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| 1. Course title: Analytical Chem. I. lab. | | | | | |
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| 2. Code: | | 3. Type (lecture, practice etc.): practice | | | |
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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):   * Analytical Chem. I. lect. | | | | | |
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| 7. Announced:fall semester, spring semester, both | | | | | |
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| 8. Limit for participants: 12 | | | | | |
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| 10. Responsible teacher (faculty, institute and department):  Ibolya Kiss PhD (Faculty of Science, Institute of Chemistry, Department of Analytical and Environmental Chemistry) | | | | | |
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| 11. Teacher(s) and percentage: | | Dr. Ibolya Kiss | | 100 % | |
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| 12. Language:English | | | | | |
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| 13. Course objectives and/or learning outcomes:  Objectives: Applying theoretical knowledge in practice.  Raising student's attention to the problems that can be solved by analytical methods every day.  Learning outcomes: students completing the course will have *knowledge* on basic quantitative analytical methods. They alone will be *able* to measure and evaluate. | | | | | |
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| 14. Course outline   1. Introduction   Work safety instructions for persons working in chemical laboratory   1. Laboratory technique, Materials and fundamental operation   Weighing with analytical balance   1. Titrimetric (volumetric) analysis   Volumetric analysis solutions  Preparation of NaOH solution  Laboratory work No. 1  Preparation of HCl solution  Laboratory work No. 2  Questions and examples   1. Standardization.   Checking the concentration of HCl solution.  Laboratory work No. 3.  Checking the concentration of NaOH solution.  Laboratory work No. 4.   1. Method of neutralization.   Laboratory work No. 5  Laboratory work No. 6   1. Determination of amount of weak acid.   Laboratory work No. 7.   1. Questions and tasks on neutralization method.   Test No. 1   1. Method of complexometry   Determination of water hardness  Laboratory work No. 8   1. Determination of water temporary hardness   Laboratory work No. 9   1. Determination of water total hardness   Laboratory work No. 10  Questions on complexometry  Test No. 2   1. Methods of redox titration 2. Determination of concentration of KMnO4 work solution   Laboratory work No. 11. Test  Determination of the amount of iron(II)  Laboratory work No. 12   1. Questions and exercises on redox titration   Test No. 3 | | | | | |
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| 15. Mid-semester works  It is compulsory to participate in practice. | | | | | |
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| 16. Course requirements and grading  *Short written test:* Each week the laboratory session begins with a short test. The test is based on the exercises of that week and the previous week (calculations, theoretical background of the determinations).  *Lab note:* During the laboratory session all students have to write a lab note, which should contain the theoretical background of the determinations, the procedure, all data of the measurements, calculations and conclusions.  *Final grade:* Grading is based on three separate factors:  - the average grade of short tests (an average of at least 2.0 is necessary to avoid a ‘fail’ final grade)  - the average grade of measurements, lab notes (an average of at least 2.0 is necessary to avoid a ‘fail’ final grade)  - the average grade Tests (an average of at least 2.0 is necessary to avoid a ‘fail’ final grade)  If one of the criterion is not fulfil, the final grade will be the fail and the student have to retake the course the next year. | | | | | |
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| 17. List of readings   1. Harris, Daniel C.: Quantitative chemical analysis, 8th edition, New York: W. H. Freeman and Co., [2010], cop. 2010 2. Skoog, West, Holler, Crouch: Fundamentals of Analytical Chemistry, 9th edition Brooks/ Cole | | | | | |
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| 18. Recommended texts, further readings   1. An electronic textbook is available from the lecturer. 2. [Arthur Israel Vogel](https://www.google.hu/search?hl=hu&tbo=p&tbm=bks&q=inauthor:%22Arthur+Israel+Vogel%22&source=gbs_metadata_r&cad=6): Vogel's Textbook of Macro and semimicro qualitative inorganic analysis, 5th edition, Longman, 1979 | | | | | |
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| **Date** | 27April, 2017 | **Prepared by** |  | | |
| Dr. Ibolya Kiss  responsible teacher | | |
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| **Endorsed by** | | |  | | |
| Dr. László Kollár program supervisor | | |