

DISCIPLINE DESCRIPTION

1. Information on the study programme

1.1 Academic institution	UNIVERSITY OF ORADEA
1.2 Faculty	FACULTY OF ENVIRONMENTAL PROTECTION
1.3 Department	ENGINEERING OF FOOD PRODUCTS
1.4 Field of study	CONTROL AND EXPERTISE OF FOOD PRODUCTS
1.5 Cycle of study	BACHELOR
1.6 Study programme/Qualification	CONTROL AND EXPERTISE OF FOOD PRODUCTS / ENGINEER

2. Information on the discipline

2.1 Name of discipline	ANALYTICAL CHEMISTRY						
2.2 Course holder	Senior Lecturer Eng. Adriana Chiş, PhD						
2.3 Seminar/Laboratory/Project holder	Senior Lecturer Eng. Adriana Chiş, PhD						
2.4 Year of study	I	2.5 Semester	II	2.6 Type of evaluation	Exam	2.7 Regime of discipline	C

(C) Compulsory; (O) Optional; (E) Elective

3. Total estimate time (hours per semester of didactic activities)

3.1 Number of hours per week	4	out of which: 3.2 course	2	out of which 3.3 seminar/laboratory/project	2
3.4 Total hours in the curriculum	56	out of which: 3.5 course	28	out of which 3.6 seminar/laboratory/project	28
Time allotment					hours
Study assisted by manual, course support, bibliography and notes					25
Additional documentation in the library/ on specialised electronic platforms and in the field					10
Preparation of seminars/laboratories/ topics/reports, portfolios and essays					12
Tutorship					12
Examinations					4
Other activities: documentation on laboratory optical and chromatographically techniques in food laboratory in Bihor County					6
3.7 Total hours of individual study		69			
3.9 Total hours per semester		125			
3.10 Number of credits		5			

4. Prerequisites (where appropriate)

4.1 curriculum	“General Chemistry” and “Organic Chemistry” exams passed
4.2 competences	Fundamental knowledge of general chemistry, inorganic and organic, chemical composition of foods, elementary physics, the use of Microsoft Office basic programs

5. Conditions (where appropriate)

5.1. related to course	Projector, screen, internet connection
5.2. related to laboratory	Laboratory devices and chemical reagents used for experiments in accord with discipline curriculum

6. Specific competences acquired

Competențe profesionale	<ul style="list-style-type: none"> ▪ Description and use of basic concepts, theories and methods of analytical chemistry used at the quality control of food raw materials and food products ▪ Explanation and interpretation of concepts and basic chemical and instrumental methods of analytical chemistry which determine the quality of food raw materials and food products, the transformations they suffer during processing, transportation and storage ▪ Evaluation of the features, performances and limitation of methods and devices used in the field of analysis and quality control of food products ▪ Application of the principles and analytical methods of chemical and instrumental type for the solving of the problems related to the quality control and expertise of the food raw material and food products related to the legislation in the field ▪ Description and use of concepts and theories regarding the use and control of the raw material and food products through chemical analysis and instrumental methods.
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7. Objectives of discipline (coming from the specific competences acquired)

7.1 General objective	<ul style="list-style-type: none"> • Getting the fundamentals of qualitative and quantitative analytical methods, both chemical and instrumental as a start for understanding and appliance of those methods regarding raw materials and final products of food industry.
7.2 Specific objectives	<ul style="list-style-type: none"> • Illustration of chemical and instrumental analytical methods for vegetal and animal foods quality determination.

8. Content*/

8.1 Course	Methods of teaching	No. of hours/Remarks
Analytical Chemistry object; Fundamental analytical methods	Interactive lecture and PowerPoint presentation	2
Chemical reactions in Analytical Chemistry		2
Solutions: properties and concentration		2
Preliminary operations in		2
Fundamentals in qualitative analysis applied on foods control		2
Quantitative analysis principles; Volumetric methods		2
Neutralisation volumetric analysis		2
Applicability on foods control		2
Precipitation volumetric analysis		2
Complexonometric volumetric analysis		2
Applicability on foods control		2
Redox volumetric analysis		2
Applicability on foods control		2
Gravimetric quantitative analysis		2
Applicability on foods control		2
Separation principles: methods and applicability on foods control for major and minor components		2
Instrumental analysis: principles of qualitative and quantitative determinations, types of methods		2
Types of methods used in foods control		2
Optical methods: principles, laws, types		2
Molecular and atomic spectroscopy in foods control		2
Chromatographic analysis: principles of qualitative and quantitative determinations, types of methods		2
Types of methods used in foods control		2
Thin layer chromatography in foods control; Gas chromatography in foods control		2
Liquid chromatography in foods control		2
Bibliography		

