UNIVERSITY OF PANNONIA

COURSE DATASHEET

Semester:	2016/17/1
Course:	Technical Thermodynamics
Code:	VEMKFK3242T
Responsible department:	Department of Physical Chemistry
Department code:	MKFK
Responsible instructor:	dr. András Dallos

Course objectives:

Teaching the thermodynamic background of chemical engineering calculations via lectures and numerical examples

Course content:

1. The molecular structure and the phase equilibrium properties of pure compounds (critical properties, boiling- and freezing point) 2. Thermodynamic properties of ideal gases and their mixtures (heat capacity, enthalpy, entropy, free enthalpy of formation) 3. The densities of fluids and solids 4. Equations of states for pure gases and liquids. Cubic EOS (vdW, RK, SRK, PR). Calculation of vapour pressure, molar volume, energy-functions of fluids (free energy, entropy, enthalpy, free enthapy, internal energy) and fugacity by EOS. 5. The P – V – T properties mixtures. Mixing rules. Technical diagrams for thermodynamic calculations. 6. Thermodynamic properties of liquids (vapour pressure, heat of vaporization, heat capacity, surface tension, density) 7. Viscosities of fluids and their mixtures 8. Thermal conductivity of fluids and their mixtures 9. Diffusion in gases, liquids and solids 10. Models for activity coefficients. UNIQUAC, WILSON, UNIFAC, COSMO 11. Vapour-liquid equilibria and flash points of multicomponent mixtures 12. Liquid-liquid and gas-liquid equilibria of multicomponent mixtures 13. Solid-liquid equilibria of multicomponent mixtures 14. Thermodynamic databases and calculating softwares 15. The methods of molecular design

Requirements, evaluation and grading:

Calculation of thermodynamic properties of a compound using the methods studied and solving technical problems using the estimated data.

Required and recommended readings:

Poling-Prausnitz-O'Connell: The Properties of Gases and Liquids. 5th Ed. McGraw-Hill, New York 2000. Bumble: Computer Generated Physical Properties. Lewis, Boca Raton, 1999. Horvath: Molecular Design. Elsevier, Amsterdam, 1992. Lyman-Reehl-Rosenblatt: Handbook of Chemical Property Estimation Methods. ACS Washington, 1990.