COURSE SYLLABUS

University	**UNIVERSITY OF ORADEA**
Faculty	**FACULTY OF ENERGY ENGINEERING AND INDUSTRIAL MANAGEMENT**
Study program*	**APPLIED AND STRUCTURAL CHEMISTRY**

I. Course Name: Inorganic compounds reactivity and structure

II. Course Details

No of hours/week						
Code	Semester	Credits	Lecture	Seminar	Laboratory	Project
STII-0239	I	7	2	1	-	-

III. Course coordinator (title, name, surname, e-mail):

IV. Course objectives

Recognizing and describing elementary concepts, approaches, theories, methods and models regarding the structure and reactivity of chemical compounds

Explaining and interpreting some properties, concepts, approaches, theories, models and fundamental notions of the structure and reactivity of chemical compounds.

Applying fundamental notions to solve problems associated with the structure and reactivity of chemical compounds.

Critically analyzing existing models and theories regarding the structure and reactivity of chemical compounds

Establishing the structure and reactivity of the studied chemical compounds, applying appropriate models and theories

V. Course content	**No. of hours**
V.1. Lecture (chapters/subchapters and paragraphs)	
Hydrogen Compounds	2
Noble Gas Compounds	2
Halogen Compounds	2
Oxygen Compounds	3
Sulfur Compounds	3
Nitrogen Compounds	2
Phosphorus Compounds	2
Arsenic and Antimony Compounds	2
Carbon Compounds	2
Silicon Compounds	2
Boron Compounds	2
V.2. Laboratory/Seminar/Project:	
Hybridization of s,p and d orbitals and the structure of inorganic compounds	2
Hybridization of s,p and d orbitals and the structure of inorganic compounds	2
Theory of molecular orbitals for biatomic molecules	2
Theory of molecular orbitals for polyatomic molecules	2
Hydrogen peroxide-redox properties	2
Oxidation states of Mn	2
Oxidation states of Cr	2

VI. Bibliography

1. C.E. Housecroft, A. G. Sharpe, Inorganic Chemistry, Pearson Ed, 2018
2. Structura si reactivitatea compusilor anorganici, Notite de curs-Platforma elearning Universitatea din Oradea
3.A. Fodor, A. Petrehele, *Chimie anorganică generală*, Ed. Univ. Oradea, 2011
4.C.Berdan, Reactivitate si mecanisme de reactie in chimia anorganica, Ed. Univ. "Al. I. Cuza" Iasi, 2006
5.A. Fodor, A. Şuteu , *Chimia anorganică. Nemetale*, Ed. Univ. Oradea, 2000
6.A. Fodor, A. Şuteu , *Chimia anorganică. Metale*, Ed. Univ. Oradea, 2000
7.C.D. Neniţescu, *Chimie generală*; E. D. P. Bucureşti,1972
8. . Material suport pentru studiu- platforma e learning

VII. Grading criteria

Activities	Assesment	% of final grade
Exam	Written exam: -meeting minimum performance standards Mid-term verification	40% 20%
Seminar/Laboratory/Project	-writing an essay on a given topic -active participation in seminar classes -training skills and mastering all knowledge acquired during seminar classes	20% 20%

VIII. Learning outcomes:

Knowledge	The student/graduate possesses in-depth knowledge of the structure and reactivity of inorganic and organic compounds.
Skills	The student/graduate applies advanced techniques for the synthesis and characterization of chemical substances.
Responsibility and autonomy	The student/graduate assumes responsibility for complex laboratory experiments and for the validity of the results obtained.
Additional results	The student/graduate develops research projects in structural and applied chemistry, using rigorous scientific methodologies.

Course coordinator,
Assitent professor dr. Fodor Alexandrina

COURSE SYLLABUS

University	**UNIVERSITY OF ORADEA**
Faculty	**FACULTY OF INFORMATICS AND SCIENCES**
Study program*	**APPLIED AND STRUCTURAL CHEMISTRY**

I. Course Name: FUNDAMENTAL PROCESSES IN ORGANIC SYNTHESIS

II. Course Details

No of hours/week						
Code	Semester	Credits	Lecture	Seminar	Laboratory	Project
STII 0780	**I**	**7**	**2**	1	-	-

III. Course coordinator (title, name, surname, e-mail): Şef lucr.dr. ing**. Mioara SEBEŞAN**
msebesan@uoradea.ro

IV. Course objectives

The discipline -Fundamental Processes in Organic Synthesis has as its major objective the knowledge and acquisition of the main aspects of the basics of industrial organic synthesis.
Knowledge of raw materials and organic synthesis processes grouped to the main reaction and the nature of the raw materials, highlighting: chemistry, thermodynamics and kinetics, mechanism and technological implications, as well as industrial achievements.

