

Design Methodology

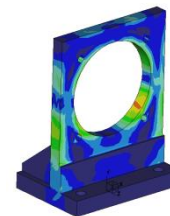
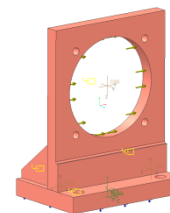
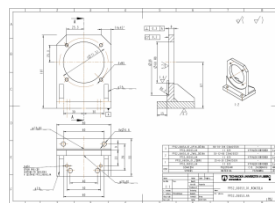
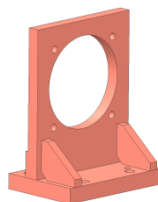
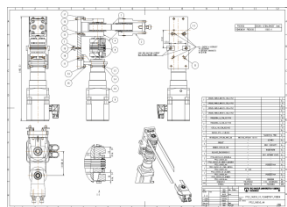
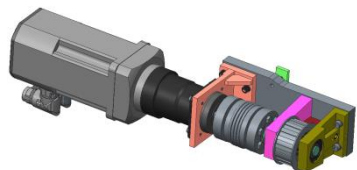
List of lectures

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Semestral project

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Department of textile and single-purpose machines



1. Introduction lecture

The introduction lecture aims to introduce students to the course „Design Methodology" and basic definitions and concepts in the design methodology.



- Tasks in developing a new product.
- Effects on New Product Development Methodologies.
- Sources of information.

2. Methods of creative work

Description of methods of creative work in the development of a new product (TRIZ method, brainstorming). Methods to improve creative attributes. Work methods increasing the creative individual performance.



3. Evaluation of variation solution and selection the best solution

- Multi-criteria decision making
- Basic terms
- Methods of weighting criteria
 - Order method.
 - Fuller's method.
 - Scoring method.
 - Method of quantitative pair comparison „Saat's method“.
 - Progressive weighting method.
- Methods of determining the order of variants
 - Conjunctive and disjunctive method.
 - PRIAM method.
 - Method of variant order.
 - Scoring method.
 - The weighted sum method.



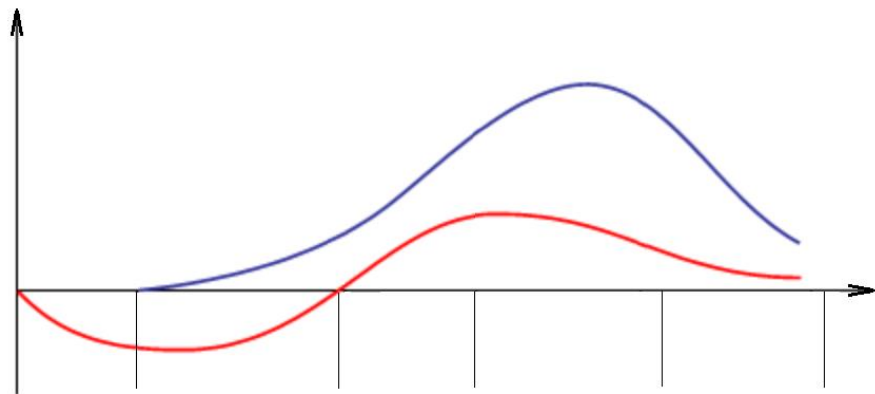
4. Product lifecycle

Produkt Lifecycle Management

Life cycle of the product in the enterprise from the development phase to the decline phase.

