



## COURSE DATASHEET

<b>Semester:</b>	2014/15/2
<b>Course:</b>	Process Design I
<b>Code:</b>	VEMKEL3253A
<b>Responsible department:</b>	Department of Hydrocarbon and Coal Processing
<b>Department code:</b>	MKOL
<b>Responsible instructor:</b>	Csilla Varga

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### Course objectives:

Development of ability for recognising the technical and economic aspects of the chemical processes for process design and intensification, for transformation and utilisation of existing equipments by the means of theoretical knowledge of chemical engineering and design softwares

### Course content:

1. Tasks and means of process design. A hierarchical approach to conceptual design. 2. Engineering economics I. Structure and prediction of total capital investment costs. Cost indexes. 3. Engineering economics II. Structure of production costs. Production cost estimation. 4. Engineering economics III. Measures of process profitability, estimation of profitability. Simplifying the economic analysis for conceptual design. 5. Input information for process design, choosing between batch and continuous processes. 6. Input-output structure of the flow-sheet. 7. Recycle structure of the flow-sheet. 8. Material and heat balances. 9. Reactor selection and design. 10. Synthesis of separation system I. 11. Synthesis of separation system II. 12. Application of simulation programmes in calculation of the material heat balances. 13. Shortcut design procedures.

### Requirements, evaluation and grading:

Examination paper: two times (min. 50%)

### Required and recommended readings:

Seider, Seader, Lewin: Product and Process Design Principles Synthesis, Analysis, and Evaluation, John Wiley, 2004 Turton, Bailie, Whiting: Analysis, Synthesis, and Design of Chemical Processes, Second Edition, Prentice Hall PTR, 2003 Peters, M.S.; Timmerhaus, K.D.: Plant design and economics for chemical engineers. McGraw Hill 2003. Brennan, D.: Process industry economics. IChemE, 1998. Kirk-Othmer: Encyclopedia of Chemical Technology, Wiley McKetta, J.J.: Encyclopedia of Chemical Processing and Design, Marcel Dekker Garrett, D.E.: Chemical engineering economics, Reinhold, 1989. Gary, J.H.; Handwerk, G.E.: Petroleum Refining, Technology and Economics, 3rd edition, Marcel Dekker Douglas, J.M.: Conceptual design of chemical processes, McGraw-Hill, 1988. Perry: Chemical Engineering Handbook (1984) Walas, S.E.: Chemical Process Equipment. Selection and Design Coulson & Richardson's, Chemical Engineering, Volume 6, 1993, Pergamon Press. Reid R. C., Prausnitz J. M., Poling B. E.: The Properties of Gases and Liquids, 1987, McGraw-Hill. Levenspiel O.: Chemical Reaction Engineering, 1972, John Wiley & Sons