

**School of Pharmacy / School of Pharmacy (English)**

**2024 - 2025 Academic Year**

**ANALYTICAL CHEMISTRY PRACTICE II**

**Syllabus**

<b>Course Description</b>					
<b>Name</b>	<b>Code</b>	<b>Semester</b>	<b>T+A Hour</b>	<b>Credit</b>	<b>ECTS</b>
ANALYTICAL CHEMISTRY PRACTICE II	PHA2213096	Spring Semester	0+3	1,5	3
<b>Prerequisites Courses</b>					
<b>Recommended Elective Courses</b>					
<b>Language of Instruction</b>	English				
<b>Course Level</b>	First Cycle (Bachelor's Degree)				
<b>Course Type</b>	Required				
<b>Course Coordinator</b>	Assist.Prof. Sema KOYUTÜRK				
<b>Name of Lecturer(s)</b>	Assist.Prof. Sema KOYUTÜRK				
<b>Assistant(s)</b>	Research assistant of faculty				
<b>Aim</b>	As being a part of quantitative chemical analysis methods, to teach principles of gravimetric and volumetric analysis methods and apply them in the laboratory. To teach various instrumental analysis methods used in quantitative analysis and to perform those skills in the laboratory.				
<b>Course Content</b>	This course contains; Gravimetric analysis and determination of sulphate, Acid-base titrations; preparation of standard solution and determination of sodium hydroxide, Preparation of standard solution and determination of hydrochloric acid, Determination of carbonate and bicarbonate mix, Precipitation titrations; determination of chloride by AgNO <sub>3</sub> solution, Complexometric titrations; determination of calcium and magnesium by EDTA solution, Oxidation-reduction titrations; determination of H <sub>2</sub> O <sub>2</sub> by permanganate solution, Determination of copper (iodometrically) by sodium thiosulfate solution, Determination of the ratios of fatty acid of various oils by gas chromatography (GC), Determination of the ratios of fatty acid of various oils by gas chromatography (GC), Determination of caffeine and aspirin in the pain-breakers by ultraviolet (UV) spectrometer, Quantitative analysis by IR spectrometry, Ion exchange chromatography, Compensatory week.				
<b>Course Learning Outcomes</b>		<b>Teaching Methods</b>		<b>Assessment Methods</b>	
1. Students discuss the stoichiometry of application methods and the principles of gravimetric analysis.		12, 14, 17, 9		A, D, E, G, H	
1.1. Interprets the gravimetric sulfate analysis and similar analysis		12, 14, 17, 9		A, D, E, G, H	
1.2. Explains the stoichiometry of gravimetric analysis.		12, 14, 17, 9		A, D, E, G, H	
2. Discuss the principles and application methods of volumetric analysis.		12, 14, 17, 9		A, D, E, G, H	
2.1. Explains the preparation and calibration of the standard solution.		12, 14, 17, 9		A, D, E, G, H	
2.2. Interprets the determination of volumetric acid and base.		12, 14, 17, 9		A, D, E, G, H	
2.3. Explains the analysis of carbonate and bicarbonate.		12, 14, 17, 9		A, D, E, G, H	
3. Discuss the application methods and principles of precipitation titrations.		12, 14, 17, 9		A, D, E, G, H	
3.1. Interprets the argentometric chloride determination.		12, 14, 17, 9		A, D, E, G, H	
4. Discuss the application methods and principles of complexometric titrations.		12, 14, 17, 9		A, D, E, G, H	
4.1. Explains the analysis of calcium and magnesium by EDTA.		12, 14, 17, 9		A, D, E, G, H	
5. Discuss the application methods and principles of oxidation-reduction titrations.		12, 14, 17, 9		A, D, E, G, H	
5.1. Explains the determination of H <sub>2</sub> O <sub>2</sub> by permanganate solution.		12, 14, 17, 9		A, D, E, G, H	
5.2. Interprets the determination of copper by sodium thiosulfate solution.		12, 14, 17, 9		A, D, E, G, H	
6. Discuss the application methods and principles of potentiometric titrations.		12, 14, 17, 9		A, D, E, G, H	
7. Discuss the application methods and principles of analysis methods by ultraviolet (UV) spectrometer.		12, 14, 17, 9		A, D, E, G, H	
7.1. Explains the determination of aspirin and caffeine by UV spectrometer.		11, 12, 14, 17, 9		A, D, E, G	
8. Discuss the application methods and principles of applications of IR spectrometer in the analysis.		11, 12, 16, 17, 9		A, D, E, G	
9. Discuss the application methods and principles of analysis methods by chromatography.		11, 12, 16, 17, 9		A, D, E, G	
9.1. Performs analysis by high pressure liquid chromatography.		11, 12, 16, 17, 9		A, D, E, G	
9.2. Determines the fatty acid ratios of various oils by gas chromatography.		11, 12, 16, 17, 9		A, D, E, G	
<b>Teaching Methods</b>	11: Demonstration Method, 12: Problem Solving Method, 14: Self Study Method, 16: Question - Answer Technique, 17: Experimental Technique, 9: Lecture Method				
<b>Assessment Methods</b>	A: Traditional Written Exam, D: Oral Exam, E: Homework, G: Quiz, H: Performance Task				
<b>Lecture Schedule</b>					
<b>Sequence</b>	<b>Topics</b>	<b>Preliminary Preparation</b>			
1	Gravimetric analysis and determination of sulphate	1, 2, 3, 4			
2	Acid-base titrations; preparation of standard solution and determination of sodium hydroxide	1, 2, 3, 4			
3	Preparation of standard solution and determination of hydrochloric acid	1, 2, 3, 4			
4	Determination of carbonate and bicarbonate mix	1, 2, 3, 4			
5	Precipitation titrations; determination of chloride by AgNO <sub>3</sub> solution	1, 2, 3, 4			
6	Complexometric titrations; determination of calcium and magnesium by EDTA solution.	1, 2, 3, 4			
7	Oxidation-reduction titrations; determination of H <sub>2</sub> O <sub>2</sub> by permanganate solution.	1, 2, 3, 4			
8	Determination of copper (iodometrically) by sodium thiosulfate solution	1, 2, 3, 4			
9	Determination of the ratios of fatty acid of various oils by gas chromatography (GC)	1, 2, 3, 4			
10	Determination of the ratios of fatty acid of various oils by gas chromatography (GC)	1, 2, 3, 4			
11	Determination of caffeine and aspirin in the pain-breakers by ultraviolet (UV) spectrometer	1, 2, 3, 4			
12	Quantitative analysis by IR spectrometry	1, 2, 3, 4			
13	Ion exchange chromatography				

Lecture Schedule		
Sequence	Topics	Preliminary Preparation
14	Compensatory week	1, 2, 3, 4
Evaluation Methods		Weight(%)
Midterm Exam		60
General Exam		40

Resources
[1] Aydın, A. O., Analitik Kimya Lab.- II Ders Notu, Sakarya, 2010. [2]. Dündar, M. Ş., Enstrümantal Analiz Lab. Deney Kitabı, Sakarya, 2008. [3] Gündüz, T, Kantitatif Analiz Laboratuvar Kitabı Gazi Kitabevi, Ankara, 2005. [4]. Kılıç, E., Köseoğlu, F., Yılmaz, H., (Çeviri editörleri), Enstrümantal Analiz İlkeleri, Skoog-Holler-Nieman, Bilim yayıncılık, Ankara, 2000.