**Module Description, available in: EN**

# *Factory Planning*

## General Information

**Number of ECTS Credits**

3

**Module code**

TSM_FactPlan

**Valid for academic year**

2024-25

**Last modification**

2019-10-11

**Coordinator of the module**

Luca Canetta (SUPSI, luca.canetta@supsi.ch)

**Explanations regarding the language definitions for each location:**

- Instruction is given in the language defined below for each location/each time the module is held.
- Documentation is available in the languages defined below. Where documents are in several languages, the percentage distribution is shown (100% = all the documentation).
- The examination is available 100% in the languages shown for each location/each time it is held.

| | 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**

No specific previous knowledge is required, considering that for each topic a short introduction is proposed before moving to the concept application.

## Brief course description of module objectives and content

The course will describe Production Systems Configuration and Management as well as the drivers influencing the choice of a given layout and the rules adopted for managing it. Various typical layouts will be described also highlighting their benefits and pitfalls, while eliciting the characteristics of the manufacturing environments justifying their choice. Well known Production Planning & Control (PPC) methods will be presented and applied. Basis on market demand forecasting will be provided.

## Aims, content, methods

### Learning objectives and acquired competencies

Being able to understand:

- The basics of product layouts and process layouts
- Push production systems
- Inventory management methods
- Simple forecasting methods

Being able to:

- Solve simple line-balancing problems
- Dimension simple cellular layout
- Select the suitable PPC method and dimension it
- Create forecast and evaluate their quality

### Contents of module with emphasis on teaching content

Introduction to Factory Planning

- Production models and production systems
- The influence of product structure and Customer delivery lead time
- Classification: MTS, ATO, MTO, ETO
- Levers of action for production system configuration
- Product-Process matrix
- Performance Indexes (KPI)
- Job Shop
- Production Line Balancing
- Group technology and manufacturing cells

PUSH Production Planning and Control

- Sales and Operations Planning (S&OP)
- Master Production Schedule (MPS)
- Material Requirement Planning (MRP)
- Capacity Planning (Rough Cut Capacity Planning; Capacity Requirement Planning)
- Dispatching rule

Inventory Management and Forecasting

- Inventory Management costs and Economic Order Quantity (EOQ)
- Power-of-Two method, EOQ Price discount, Production Economic Order Quantity
- Inventory Management Methods; Replenishment, Periodic Order Quantity (POQ)
- Safety Stock
- Forecasting methods (time series analysis)

### Teaching and learning methods

Frontal theoretical lessons integrated with interactive exercises

### Literature

The material distributed by the lecturer is enough, reference books can be suggested if the students want to deepen the knowledge of specific subjects, for instance:

- Factory Physics, Wallace J. Hopp and Mark L. Spearman, Waveland Pr Inc; 3 edition (August 31, 2011)
- Manufacturing Planning and Control for Supply Chain Management: The CPIN Reference, F. Robert Jacobs, William Berry, D. Clay Whybark, Thomas Vollmann, McGraw-Hill Professional; 2nd edition (July 23, 2018)
- Forecasting: Methods and Applications, Spyros G. Makridakis, Steven C. Wheelwright, Rob J Hyndman, Wiley; 3 edition (December 1997)

## Assessment

### Certification requirements

Module does not use certification requirements

### Basic principle for exams

**As a rule, all the standard final exams for modules and also all resit exams are to be in written form**

### Standard final exam for a module and written resit exam

#### Kind of exam

written

#### Duration of exam

120 minutes

#### Permissible aids

*Aids permitted as specified below:*

**Permissible electronic aids**

No electronic aids permitted

**Other permissible aids**

A4 recto/verso with hand written formulas, no numeric example allowed

**Special case: Resit exam as oral exam**

**Kind of exam**

oral

**Duration of exam**

30 minutes

**Permissible aids**

*Aids permitted as specified below:*

**Permissible electronic aids**

No electronic aids permitted

**Other permissible aids**

As for the written exam: A4 recto/verso with hand written formulas, no numeric example allowed