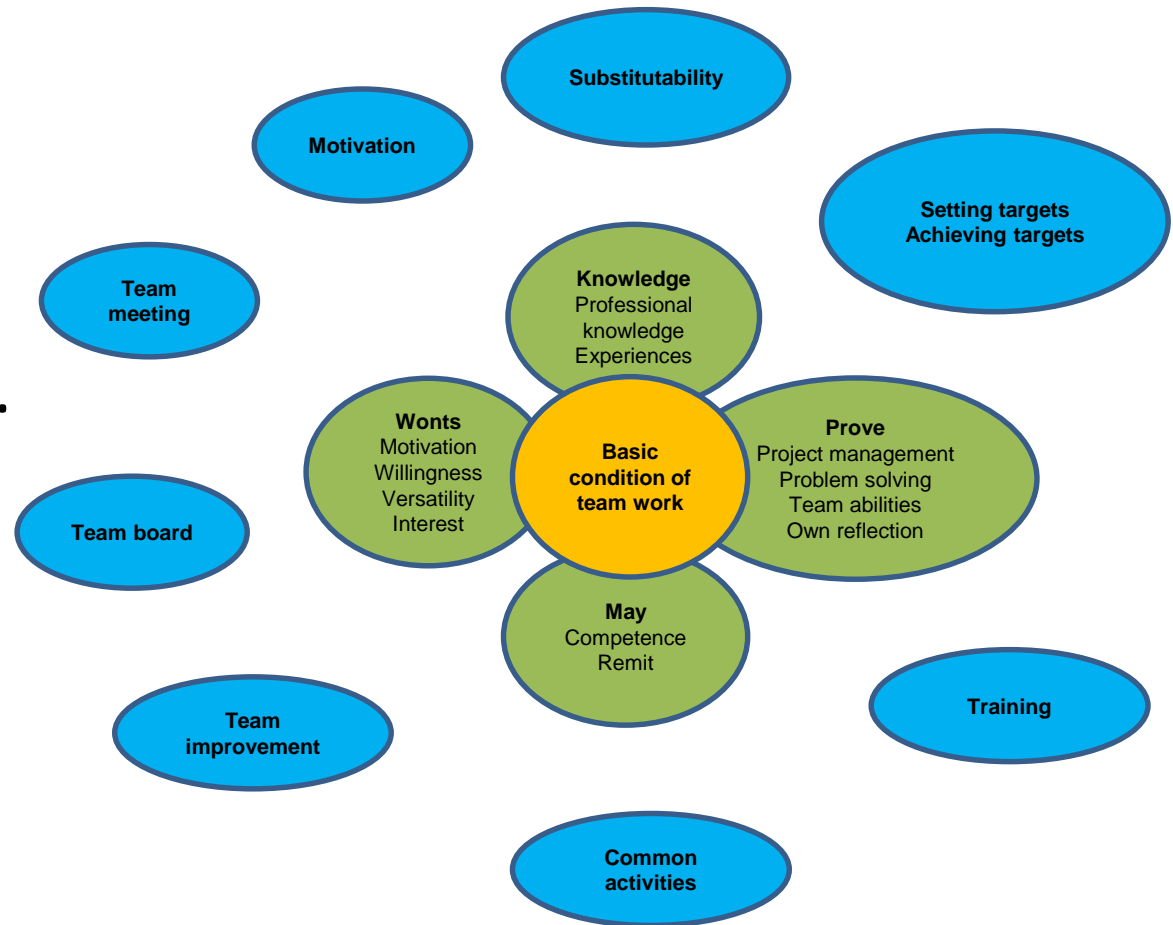


- Development phase.
- Product introduction phase.
- Growth phase.
- Phase of ripeness.
- Decline phase.



5. Team work

- Implementing teamwork.
- Team definition.
- Creating a team.
- Team awards.



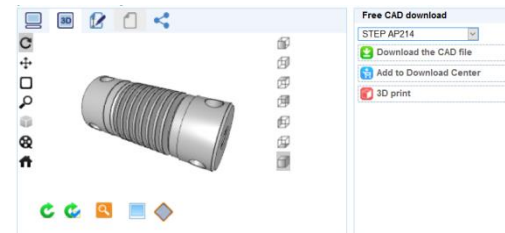
6. Technological design and technical preparation of production

Technological design takes the form of a design that meets the requirements of its function and the requirements for its production.



7. Standardized building elements of machines

Introducing students to the possibilities of using standardized and norm parts. Search, copy and use parts in 2D and 3D documentation.





8. Drives

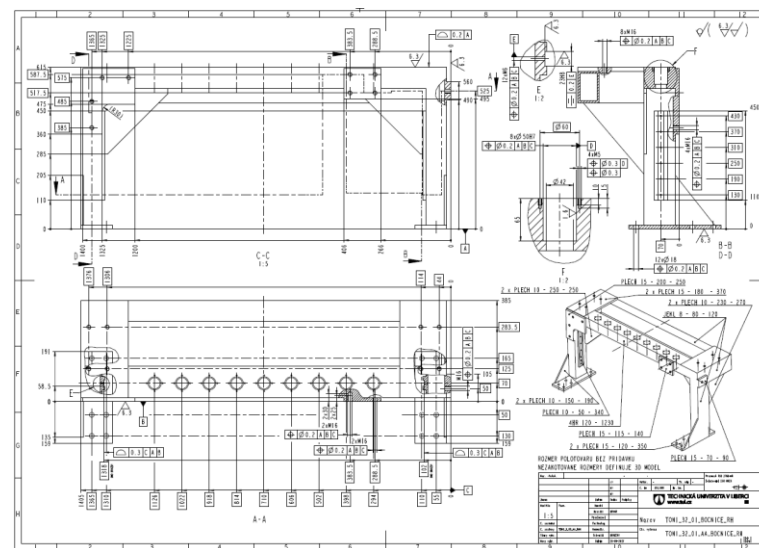
Sorting and rules for the use of drives

- Electric.
- Pneumatic.
- Hydraulic.
- Internal combustion engine.



9. Basic rules for creating drawing documentation

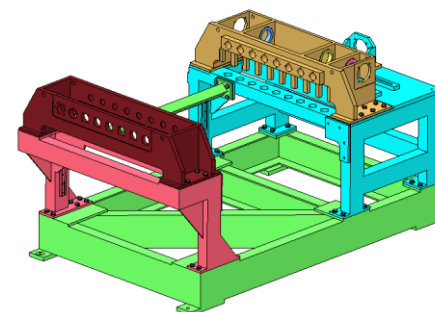
- Purity of CAD data.
- Numbering of CAD data.
- Drawing area.
- Changes in drawing documentation.
- Non drawing documentation.



