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| **Subject**   | **ANALYTICAL CHEMISTRY**  |
| **Type**   | **Semester**  | **ECTS**  | **Code**  |
|                                 Z   |             2  |        4 (1+2)  |       130ACH159  |
| **Course Lecturer**  | **Prof. Asst. Dr. Fidan Feka**  |
| **Course Assistant**  | **Prof. Asst. Dr. Fidan Feka**  |
| **Course Tutor**  |   |
| **Aims and Objectives**  | The subject "Analytical chemistry" offers the main concepts in establishing the theoretical bases: on legalities in chemical analysis. Application in qualitative and quantitative chemical analysis, their sensitivity and selectivity as well as in the qualitative and quantitative composition of solutions and their activity. Also know the solubility product, the factors that affect the solubility of chemical reactions. To master the basic standard work procedures and techniques from qualitative chemical analysis and organic analysis using classical analytical separation and identification methods, will understand the conditions of performing chemical-analytical procedures in real conditions, and apply modern instrumental separation procedures analytical.  |
| **Learning outcomes**  | After completing this course (subject), the student will be able to:  * You know the general concepts of analytical chemistry and distinguish between qualitative and quantitative analytical reactions;
* To understand the qualitative and quantitative composition of solutions and their activity;
* You describe and compare equilibria in homogeneous and heterogeneous systems.
* Application of Analytical Chemistry course in food analysis.

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| **Alignment of Course’s Learning Outcomes to Programs Learning Outcomes.**  | 1. Application of theoretical knowledge: - BSc program. (Outcome 1, 2, ): Possess and understand advanced knowledge in food chemistry, microbiology, engineering and sensory evaluation, using this understanding to create, process and preserve healthy, safe and quality food items up. - To apply advanced techniques, methods, tools and instruments in the processing, analysis and safety assessment of food products, ensuring compliance with food laws and regulations. 2. Evaluation and critical analysis: -BSc Program (Outcome 3, 4,5,6,7,8,9): Analyze, evaluate and interpret food science data, including research literature, ensuring that findings are innovatively and ethically communicated to an audience different, from colleagues to the general public. -Demonstrate understanding and technical competence in basic principles of nutrition, distinguishing between different food components and their health implications. - Organize and convey technical and relevant information effectively, orally and in writing, ensuring clarity and accuracy to a diverse audience, including supervisors, peers and customers. - Execute and lead research projects in food science, navigating the complexities of nutrition and exercise science, particularly when addressing ethical, cultural and environmental dimensions. - Interpret, compare and classify findings from food science research, ensuring that decisions and results conform to established standards and best practices. - Exercise autonomy and initiative in identifying health-related interactions between dietary nutrients and exercise, designing optimal dietary and exercise programs to maintain health. - Address and solve complex problems related to food processing, utilizing integrated knowledge from different fields of food science. 3. Development of practical skills: BSc Program (Outcome 7,8 and 9): - Interpret, compare and classify findings from food science research, ensuring that decisions and results conform to established standards and best practices. - Exercise autonomy and initiative in identifying health-related interactions between dietary nutrients and exercise, designing optimal dietary and exercise programs to maintain health. - Address and solve complex problems related to food processing, utilizing integrated knowledge from different fields of food science. 4. Evidence-based approach: BSc program (Outcome 9 and 10): - Address and solve complex problems related to food processing, utilizing integrated knowledge from different fields of food science. - Engage in continuous learning, staying up-to-date with the latest trends, challenges and innovations in the field of food science, nutrition and exercise science.  |
| **Content**  | **Weekly plan**  | **Week**  |
| Qualitative and quantitative chemical analysis  | 1  |
| Disperse systems, their qualitative and quantitative composition.  | 2  |
| Ion activity, activity coefficient.  | 3  |
| Equilibrium of chemical reactions. Law of mass action.  | 4  |
| Analysis of analytical groups (cationic and anionic)  | 5  |
| The pH factor. Acid-base reactions, Autoprotolysis of water.  | 6  |
| Presentation of Seminars  | 7  |
| Buffer solutions   | 8   |
| Precipitation-product solubility reactions.  | 9   |
| Quantitative chemical analysis, methods of quantitative analysis  | 10    11  12  |
| Neutralization methods, acid-base indicators, acid-base titration curves, titration of strong acid with strong base.  | 11  |
| Precipitation, complexation and oxidoreduction methods  | 12  |
| Instrumental analytical methods. Analysis of food products  | 13  |
| Presentation of case studies  | 14  |
|   | Final assessment  | 15  |
|   | Learning activity  | Weight %  |
| Teaching/ Learning methods  | **1. Lecture: 15%** -Aim: To present the main concepts, models and theories in knowledge management in Analytical Chemistry -Relevant to: Building fundamental understanding and providing a theoretical framework for the subject. **2. Case studies and analysis: 25%** -Aim: To apply the theoretical knowledge in practical scenarios anilization of samples -Important for: Critical evaluation of the effectiveness of knowledge management in different contexts and reflection on practical examples. **3. Group discussions and seminars: 20%** -Goal: To encourage interactive learning, exchange of ideas and development of critical thinking. -Relevant to: Discussing different models and theories in depth and reflecting on their application in Analytical Chemistry **4. Project work: 20%** - Goal: To promote creativity, application of practical skills and cooperative learning. -Important for: Developing new and creative ways of managing knowledge in analytical chemistry course contexts and identifying barriers and facilitators to knowledge management. **5. Assignments and Research Papers: 10%** -Goal: To increase research skills and the ability to critically analyze information. -Relevant to: In-depth study of specific topics within knowledge management, increasing understanding through research. **6. Guest lectures and seminars: 10%** - Purpose: To provide exposure to industry experts and practical knowledge. -Relevant to: Gaining different perspectives on knowledge management practices and challenges in analytical chemistry.  |
|  **Literature/References**  |  * [**Analytical Chemistry**](http://www.e-booksdirectory.com/details.php?ebook=8193)**, Ira S. Krull (ed.), InTech, 2012**
* Kimia Analitike I (KA-I), Mustafë R. Bacaj, Prishtnë 2002.
* Kimia Analitike (analiza cilësore dhe sasiore), Sefer Matja etj. Tiranë 2003
* Daut Vezi, Bazat teorike të kimisë analitike Tiranë, 2012.
* Besnik Hoxha, Kimia Analitike (Pjesa eksperimentale) Prishtinë 2001.

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