<ol style="list-style-type: none"> 1. Chirilă Elisabeta, 2004, Chimie analitică calitativă, Ovidius University Press, Constanța 2. Chiș Adriana, 2009, Curs de chimie analitică calitativă, cantitativă și instrumentală, Editura Universității Oradea 3. Chiș Adriana, 2021, Curs de chimie analitică, uz intern 4. Gocan S.și Simona Cobzac, 2006, Metode moderne de prelucrare a probelor organice, Editura Risoprint, Cluj-Napoca 5. Hodișan T., Cimpoiu Claudia, Haiduc Iovanca, Hodișan S., 2002, Teorie și aplicații în chimia analitică,Editura Risoprint, Cluj-Napoca 6. Liteanu C, 1972, Metode de separare în chimia analitică, Institutul Central de Cercetări Chimice, București 7. Neacșu H. I. și Janstsch L., Chimie analitică și instrumentală, 2006, Editura Academic pres & AcademicDirect Cluj-Napoca 8. Pietrzyk D. și C. Frank, 1989, Chimie analitică, Editura Tehnică, București 		
	Methods of teaching	No. of hours/ Remarks
8.3 Laboratory	Practical applications	
Work protection in analytical chemistry laboratory		2
Normal solution preparation		2
Dilution of solutions		1
Correction factor of solutions		1
Neutralisation volumetric analysis		4
Acidity of animal and vegetal origin foods		
Precipitation volumetric analysis		4
Salt content of animal and vegetal origin foods - Mohr method		
Redox volumetric analysis		4
Factor of potassium permanganate, sodium thiosulphate and iodine normal solutions determination		
Oxygen content of water – Winkler method		
Complexometric volumetric analysis		2
Water hardness		
Colorimetric determination: ammonia		2
Spectrophotometry - Calibration curves for nitrites in water – Griess method		2
Spectrophotometry - Calibration curves for nitrites in water – Griess method		2
Practical examination of studied methods		2
Bibliography		
<ol style="list-style-type: none"> 1. Chiș Adriana, 2008, Ecotoxicologie alimentară: aspecte teoretice și practice, Ed. Universității din Oradea 2. Chiș Adriana, 2020, Îndrumător de lucrări practice – Contaminanți chimici, uz intern 3. Chiș Adriana, 2021, Îndrumător de lucrări practice – Reziduuri organice și anorganice în produse alimentare, uz intern 4. Cordoș E., T. Frențiu, Ana-Maria Rusu, Michaela Ponta, A. Fodor, 1998, Analiza prin spectrometrie atomică, Institutul Național de Optoelectronică București 5. Cotrău M., Proca Maria, 1988, Toxicologie analitică, Editura Medicală, București 6. Fabritius K., Cupsa Cristina, Purcarea Mihaela,2004, Masuri de urgenta în cazul expunerii la pesticide, GEEA 7. Gocan S, 1998, Cromatografia de înaltă performanță, Partea I. Cromatografia de gaze, Editura Dacia 8. Gocan S.și Simona Cobzac, 2006, Metode moderne de prelucrare a probelor organice, Editura Risoprint 9. Hura Carmen, 1995, Metode de determinare a reziduurilor de pesticide din produsele alimentare, Editura Septentrion Iași 10. Hura Carmen, 2006, Ghid de laborator – Metode de analiză pentru produse alimentare, Editura Cermi, Iași 11. Mănescu S., Cucu M., Diaconescu Mona – 1994, Chimia sanitară a mediului – Apă, aer, sol, Ed. Medicală București 12. Mănescu S., Dumitrescu H., Bărduță Zenovia, Diaconescu Mona – 1982, Chimia sanitară a mediului – Alimente, Ed. Medicală București 		

13. Popescu N, Popa G., Stănescu V., 1986, Determinări fizico-chimice de laborator pentru produsele alimentare de origine animală, Editura Ceres, București
14. Rotaru, O. și M. Mihaiu, 2002, Igiena veterinară a produselor alimentare – Patologie prin alimente, Editura Toderico, Cluj-Napoca
15. *** Colecția de standarde – industria alimentară
16. *** Legis – program informatic referitor la legislația din România
17. *** www.w.efsa.europa.eu
18. *** www.codexalimentarius.net

9. Corroboration of discipline content with the expectations of the epistemic community, professional associations and representative employers from the field corresponding to the study programme

- The students will obtain the necessary knowledge regarding the chemical substances that can contaminate the foods, including water, contamination pathways, the toxic effects that can appear as a consequence of ingesting contaminated foods.
- The students will obtain the necessary skills in order to carry out qualitative and quantitative determination of these substances from the environment and foods through chemical analyses, through classical and instrumental methods as well as through quick analyses specific to a technological flow

* The content and the number of hours allocated to each course / seminar / laboratory / project respectively will be detailed during the 14 weeks of each semester of the academic year.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the final grade
10.4 Course	Test answer and problem solving	Write test – 10 questions	60%
10.6 Laboratory	<ul style="list-style-type: none"> • Execution and calculations of practical Works including homework • Practical determination and calculation during the practically test 	Global evaluation <ul style="list-style-type: none"> • Continuous evaluation based on laboratory practical activities • Practical test referring to one of the determinations performed during the semester, which will be assign randomly to every student Note: the working protocol will be consulted in the Laboratory Notebook	20% 20%
10.8 Minimum standard of performance: minimum 4 questions of the test and minimum 5 grade in laboratory activities			

Date of completion

Signature of course holder**

Signature of seminar/ laboratory **

20.06.2023

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Date of approval in the department

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Signature of the Head of Department

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Dean signature

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** - Name, first name, academic degree and contact details (e-mail, web page, etc) will be specified