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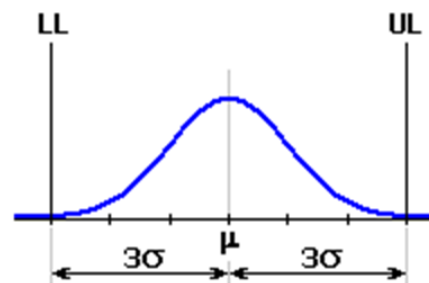
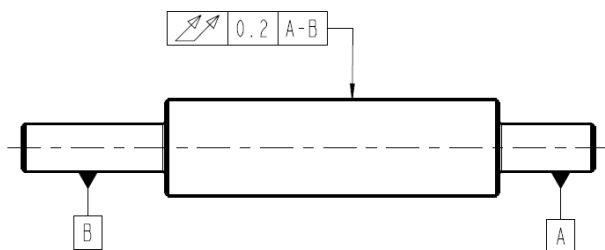
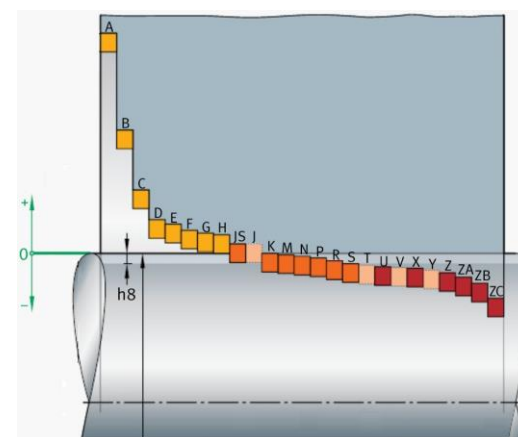
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11. Determination of tolerances

- Tolerance of dimensions.
- Geometrical and positional tolerances.
- Tolerance analysis.



12. Industrial legal protection

Familiarization with the issues of industrial legal protection (patent, industrial design, trademark).



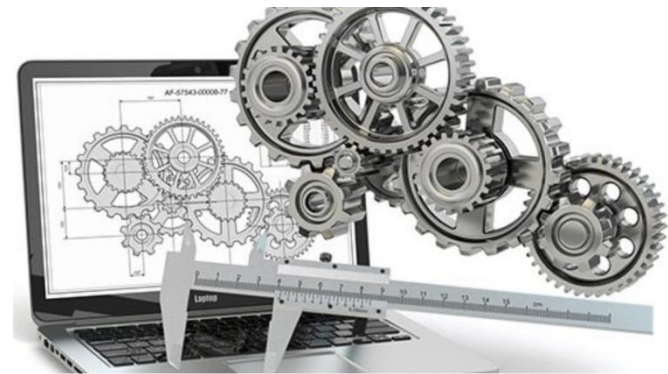
Úřad průmyslového vlastnictví

<https://www.epo.org/index.html>

13. Systems for support activities for the CAD engineer

The aim of this lecture is to familiarize students with other software tools for **CAD** designer work.

- PDM/PML
- FMEA
- ECR

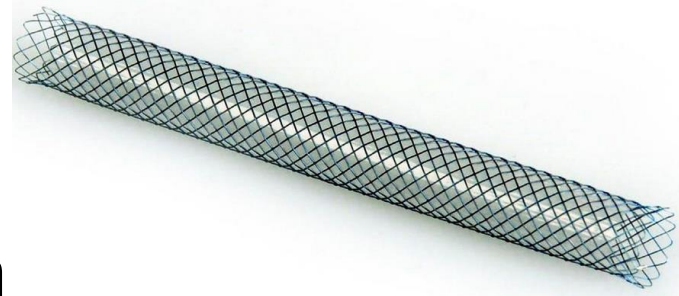


<https://www.cad.cz/pdmlm/86-pdmlm/4632-bezvykresova-dokumentace-nastupujici-realita.html>

14. Modern materials

Use of modern materials in engineering.

- Polymeric materials.
- Nanomaterials.
- „HIGH-TECH“ Materials
- Smart materials.



15. Safety of machinery

- DIRECTIVE 98/37/EC OF THE EUROPEAN PARLIAMENT: of 22 June 1998.
- DIRECTIVE 2009/104/EC OF THE EUROPEAN PARLIAMENT: of 16 September 2009.
- Identify of danger.
- Risk reduction.
- Safe construction.



Term project

The aim of the project is to find a technical solution to the problem. This solution will include the design of several variants, the evaluation and selection of the optimal variant, the design of the optimal variant and its presentation.

Useful links, used and recommended literature

- **Conceptual Design**, *Myrup Andreasen, Mogens, Thorp Hansen, Claus, Cash, Philip, 2015, Springer.*
- **Product Lifecycle Management**, *John Stark, 2015, Springer.*
- **Engineering Design**, *G. Pahl, W. Beitz, J Feldhusen, K. H. Grote, Springer (2007)*
- Each lecture contains references to resources relevant to the topic

