



## COURSE DATASHEET

<b>Semester:</b>	2014/15/2
<b>Course:</b>	Laboratory Practices from General and Inorganic Chemistry
<b>Code:</b>	VEMKAKB233A
<b>Responsible department:</b>	Department of General and Inorganic Chemistry
<b>Department code:</b>	MKAK
<b>Responsible instructor:</b>	dr. Zsolt Valicsek

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### Course objectives:

To get acquainted with fundamental tools and measuring operations in chemical laboratory, to attain practice. Knowledge of materials and most important reactions of inorganic chemistry, practice in fundamental chemical operation.

### Course content:

1. General information. Introduction of the program of the laboratory practice. Division into groups. Safety regulations. Introduction of tools and fundamental operations: measurements of mass, volume, and temperature; filtration. 2. Examination paper on safety regulations. D1: H and the non-metallic element of group IV. and V. E1= analysis: NO<sub>2</sub>- NO<sub>3</sub>- PO<sub>4</sub><sup>3-</sup>- CO<sub>3</sub><sup>2-</sup>- SCN<sup>-</sup>. 3. D2: The non-metallic element of group VI.+ members of D1 group . E2: SO<sub>3</sub><sup>2-</sup>- S<sub>2</sub>O<sub>3</sub><sup>2-</sup>- SO<sub>4</sub><sup>2-</sup>- and NO<sub>2</sub>- NO<sub>3</sub>- PO<sub>4</sub><sup>3-</sup>- CO<sub>3</sub><sup>2-</sup>- SCN<sup>-</sup>. 4. D3: The non-metallic element of group VII.+ members of D2 group. E3: F- Cl- Br- I- ClO<sub>3</sub><sup>-</sup>- BrO<sub>3</sub><sup>-</sup>- IO<sub>3</sub><sup>-</sup>- ClO<sub>4</sub><sup>-</sup>- and SO<sub>4</sub><sup>2-</sup>- NO<sub>3</sub><sup>-</sup>- PO<sub>4</sub><sup>3-</sup>- CO<sub>3</sub><sup>2-</sup>. 5. D4 (metalloids): B<sub>4</sub>O<sub>7</sub><sup>2-</sup>- Al<sup>3+</sup>+ SiO<sub>3</sub><sup>2-</sup>- As<sup>3+/5+</sup>+ Sb<sup>3+/5+</sup>+ + members of D3 group. E4 : B<sub>4</sub>O<sub>7</sub><sup>2-</sup>- Al<sup>3+</sup>+ SiO<sub>3</sub><sup>2-</sup>- AsO<sub>3</sub><sup>3-</sup>- AsO<sub>4</sub><sup>3-</sup>- Sb<sup>3+</sup>. 6. D5 (alkali + alkaline earth metals): Li<sup>+</sup>+ Na<sup>+</sup>+ K<sup>+</sup>+ NH<sub>4</sub><sup>+</sup>+ Ca<sup>2+</sup>+ Sr<sup>2+</sup>+ Ba<sup>2+</sup>+ Mg<sup>2+</sup>+ + D4 részek. E5: Li<sup>+</sup>+ Na<sup>+</sup>+ K<sup>+</sup>+ NH<sub>4</sub><sup>+</sup>+ Ca<sup>2+</sup>+ Sr<sup>2+</sup>+ Ba<sup>2+</sup>+ Mg<sup>2+</sup>. 7. D6 (heavy metals): Cu<sup>2+</sup>+ Ag<sup>+</sup>+ Zn<sup>2+</sup>+ Cd<sup>2+</sup>+ Hg<sub>2</sub><sup>2+</sup>+ Sn<sup>2+/4+</sup>+ Pb<sup>2+</sup>+ Bi<sup>3+</sup>. E6: Cu<sup>2+</sup>+ Ag<sup>+</sup>+ Zn<sup>2+</sup>+ Cd<sup>2+</sup>+ Hg<sub>2</sub><sup>2+</sup>+ Hg<sup>2+</sup>+ Sn<sup>2+/4+</sup>+ Pb<sup>2+</sup>+ Bi<sup>3+</sup>. 8. D7 (transition metals): Cr<sup>3+</sup>+ Mn<sup>2+</sup>+ Fe<sup>2+</sup>+ Fe<sup>3+</sup>+ Co<sup>2+</sup>+ Ni<sup>2+</sup>+ + D6 group. E7: Cr<sup>3+</sup>+ Mn<sup>2+</sup>+ Fe<sup>2+</sup>+ Fe<sup>3+</sup>+ Co<sup>2+</sup>+ Ni<sup>2+</sup>+ Cu<sup>2+</sup>+ Ag<sup>+</sup>+ Zn<sup>2+</sup>+ Cd<sup>2+</sup>+ Hg<sub>2</sub><sup>2+</sup>+ Hg<sup>2+</sup>+ Al<sup>3+</sup>+ Bi<sup>3+</sup> (only with NaOH and NH<sub>4</sub>OH reagents) 9. Preparation of two types solutions (by dilutions of concentrated solution of an acid, or by solution of solid materials). Measuring of density with pycnometer. 10. Calibration of volumetric glassware and titration with the use of calibrated implements. 11. Measuring of vapour density (molecular weight) by modified Victor-Mayer method. 12. Measuring of boiling point. Measuring of freezing point depression by Rast method 13. Measuring of gas solubility. 14. Measuring of pH - titration of a weak acid by a strong base. 15. Final examination paper

### Requirements, evaluation and grading:

Successful examination paper on safety regulations. The experiments are to be performed, the measurements and calculations have to be reported. The mark of the practice is based on the total points given for the measurements, the written tests about the theoretical background, and the final examination paper. The condition of the pass mark is a satisfactory level of at least 50% of the tests and the measurements as well as the final examination paper.

### Required and recommended readings:

Általános kémiai laboratóriumi gyakorlatok, Összeállította a tanszéki munkaközösség, VE, 1994. Szeretlen



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### Required and recommended readings:

kémiai reakciók, (Szerk. Welther Károlyné), VE, 1993. Barcza L.: A minőségi kémiai analízis alapjai, Medicina, Bp. 1989. Erdey L. : Bevezetés a kémiai analízisbe, Tankönyvkiadó, Bp. 1961