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| 1. Course title: Physical Chem. I. lect. | | | | | |
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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 Chem. I. lect. | | | | | |
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| 7. Announced:fall semester, spring semester, both | | | | | |
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| 8. Limit for participants: - | | | | | |
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| 10. Responsible teacher (faculty, institute and department):  Sándor Kunsági-Máté, PhD (Faculty of Science, Institute of Chemistry, Department of General and Physical Chemistry) | | | | | |
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| 11. Teacher(s) and percentage: | | Dr. Sándor Kunsági-Máté | | 100 % | |
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| 12. Language:English | | | | | |
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| 13. Course objectives and/or learning outcomes: The scope is to understand the material structure backgrounds necessary for evaluation of experimental results, also improving modeling ability of students according to the structure, chemical changes and reaction. | | | | | |
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| 14. Course outline   1. The basic terms of thermodynamics, processes, physical properties and state functions. 2. The first law of thermodynamics. Heat capacity, internal energy, enthalpy. 3. Basics of thermo chemistry, heat of transformation. Hess’s law, Kirchhoff’s law. 4. The second and third law of thermodynamics, entropy, efficiency, free energy, free enthalpy, fundamentals of statistical thermodynamics. 5. The properties of the gas state, kinetic theory of gases. 6. The liquid state, surface tension, transformation of pure material, critical state, the property of solids. 7. Partial molar quantities, mixtures, properties of solutions. 8. Colligative properties, the phase rule, distribution, phase diagrams, separation of mixture. 9. Chemical equilibriums, direction of chemical processes 10. Basics of reaction kinetics, reaction rate equations, order of chemical processes, first-order, second-order reactions. 11. Parallel reactions, consecutive reactions, catalysis, enzyme catalysis. 12. Heterogeneous reactions, chain reactions, photochemical reactions, polymerization, oscillation reactions. 13. The temperature dependence of the reaction rate, the reaction rate coefficient, collision theory, transient state theory. | | | | | |
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| 15. Mid-semester works  Attending lectures is highly recommended. | | | | | |
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| 16. Course requirements and grading  Oral exam starts with a short test. Solving it the student proves that she/he could learn the basic definitions, equations, laws, and has the necessary problem solving expertise. After successful test the student draws two question leaflets with topics about the text. After a short preparation the exam starts with a short presentation using chalk for drawing and derivations. The student also answers questions raised during the exam. | | | | | |
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| 17. List of readings   1. Peter Atkins, Julio de Paula: Physical Chemistry, W. H. Freeman and Company, New York, 2010. | | | | | |
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| 18. Recommended texts, further readings   1. Peter Atkins, Julio de Paula: Physical Chemistry, W. H. Freeman and Company, New York, 2010. | | | | | |
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| **Date** | 13 April, 2017 | **Prepared by** |  | | |
| Sándor KUNSÁGI-MÁTÉ, PhD  responsible lecturer | | |
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| **Endorsed by** | | |  | | |
| Dr. László Kollár, DSc program supervisor | | |