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| 1. Course title: General and Inorganic Chemistry II. | | | | | |
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| 2. Code: | | 3. Type (lecture, practice etc.): lecture | | | |
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| 4. Contact hours: 4 hoursper week | | 5. Number of credits (ECTS): 5 | | | |
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| 6. Preliminary conditions (max. 3):   * General and Inorganic Chemistry I. (lecture) * General and Inorganic Chemistry I. (seminar) * General and Inorganic Chemistry I. (laboratory) | | | | | |
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| 7. Announced:fall semester,  xspring semester, both | | | | | |
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| 8. Limit for participants: 150 | | | | | |
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| 10. Responsible teacher (faculty, institute and department):  László Kollár DSc (Faculty of Science, Institute of Chemistry, Department of Inorganic Chemistry) | | | | | |
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| 11. Teacher(s) and percentage: | | László Kollár | | 100% | |
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| 12. Language:English | | | | | |
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| 13. Course objectives and/or learning outcomes:  Objectives: The lecture intends to introduce students to give an overview on the chemistry of the elements of the periodic table. A special focus is given on the bioinorganic chemistry issues especially in case of alkali, alkaline earth metals, as well as selected transition metals such as iron and copper.  Learning outcomes: Students completing the course will have *knowledge* on the compounds of metals and non-metals as well as their compounds.  They will be *able* to characterise basic compounds of metals and non-metals regarding their structure, bonding properties, chemical and physical properties. They will have a *competence* of evaluating readings in inorganic chemistry. Their positive *attitude* towards innovative methods will increase significantly. | | | | | |
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| 14. Course outline  Nonmetals and their compounds. Hydrogen and its isotopes, its use and application. Hydrides.  General characterisation of metals. Alkali metals, their occurrence, physical and chemical properties.  The hydrides, halides, oxides, hydroxydes, sulfides, polysulfides and carbonates of alkali metals. The crystal energy and solubility of alkali salts. The biocoordination chemistry of alkali metals (introduction).  Alkaline earth metals, their occurrence, physical and chemical properties. Their compounds and use.  The elements of group III and their physical and chemical properties. Hydrides, oxides. Their compounds and use. Preparation of boron and aluminium. Organic compounds of boron and aluminium.  The elements of group IV and their physical and chemical properties. The comparison of C and Si compounds. The stereochemistry of C, the main types of carbon compounds. Hydrides and halides. Oxides, oxoacids, oxohalides. The characterisation of some compounds with C-N bond, their practical importance. Carbides.  The elements of the nitrogen group, their occurrence, physical and chemical properties. Their compounds, the comparison of the stereochemistry of N and P. Hydrides, the synthesis of NH3 . Oxides and oxoacids, their structure and chemical properties, their practical importance.  Chalcogens, physical and chemical properties, their compounds with hydrogen and halogens. Water. Oxo-compounds of S, Se, és Te.  The occurrence of halogens, physical and chemical properties. Interhalogens. Hydrogen halides and oxo-compounds (oxides, oxoacids). The structure and properties of oxoacids.  The occurrence of noble gases, their physical and chemical properties.  General characterisation of transition metals, physical and chemical properties. The variability of their oxidation states and their electronic structure. Complex formation and its consequences. The optical and magnetic properties of transition metal complexes.  The production of transition metals, reduction of oxides and halides, thermal decomposition of halides and carbonyls, electrolysis. Transition metal hydrides, halides, their structures and stabilities. Halogeno-complexes. Transition metal oxides, hydroxides, sulfides, cyanides, thiocyanates. Carbonyl complexes and their bonding properties.  Ti, Zr, Hf and their compounds. V, Nb, Ta and their compounds.  Cr, Mo, W and their compounds. Mn, Tc, Re and their compounds.  Fe, Co, Ni and their compounds. Platinum metals and their most important compounds. Cu, Ag, Au and their compounds. Zn, Cd, Hg and their compounds. The biocoordination chemistry of Fe and Cu (introduction).  Week 13  Lantanoids and actinoids. The electronic structure of lanthanides, the atomic and ionic radii, the lanthanide contruction. The production of transurane elements. Complexes and practical applications of lantanoids and actinoids. | | | | | |
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| 15. Mid-semester works  Attending lectures is highly recommended. | | | | | |
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| 16. Course requirements and grading  Oral exam is based on lectures, accessible electronic sources and lecture materials.  Most common questions in the structure of end term examination are: describing notions, relations, recognizing figures, analysis, multiple choice questions.  Grades:  0–50% fail  51–65% acceptable  66–75% average  76–90% good  91–100% excellent | | | | | |
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| 17. List of readings  F. A. Cotton – G. Wilkinson: Advanced Inorganic Chemistry. John Wiley & Sons, New York, 1988.  N.N. Greenwood – A. Earnshaw: Chemistry of the Elements. Butterworth-Heinemann, Oxford, 1997.  D. D. Ebbing: General Chemistry. Houghton Mifflin Company, Boston,1988. | | | | | |
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| 18. Recommended texts, further readings   1. An electronic textbook is available from the lecturer. | | | | | |
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| **Date** | 13 April, 2017 | **Prepared by** |  | | |
| Dr. László KOLLÁR  responsible teacher | | |
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| **Endorsed by** | | |  | | |
| Dr. László KOLLÁR program supervisor | | |