



SUBJECT DATASHEET

Semester:	2010/11/2
Subject:	Product design
Code:	VEMKTEV246T
Responsible department:	Department of Hydrocarbon and Coal Processing
Responsible department code:	MKOL
Responsible lecturer:	Dr. Jenő Hancsók

Educational objectives:

The objective is to review the aspects of the modern chemical product design and acquire the method of practical realization

Detailed content of the subject:

1. Place and role of product design in the chemistry and in the training of chemical engineers (definition, necessity and importance of chemical product design)
2. Process of the product design (demands, possibilities, selection, production, quality control etc.)
3. Demands (measure of consumer demands and definition of those), characteristic properties, given and evaluation of concrete data, (milestone I.)
4. Possibilities (initial conception, from idea to product; the source of ideas: literature including patents, conception of developers and user, external experts)
5. Possibilities to solve problems, exploration of chemistry of idea and extraction possibilities (from natural material); accidental structural recognition, combinatory chemistry)
6. Classification and pre-qualification of idea; aspects of pre-selection: scientific grounding, engineering approach, lowest risk; selection of best solutions: low cost, safety, harmful environmental effect as low as possible (milestone II.)
7. Selection, necessity of selection matrix
8. Objective factors of selection: thermodynamic, kinetic (reaction rate, mass and heat transport) properties etc.; less objective factors (new or upgraded product); subjective factors (effect of product on sense-organs of customer: noise, humidity, feeling of cold)
9. Risks at product selection; multitude of risk (recognition and categorization, estimation with engineering approach); comparison of risks of possible products; risk management (risk decrease at product development, considering and handling of risk; (milestone III.)
10. Product production (intellectual property: patents, step of patenting process, commercial privacy)
11. Acquisition of supplementary information (reaction route, etc.); final properties (structure of product: chemical composition, measures, chemical reactions, thermodynamic properties of product); most important product characteristics: structure: solidity, flexibility, equilibrium states: changing temperature, pH, rate of key processes, heat transfer, flow properties, diffusion; chemical and physical effects
12. Special products, like micro-structured products (thermodynamics, colloid stability, rheology and mixing, reaction kinetics).
13. Chemical processes, manufacturing equipments
14. Economical considerations (mass products, special products), economy of process (economic potential, investment requirements), economy of products, cash-flow, market share (milestone IV.)

Detailed content of the laboratory practise



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Detailed content of the subject:

Requirements:

Preparation of design project at deadline and successful presentation in the semester about design project. Exam paper has to be at least 50%, which is 55% of the grade.

Detailed content of the laboratory practise

Requirements:

The laboratory part-grade determined by the accuracy of experimental results (70%) and final labour report (30%), which has to be at least 50%. It is 45% of the grade.

Possibilities for repeating the subject:

Agreed with the course chief

Learning efforts necessary to satisfy the requirements of the subject:

Preparation of design project.



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Requirements:

Total 84 hour óra, hereof:

- Contact time: 28 hour
- Personal product design project: 14 hour
- Laboratory practise: 42 hour

Required and suggested references: