

FACULTY OF CHEMISTRY					
SUBJECT CARD					
Name of subject in English:	Fundamentals of analytical chemistry				
Main field of study (if applicable):	all Faculty of Chemistry				
Specialization (if applicable):					
Profile:	academic				
Level and form of studies:	1st level, full-time				
Kind of subject:	obligatory				
Subject code:	CHC014011				
Group of courses:	NO				
	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)			30		
Number of hours of total student workload (CNPS)			60		
Form of crediting			crediting with grade		
For group of courses mark (X) final course					
Number of ECTS points			2		
including number of ECTS points for practical (P) classes			2		
including number of ECTS points for direct teacher-student contact (BK) classes			1		
PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES					
1 Basic knowledge and abilities on general chemistry and inorganic chemistry					
SUBJECT OBJECTIVES					
C1 To provide students to be familiar with basic principles and procedures in analytical chemistry					
C2 To provide students to be familiar with knowledge on appropriate analytical procedures conducted for detection and determination of selected sample constituents					
C3 To provide student with ability to work with gravimetric and volumetric analysis					
SUBJECT LEARNING OUTCOMES					
related to skills:					
PEK_U01 Correctly carries out specific operations of classical chemical analysis (weighing, analytical precipitation, filtering precipitates, sampling, titrating)					
PEK_U02 Is capable of performing simple quantitative analysis using gravimetric or titrimetric methods of analysis as well as spectrometric method					
PEK_U03 Is able to describe a course of analysis with the use of chemical reactions					
PEK_U04 Is able to calculate results of executed analysis					
PROGRAMME CONTENT					
Laboratory					Number of hours
Lab1	Safety and laboratory rules. Grading. Schedule. General procedures of good laboratory technique				2
Lab2- Lab3	Acid-base titration - standardization of an HCl solution and determination of NaOH				4
Lab 4- Lab5	Determination of Na ₂ CO ₃ and NaOH in a solution (acid-titration with a HCl solution)				4

Lab6- Lab7	Determination of Fe and Ni in a solution - gravimetric determination of Fe	4
Lab8- Lab9	Determination of Fe and Ni in a solution continuation – red-ox titration of Fe	4
Lab10- Lab11	Determination of Fe and Ni in a solution (cont.) - complexometric titration of Fe and Ni	4
Lab 12- Lab 13	Water chemical analysis - determination of hardness and Cl ⁻ ions	4
Lab 14- Lab 15	Water chemical analysis – determination of O ₂ and NH ₄ ⁺ ions	4
	Total hours	30
TEACHING TOOLS USED		
N1 Informative lecture N2 Completing quantitative analysis N3 Report preparation N4 Office hours		
EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT		
Evaluation (F – forming (during semester), P – concluding (at semester end))	Learning outcomes number	Way of evaluating learning outcomes achievement
F1	PEK_U01-PEK_U04	Grade on experimental work = arithmetic mean of grades achieved for lab reports prepared on conducted analyses and obtained results
F2	PEK_U02-PEK_U04	Grade on tests 1-4 (max. 12 points) F2 = 3,5 if 6,00-7,50 points 4,0 if 7,75-9,00 points 4,5 if 9,25-10,50 points 5,0 if 10,75-11,00 points 5,5 if 11,25-12,00 points
P (laboratorium) = 2/3×F1 + 1/3×F2		
PRIMARY AND SECONDARY LITERATURE		
PRIMARY LITERATURE: [1] A. Cygański, Chemiczne metody analizy ilościowej, wyd. 7, WNT, Warszawa, 2013 [2] J. Minczewski, Z. Marczenko, Chemia analityczna t. 1 i 2, wyd. 9, PWN, Warszawa, 2019 [3] T. Lipiec, Z.S. Szmaj, Chemia analityczna z elementami analizy instrumentalnej, wyd.7, PZWL Warszawa, 1996 [4] D.A. Skoog, D.M. West, F.J. Holler, S.R. Crouch, Podstawy chemii analitycznej t. 1 i 2 (przekład z j. ang.), PWN, Warszawa, 2006		
SECONDARY LITERATURE: [1] Ćwiczenia rachunkowe z chemii analitycznej, praca zbiorowa pod red. Z. Galusa, wyd. 10, PWN, Warszawa, 2019		
SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)		
Prof. dr hab. inż. Paweł Pohl, pawel.pohl@pwr.edu.pl		