Karta przedmiotu / Course description

Informacje ogólne o przedmiocie / General information about the course	
1. Kierunek studiów / Major of study: Pharmacy	**2. Poziom kształcenia / Study level:** uniform master's studies **3. Forma studiów / Form of study:** full time studies
4. Rok / Year: I	**5. Semestr / Semester: II**
6. Nazwa przedmiotu / Course name: Analytical chemistry	
7. Status przedmiotu / Course status: obligatory	
8. Jednostka realizująca przedmiot, adres, e-mail: **Name of Department, mailing address, e-mail**: Department of Analytical Chemistry, Jagiellońska 4, 41-200 Sosnowiec, e-mail: zcha@sum.edu.pl, http://zakladchemiianalitycznej.sum.edu.pl/	
9. Treści programowe przedmiotu Course contents: • To acquaint students with the theoretical foundations of the methods of classical quantitative analysis by titration and weighing, and by electrochemical methods, as well as by calculation principles the content of the substance in the sample based on the results of the analysis using the above-mentioned methods. • The student acquires practical skills in the field of techniques: electroanalytical, titration and weighing, learns to properly prepare a sample for quantitative analysis and perform it correctly, titrimetric, electrochemical or, as appropriate, gravimetric analysis of the substance contained in the sample using a specific analytical procedure given in the literature, e.g. Polish Pharmacopoeia • Developing the ability to correctly interpret the obtained results of quantitative analysis titration, weighing, electrochemical processing and performing their statistical processing in accordance with Principles of Good Laboratory Practice (GLP)	
10. liczba godzin z przedmiotu / Number of hours for the course	**80**
11. liczba punktów ECTS dla przedmiotu / Number of ECTS points for the course	**7**
12. Formy i tematy zajęć / Forms and topics of classes **12.1. Lectures** 1. General analytical issues and statistical evaluation of results 2. General information on titration methods and acid-base measurements 3. Redoximetry 4. Precipitation titration, argentometry 5. Complexometry 6. Gravimetry 7. Potentiometry 8. Conductometry 9. Electrolysis **12.2. Seminars** 1. Validation of analytical methods 2. Calculations in acid-base measurements 3. Acid-base titration curves 4. Calculations in redoximetry 5. Solubility and solubility product. Calculations in gravimetric analysis 6. Calculations in complexometric analysis and precipitometry 7. Electroanalytical methods 8. Final test	**Liczba godzin** **Number of hours** **20** **15**

12.3 Laboratory classes 1. Introductory exercises - exercises in preparation and dilution of solutions, familiarization with technique of weighing chemicals; familiarization with the technique of titration. Execution an exemplary acid-base determination. 2. Quantitative determination of hydrochloric acid by alkalimetric titration. 3. Alkalimetric determination of naproxen and weighing exercise. Getting to know the information included in selected Summary of Product Characteristics (ChPL). 4. Manganometric determination of hydrogen peroxide (H_2O_2) in hydrogen peroxide - direct titration. Getting to know the information included in selected Summary of Product Characteristics (ChPL) 5. Iodometric determination of copper (II) - an example of indirect titration. 6. Complexometric determination of calcium (Ca^{2+}) and magnesium (Mg^{2+}) ions next to each other. Overview of EDTA titration methods. 7. Gravimetric determination of magnesium (Mg^{2+}) in the form of 8-hydroxyquinolinate with drying to constant weight. 8. Precipitometric determination of zinc ions (Zn^{2+}) 9. Conductometric measurement of the conductivity of water as recommended by the Pharmacopoeia and salt mixtures (NaCl, KBr, and KI). Determination of sodium chloride (NaCl) in saline by conductometric precipitation titration. Preparation of the report. Getting to know the information included in selected Summary of Product Characteristics (ChPL). 10. Potentiometric pH measurement. Characteristics of a glass electrode. Preparation of the report. 11. Determination of salicylic acid in a pharmaceutical preparation by potentiometric alkalimetric titration. Preparation of the report. Getting to know the information included in selected Summary of Product Characteristics (ChPL). 12. Selection of the analytical method for the determination of silver ions (Ag^{+}) - discussion of possible methods. Determination of silver by the Volhard method. 13. Summary and evaluation of acquired knowledge and skills.	45

13. Literatura / Readings

Douglas A. Skoog, Donald M. West, F. James Holler, Stanley R. Crouch. Fundamentals of Analytical Chemistry. 8th Ed. USA, 2004

14. Kryteria oceny – szczegóły / Detail evaluation criteria

Zgodnie z zaleceniami organów kontrolujących / In accordance with the recommendations of the inspection bodies

Zaliczenie przedmiotu - student osiągnął zakładane efekty uczenia się / Completion of the course – student has achieved the assumed learning outcomes

Szczegółowe kryteria zaliczenia i oceny z przedmiotu są zamieszczone w regulaminie przedmiotu / Detail criteria for completion and evaluation of the course are specified in the course regulations