Module Description, available in: EN

Product Innovation and Product Lifecycle Management

General Information

Number of ECTS Credits

3

Module code

TSM_Product

Valid for academic year

2025-26

Last modification

2021-01-03

Coordinator of the module

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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

To attend this module, students must have a Bachelor's degree in Engineering (mechanical, electrical, industrial, ...)

Students should have the following experience:

- know the purpose and content of project specifications and requirements with respect to user needs,
- know the evaluation methods (value benefit analysis, SWOT analysis, etc.)
- know the basic steps of a product development process (in the consumption and/or investment goods sectors)
- have experience in the application of CAD system (mechanical or electrical)
- have worked in a team on at least one small development project

Brief course description of module objectives and content

Students become acquainted with the product innovation process and its strategic importance for enterprises. The will learn different processes, methods and tools to develop new products and further optimize them along its full lifecycle. A special focus is on the development of complex systems, an interdisciplinary environment. Current approaches and new tools are discussed in addition to established processes such as Systems-Engineering or VDI2206. To further explain the impact of product development outcome on an enterprise level, course will focus on the information flow across an industrial enterprise. Both, the process level (engineering, sales, manufacturing, purchasing, service) as well as the data level (CAX, PLM, ERP, IoT)

The module will be accompanied by a product development project, where students apply the theory "hands-on" on a realistic example throughout the semester

Aims, content, methods

Learning objectives and competencies to be acquired

Students

- know the importance of innovation for enterprises,
- understand the integration of technological product innovation and product development in business processes within enterprises,
- possess an in-depth knowledge of the product innovation process (processes, methods, and tools),
- can correctly apply methods and tools in the innovation process according to the situation,
- know the importance of PLM in enterprises,
- possess an in-depth knowledge of the product conception process,
- possess an in-depth knowledge concerning product structure and product variants (serial and plant production) and can apply these in concrete examples,
- know the relationship between the most important data generation systems and management systems of technological product data,
- know the impact of design decisions and design data for all subsequent processes in an enterprise

Module content with weighting of different components

The module comprises the two main subject areas: “Development methods and product innovation” and “Product lifecycle management”.

- Product innovation process
- Classical methods such as VDI 2221, 2222, 2206
- Systems Engineering (cross disciplinary approaches)
- Creativity methods
- Alternative product development processes
- Tools for product development and lifeycle management (CAx, PLM, ERP, IoT)
- Product lifecycle management
- Product structure management: Variant management, product configuration, material master data, product description data
- Release processes and change management

Teaching and learning methods

- Theoretical instructions in classroom
- Theoretical instructions based on guided self-teaching
- Project-oriented work in the form of group work in present and as self-study hours (students will be assisted through)
- Presentation and discussion in peer and expert groups

Literature

Development methods and product innovation

- **German**: Pahl, G.; Beitz, W.; Feldhusen, J.; Grote, K.-H.: „Pahl/Beitz. Konstruktionslehre. Grundlagen erfolgreicher Produktentwicklung. Methoden und Anwendung“. Berlin: Springer-Verlag. 2007. – ISBN-10 3-540-34060-2, ISBN-13 978-3-540-34060-7
- **French**: Tassinari Robert, Pratique de l’analyse fonctionnelle, L’Usine Nouvelle, France, 2003, ISBN : 2-10-005338-8
- **English**: Pahl, G., Beitz, W., Feldhusen, J., Grote, K.-H.: Engineering Design, A Systematic Approach, 3rd ed., 2007, XXI, 617 p., Hardcover, ISBN 978-1-84628-318-5
- **English**: Ulrich, T. U., Eppinger, S.D., Product Design and Development, 3rd ed., 366p, Hardcover, ISBN 007-123273-7

Product Lifecycle Management

- **German**: Eigner Martin / Stelzer Ralph: Produktdatenmanagement-Systeme, Springer, ISBN-10: 3-540-66870-5
- **French**: Debaecker Denis: PLM : La gestion collaborative du cycle de vie des produits, Hermes, France, 2004, ISBN : 2-7462-0884-9
- **English**: Stark John, Product Lifecycle Management : 21st century paradigm for product realisation, Springer, London, 2005
- **English**: Saaksvuori Antti / Immonen Anselmie, Product Lifecycle Management, Springer, ISBN-10: 3-540-25731-4

Assessment

Additional performance assessment during the semester

The module contains additional performance assessment(s) during the semester. The achieved mark of the additional performance assessment(s) applies to both the regular and the resit exam.

Description of additional performance assessment during the semester

1/3 Project work

2/3 Written exam

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

Open Book,
Devices must be in offline mode.

Other permissible aids

Any auxiliary materials or other documents required for the examination will be provided only by the lecturers.
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

Open Book,
Devices must be in offline mode.

Other permissible aids

Any auxiliary materials or other documents required for the examination will be provided only by the lecturers.