PARIS - SACLAY

**Workload (HEE):** 60

**On-site hours (HPE):** 34,50

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### Description

Production flows in factories, patient flows in hospitals, customer flows in supermarkets: understanding and managing flows is an issue in all industrial activities. Beyond specific issues, flow management is an overarching approach that can be adapted in many industrial situations.

Understanding and controlling flows is a major component of industrial performance. This module provides an introduction to industrial flow management. The use of discrete event simulation to tackle these issues is presented.

### Quarter number

ST7

### Prerequisites (in terms of CS courses)

none

### Syllabus

Principles of discrete-event simulation of systems of industrial flows.

Use of Simul8 for discrete-event simulation.

Optimisation of flow systems.

Use of OptQuest coupled to Simul8 for simulation-optimisation.

Perspectives on the industrial implementation of these techniques.

Industrial case studies.

### Class components (lecture, labs, etc.)

The module will comprise lectures, either presential or as videos and reading assignments to prepare individually, and study cases and exercises.

### Grading

90 minutes written exam.

Assignment.

The overall mark will be 50% for the final exam and 50% for the assignment.



### **Course support, bibliography**

Exercises and study cases, lecture notes, videos.

Textbook for this course: Robinson S. Simulation the practice of model development and use. 2nd ed. London: Palgrave Macmillan 2014.

### **Resources**

Discrete-event simulation software Simul8, and the extension OptQuest for simulation-optimisation.

*Simul8 only exists for Windows. Students using Mac OS will need to install a virtual machine, which may slow down the simulation software and compromise its general usability.*

Lectures, videos, exercises and industrial study-cases.

### **Learning outcomes covered on the course**

After this module, students will be able to use simulation and optimisation approaches to understand and improve the performance of a flow system.

This course will address the following competencies:

- C1 Analysing, designing and realising complex systems with scientific, technological, human and economic components
  - C1.2 Using and developing relevant models, choosing the right modelling scale and simplifying hypotheses to address the problem
  - C1.3 Resolving the problem through approximating, simulating and experimenting
- C2 Developing specific knowledge of a scientific or industrial domain et a professional domain
  - C2.1 Exploring a scientific or engineering domain or discipline
- C3 Acting, innovating in a scientific and technological environment
  - C3.6 Evaluating the effectiveness, feasibility and robustness of proposed solutions

### **Description of the skills acquired at the end of the course**

Use of discrete-event simulation for modelling industrial systems, and implementation on Simul8.