UNIVERSITY OF PANNONIA

COURSE DATASHEET

Semester:	2016/17/1
Course:	Process Design 2
Code:	VEMKEL3153A
Responsible department:	Department of Hydrocarbon and Coal Processing
Department code:	MKOL
Responsible instructor:	Csilla Varga

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:

Basic data for heat exchanger network (HEN) design
preparation of simulation flowsheet 1.

Goal of heat exchanger network design

Composite curves

preparation of simulation flowsheet 2. components, thermodynamic system, streams. Creating initial streams fand equipments before the reactor feed.

Composite curves, rules for the pinch point

Reactions, simulation of the reactor. Mass balance. Simulation of the separation system 1.

rules of the pinch point

threshold problems

Simulation of the separation system 2.

problem table algorithm, different minimum driving forces in a system

Simulation of the separation system 3. Mass balance, recirculation, convergence, calculation sequence

different minimum driving forces in a system

grand composite curve

Simulation of the separation system 4. Mass balance, recirculation, convergence, calculation

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Course content:

sequence

utility selection

grand composite curve

Succeed simulation for the whole technology. Documentation.

HEN design 1: For maximum energy recovery

simulation paper

HEN design 1: For maximum energy recovery

deteremination area requirement, energy requirement, capital cost and operation cost of HEN without process-process heat exchange

HEN design 2: For minimum network surface area

determination of pinch point at a given minimum temperature difference

HEN design 2: For minimum network surface area

utilities. Integration of heat engines and heat pumps

Utilities. Grand composite curve. determination fo heat exchange area and cost.

Utilities. Integration of heat engines and heat pumps

Grid diagram, modified flowsheet. Conclusions.

Requirements, evaluation and grading:

creating all the preparation studies for the technology design;
achieving at least 20% for each part of the examination paper (theoretical, calculation and simulation) the first preparation works should be above 50%.

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Requirements, evaluation and grading:

Examination papers: twice (theoretical and calculation parts): each at min. level of 50%;
max. score for the theoretical part of the examination paper is 15 and 35 for the calculation part
Theoretical part begins with basic knowledge questions that have to be managed to without any failures.
Simulation paper and preparation works according to technology design within the semester have to be together at least 50% of the total scores (max. is 50 scores); but among the preparation works only one may be below the 50% level. Simulation paper should be executed at min. level of 40%.

Possibilities for repeating the subject: Next week, once but from the 2. and 3. preparation works only one may be below the 50% level
Simulation and heat exchanger network preparation works can not be repeated.

Required and recommended readings:

1. Linnhoff, B. et al.: User Guide on Process Integration for the Efficient Use of Energy, 1994, IChemE, Rugby, UK. 2. A Guide to Pinch Technology. Linnhoff March, 1998. 3.. Felber Gábor: Eljárástervezés III. 1995. Egyetemi jegyzet 4. Turton, Baille, Whithing, Shaeiwitz: Analysis, Synthesis, and Design of Chemical Processes, 2003, Prentice Hall 5. Seider, Seader, Lewin: product and Process Design Priciples, 2004, Wiley 6. Smith, R.: