Physical Chemistry (CFZ - WS)

1. Basic concepts of physical chemistry (allowance 2/0)

2.Latent conditions (allowance 2/0)

a. Gases: equation of state of ideal and real gas.
b. Liquids: vapor pressure, surface tension, contact angle, viscosity.
c. Solids: classification, crystalline and amorphous structure, isomorfie, polymorphism.

3. Fundamentals of thermodynamics (allowance 3/0)

a. Basic concepts. Energy, heat, work.
b. First law of thermodynamics, enthalpy. Thermochemistry. Calorimetry.
c. II. law of thermodynamics, entropy, spontaneous processes.
d. Helmholtz Gibssova and function. Chemical potential. The third law of thermodynamics. Thermodynamics and living systems.

4. Phase equilibria (allowance 3/0)

a. General conditions of equilibrium conditions. Gibbs phase rule.
b. One-component systems. Clapeyron and Clausius-Clapeyron equation.
c. Two-component system. Mixing function. Ideal and real solutions. Fugacity and activity. Raoult's and Henry law.
d. Colligative properties of the solution and its biological significance.
e. Three-component system.
f. Distribution balance.
g. Balance at the interface.

5. Chemical equilibrium (allowance 2/0)

a. The equilibrium constant, the extent of reaction and degree of transformation.
b. Conditions for balance and be influenced by its outward influences.

6. Electrolyte solutions (allowance 2/0)

a. Electrolytic dissociation. Activity and activity koeficient.Teorie strong electrolyte. The theory of weak electrolyte.
b. Acid-base balance of the selected system.
c. Electrolytic conductivity, conductometry.

7. Electrochemical equilibrium of heterogeneous systems (allowance 4/0)

a. The speed of chemical reactions. Total and partial responses like.
b. Types of chemical reactions.
c. Kinetics of elementary chemical reactions.

d. Theory of reaction velocities.
e. Dependence of rate constant on temperature.
f. Reaction coordinate.
g. More complex kinetics of chemical reactions.

8. Colloidal Systems (allowance 2/0)
a. Types and characteristics of disperse systems.
b. Electrokinetic phenomena.

9. Molecular transport (allowance 2/0)
a. Diffusion.
b. Types and properties of membranes.
c. Membrane technology.

10. Physical properties of materials (allowance 2/0)
a. Electrical, magnetic and optical properties.
b. Methods of study materials.

11. Practical laboratory exercises (allowance 0/28)
a. Electrochemical methods: potentiometry, conductometry.
b. Absorption spectrophotometry: absorption spectrum of substances, the dependence of the spectrum acidobasického pH indicator.
c. Polarimetry and refractometry.
d. Physical properties of liquids: viscosity and surface tension.