UNIVERSITY OF PANNONIA

COURSE DATASHEET

Semester:	2016/17/1
Course:	Analysis of chemical technologies
Code:	VEMKFOV258A
Responsible department:	Department of Process Engineering
Department code:	MKFO
Responsible instructor:	dr. Sándor Németh

Course objectives:

Introducing the theoretical fundamentals and practical methods of the analysis of chemical process systems.

Course content:

Introduction. Review of the modelling of chemical technologies. CAPE software System analysis: process variables, degree of freedom, stability, controllability, sensitivity Mathematical representation of unit models: linear, nonlinear, differential, partial differential equation system. Application examples Structure of the technology system. Flow-sheet analysis, flow-sheet calculation Residence time distribution: E, F, I function; Segregation model, Maximum mixedness model CFD models, numerical methods, typical problems, CFD Software Analysis of typical units: piping, valves, pumps, compressors Analysis of heat exchangers, and heat exchanger networks Analysis of phase and component separation systems Chemical reactors and reactor systems Case study: heat exchanger design and analysis, reactor design and analysis Case study: Design and analysis of a components separation system. Fault diagnosis technique. Estimation of process (state) variables and parameters. Application of the results of technology analysis: design and control of the chemical technology

Requirements, evaluation and grading:

Grading is based on the results of 3 midterm exams and 3-4 laboratory reports. Midterm exams consist of theoretical and practical parts. Theoretical parts cover the modelling and analysis methods. Practical parts involve solving particular problems. The grade is determined with the weighting of results of the midterm exams and the reports. Repeated examinations cannot be taken in the examination period.

Required and recommended readings:

B. Wayne Bequette: Process Dynamic. Modelling, Analysis, and Simulation. Prentice Hall, New Jersey, 1998. Reid R.C., Prausnitz J.M., Poling B.E: The properties of Gases and Liquids, McGraw-Hill, 1987 AspenPhysical Property System, Physical Property Methods and Models, AspenTech Inc. , 2006 Coulson & Richardson: Chemical Engineering Vol 1-6 Pergamon Press, Oxford, 1993 Perry Chemical Engineering Handbook, McGraw Hill, 1999 Aspen Plus, Aspem Dynamics Reference Guide, AspenTech Inc. , 2006 H. Lomax, T.H. Pulliam, D.W. Zingg: Fundamentals of Computational Fluid Dynamics, 1999 V.V. Ranade: Computational Flow Modeling for Chemical Reactor Engineering, 2001 K.A. Hoffmann, S.T. Chiang: Computational Fluid Dynamics 4th edition, volume I-III., 2000 T.J. Chung: Computational Fluid Dynamics, 2002