Course code: ……. **Plan position:** ……

A. INFORMATION ABOUT THE COURSE

B. Basic information

Name of course	***Analytical Chemistry***
Field of studies	Chemical Technology
Level of studies	First degree
Profile of studies	General academic
Form of studies	Stationary
Specialty	1. Chemical process technology 2. Bioengineering 3. Chemistry and technology of cosmetics
Unit responsible for the field of studies	Faculty of Chemical Technology and Engineering/Division of General and Inorganic Chemistry
Name and academic degree of teacher(s)	Przemysław Kosobucki, Ph.D., D.Sc., Associate Professor; Katarzyna Jurek, Ph.D.
Introductory courses	Course of General Chemistry
Introductory requirements	Background of chemistry and physics from secondary school and basic knowledge of algebra

C. Semester/week schedule of classes

Semester	Lectures (W)	Auditorium classes (Ć)	Laboratory classes (L)	Project classes (P)	Seminar (S)	Field classes (T)	Number of ECTS points
winter	15	15					4
summer			75				6

2. LEARNING OUTCOME

No.	Learning outcomes description	The reference to the learning outcomes of specific field of study	The reference to the learning outcomes for the area
KNOWLEDGE			
W1	Has a structured, theoretically underpinned knowledge of general understanding of analytical chemistry.	K_W03	P6S_WG
W2	Has knowledge of techniques and methods for the characterization and identification of chemical products.	K_W11	P6S_WG
SKILLS			
U1	Works individually and as part of a team.	K_U02	P6S_UO P6S_UK
U2	Selects analytical methods for the qualitative and quantitative determination of chemical compounds and evaluation of their physico-chemical properties.	K_U11	P6S_UW

SOCIAL COMPETENCES			
K1	Is aware of the responsibility for jointly tasks, which are related to teamwork.	K_K04	P6S_KK P6S_KO

3. TEACHING METHODS

A. Traditional methods used

Multimedia lecture, laboratory experiments and calculations (classes) performed by students under supervision of academic staff.

4. METHODS OF EXAMINATION

Written exam from lectures, written tests from laboratories and classes.

5. SCOPE

Lectures	Process of quantitative chemical analysis. Errors and statistical calculations of analytical results. Basic chemical laws used in quantitative analysis. Introduction to gravimetric determinations. Fundamentals of quantitative analysis in solution. Titrimetric analysis: acid-base, precipitations, redox, complexometric - EDTA. Titration analyses in applications. Theory of indicators: acid – base, redox, complexometric and precipitations. Classification of the instrumental methods. Introduction to spectrophotometry, spectrophotometers, UV - Vis spectrophotometry, IR spectroscopy in analytical applications, atomic absorption and emission spectroscopy. NMR. Fundamentals of electrochemical methods: potentiometry, conductometry. Introduction to chromatographic and electromigration techniques.
Classes	Calculation related to the preparation of solutions from a solid weight sample or by dilution. Calculation rules related to the standardization of solutions. Calculation related with determination of components by means of: volumetric, alkacymetric, precipitation and redoximetry. Methods of calculations necessary for instrumental determinations.
Laboratories	Health and safety rules and good laboratory practices. Systematics of analytical methods. Filtration and washing. Roasting and drying. Weighing determination of selected ions. Volume analysis: alkacymetry, complexometry, precipitation analysis and redoximetry. Standard solutions (preparation standardization), selected markings in the field of volumetric analysis. Water analysis and artificial fertilizers. Separation and analysis of ferrous and non-ferrous alloys (Al, Cu, Pb). Physicochemical methods in quantitative analysis, with particular emphasis on potentiometry, conductometry, spectrophotometry and electrogravimetry.

6. METHODS OF VERIFICATION OF LEARNING OUTCOMES

LEARNING OUTCOME	Form of assessment					
	Oral examination	Written exam	Colloquium	Project	Report	Credit for experiments
W1			x			
W2			x			x
U1						x
U2			x			x
K1			x			x

7. LITERATURE

Basic literature	1. Harvey D., 2000. Modern Analytical Chemistry. MC Graw Hill.
Supplementary literature	1. Harris D.C., 2010. Quantitative Chemical Analysis, W.H. Freeman and Co. N.Y. 8th Ed. 2. Fifield F.W., Kealey D., 2000. Principles and Practice of Analytical Chemistry, Blackwell Science. 3. Skoog D.A., Holler F.J., Holler F.J., Crouch S.R., 2014. Fundamentals of Analytical Chemistry, 9th Edition, Belmont. 4. Materials prepared by lecturer.

8. TOTAL STUDENT WORKLOAD REQUIRED TO ACHIEVE EXPECTED LEARNING OUTCOMES EXPRESSED IN TIME AND ECTS CREDITS

Student's activity		Student workload– number of hours
Classes conducted under a direct supervision of an academic teacher or other persons responsible for classes	Participation in classes indicated in point 1B	105
	Supervision hours	30
Student's own work	Preparation for classes	40
	Reading assignments	35
	Other (preparation for exams, tests, carrying out a project etc)	40
Total student workload		250
	Number of ECTS points	**10**