Module Description

Quantitative Methods in Industrial Operations Management

General Information

Number of ECTS Credits

3

Abbreviation

TSM_QInOpMgmt

Version

2.12.2016

Responsible of module

Stephan Bütikofer, ZHAW

Language

	Bern	Lausanne	Zurich
Instruction	☐ D ☐ E ☐ F	☐ E ☐ F	☐ D ☒ E
Documentation	☐ D ☐ E ☐ F	☐ E ☐ F	☐ D ☒ E
Examination	☐ D ☐ E ☐ F	☐ E ☐ F	☐ D ☒ E

Module category

☐ Fundamental theoretical principles
☒ Technical/scientific specialization module
☐ Context module

Lessons

☒ 2 lecture periods and 1 tutorial period per week

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 acquired competencies

- 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.

Contents of module with emphasis on teaching content

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

Prerequisites, previous knowledge, entrance competencies

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

Literature

Will be announced at the beginning of the semester

Assessment

Certification requirements for final examinations (conditions for attestation)

None

Written module examination

Duration of exam :	120 minutes
Permissible aids:	All the material of the course is permitted. Open book exam