Module Description, available in: EN

Quantitative Methods in Industrial Operations Management

General Information

Number of ECTS Credits

3

Module code

TSM_QInOpMgmt

Valid for academic year

2026-27

Last modification

2018-11-06

Coordinator of the module

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Explanations regarding the language definitions for each location:

- Instruction is given in the language specified for each location and module execution.
- Documentation is available in the language(s) listed for each location and module execution. If the documentation is in multiple languages, the percentage distributed is indicated (100% = all documentation provided).
- The examination, including both questions and answers, is provided entirely (100%) in the language(s) specified for each location and module execution. The exams are on-site.

	Lausanne			Lugano	Zurich		
Instruction					**X** E 100%		
Documentation					**X** E 100%		
Examination					**X** E 100%		

Module Category

TSM Technical scientific module

Lessons

2 lecture periods and 1 tutorial period per week

Entry level competences

Prerequisites, previous knowledge

Linear Algebra:

- Solving systems of linear equations with Gaussian elimination
- Vector and matrix calculus

Analysis:

- Differential calculus of one variable

Statistics:

- Fundamentals of probability theory
- discrete and continuous density functions

Brief course description of module objectives and content

Operations management is concerned with the design, operation and optimization of the value-adding areas of a company. At the strategic level it includes in particular the design of infrastructure and resources, the dimensioning of capacity and the definition of business processes. At an operational level, it includes ongoing planning and control of operational activities. The aim is to achieve high business performance through clever organization and efficient use of resources.
In a first part an overview of the classical themes of Operations Management is given. In a second part selected methods of quantitative Operations Management (see Operations Research) are applied to tasks of important areas (see. contents below) of Operations Management. These tasks will be analyzed and optimized with the help of mathematical models.

Aims, content, methods

Learning objectives and competencies to be acquired

- The students have an overview of the various areas of Operations Management.
- The students can classify operational issues in the tasks of the Operations Management (i.e. design or operations).
- The students know selected quantitative methods and models of Operations Management.
- The students can make use of the learned methods and are aware of the assumptions and restrictions of these.
- The students can formulate practical questions from Operations Management as mathematical models.

Module content with weighting of different components

Part 1 (2 weeks):

- Overview of the areas of Operations Management (design and operations)
- Focus on operations
  - Overview production planning and control
  - Aggregate planning: Sales & operations planning and master production scheduling

Part 2: From the areas below selected methods of quantitative Operations Management are taught.

- Capacity planning and lead times (1 week)
- MRP concepts, mathematical foundation of MRP planning calculations (2 weeks)
- Lotsizing and inventory control (3-4 weeks)
- Scheduling (5-6 Wochen)

Teaching and learning methods

Lecture with exercises

Literature

Will be announced at the beginning of the semester

Assessment

Additional performance assessment during the semester

The module does not contain an additional performance assessment during the semester

Basic principle for exams

As a rule, all standard final exams are conducted in written form. For resit exams, lecturers will communicate the exam format (written/oral) together with the exam schedule.

Standard final exam for a module and written resit exam

Kind of exam

Written exam

Duration of exam

120 minutes

Permissible aids

Aids permitted as specified below:

Permissible electronic aids

A hand calculator is permitted. No laptop!

Other permissible aids

All the material of the course is permitted. Open book exam.

Exception: In case of an electronic Moodle exam, adjustments to the permissible aids may occur. Lecturers will announce the final permissible aids prior to the exam session.

Special case: Resit exam as oral exam

Kind of exam

Oral exam

Duration of exam

30 minutes

Permissible aids

Aids permitted as specified below:

Permissible electronic aids

A hand calculator is permitted. No laptop!

Other permissible aids

All the material of the course is permitted. Open book exam.