V. Course content	**No. of hours**
V.1. Lecture (chapters/subchapters and paragraphs)	
5.1.1. Fundamental processes in industrial organic synthesis. Oxidation. General aspects, types of reactions, thermodynamic aspects.	2
5.1.2. Oxidation, types of reaction mechanisms, oxidizing agents.	2
5.1.3. Oxidation, catalysts, industrial implementation; oxidation of aliphatic hydrocarbons, olefins and aromatic hydrocarbons.	2
5.1.4. Hydrogenation/dehydrogenation. General aspects, types of reactions, thermodynamic aspects, mechanisms, catalysts,industrial implementation.	2
5.1.5. Hydrogenation/dehydrogenation, particular aspects- hydrogenation of vegetable oils, dehydrogenation of ethylbenzene.	2
5.1.6. Alkylation and acylation, types of reactions, thermodynamic aspects, mechanisms, alkylation/acylation agents.	2
5.1.7. Alkylation and acylation, catalysts, industrial implementation. special problems-synthesis of ethylbenzene and linear acylbenzene.	2
5.1.8. Nitration, types of reactions, thermodynamic aspects, mechanisms, nitrating agents.	2
5.1.9. Nitration, catalysts, industrial implementation; obtaining nitrobenzene.	2
5.1.10. Sulfonation, types of reactions, thermodynamic aspects, mechanisms, sulfonating agents.	2
5.1.11. Sulfonation, catalysts, industrial implementation; obtaining alkylbenzene sulfonate.	2
5.1.12. Halogenation: chlorination, bromination, iodination, fluorination.	2
5.1.13. Esterification/Hydrolysis, types of reactions, thermodynamic aspects.	2
5.1.14. Esterification/Hydrolysis, reaction mechanisms, catalysts, industrial implementation.	2
V.2. Seminar:	
5.2.1 General types of chemical organic reactions, thermodynamic aspects, mechanisms, catalysts.	2
5.2.2 Presentation and characterization of catalysts.	2
5.2.3 Obtaining and characterization of a catalyst.	2
5.2.4 Characterization of raw materials and products of the organic industry, distillation curve, flash points.	2
5.2.5 Characterization of raw materials and products of the organic industry, surface tension.	2
5.2.6 Characterization of raw materials and products of the organic industry, notions of instrumental analysis for organic products.	2
5.2.7. Evaluation.	2

VI. Bibliography

6.1. Neniţescu C.D., *Chimie organică*, vol. 1, Editura Didactică şi Pedagogică, Bucureşti, 1980.
6.2. Neniţescu C.D., *Chimie organică*, vol. 2, Editura Didactică şi Pedagogică, Bucureşti, 1980.
6.3. * * * *Organic Syntheses*, 2-nd ed., vol. 1-8, Ed. H. Gilman, J. Wiley, New-York, 1953-1993.
6.4. K. Weissermel, H.-J. Arpe *Industrial Organic chemistry*, ed. aII-a, VCH, WEinheim, 1993.
6.5. H.A.Wittcoff, *Industrial Organic Chemicals*, J.Wiley&Sons, Chichester,1996.
6.6. Ch. N Satterfield, *Heterogeneous Catalysis in practice*, McGraw Hill, New York, 1992.
6.7. I Cristea - *Reacţii şi mecanisme de reacţii in chimia organică*, Ed. Risoprint, Cluj-Napoca, 2000.
6.8. Sorin Mager - *Chimie organică*, partea I, vol. I, Ed. Univ. Babeş-Bolyai, 1992.
6.9. Hadaruga, D.I., *Intermediari în industria organica*, Note de curs, Electronic Release, 2007.
6.10. I.Zarafu, L.Ivan, *Reactivi si sinteze in chimia organica moderna*, Editura Universitatii din Bucuresti, 2008.
6.11.T.W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder, Organic Chemistry, 12th Edition, John Wiley & Sons, Inc., New York, 2016;
6.12. John McMurry, Organic Chemistry, 9 th Edition, Cengage Learning, 2015.
6.13.https://fr.khanacademy.org/science/organic-chemistry
6.14. https://www.organic-chemistry.org/
6.15. https://e.uoradea.ro/

VII. Grading criteria

Activities	Assesment	% of final grade
Exam	***Written exam:*** ***1. Requirements in order to get the minimum grade for passing the exam*** Attendance at least 40% of the total number of course hours.Attendance at seminar hours. Understanding the thermodynamic aspects involved in the synthesis of organic compounds. ***1. Requirements for the maximum grade*** Correlating the chemical structure of organic compounds with their reactivity. Knowledge of all processes in organic synthesis, presented. Knowledge of the factors that influence the development of fundamental processes in organic synthesis.	**80%**
Laboratory	***1.Requirements in order to get the minimum grade for passing the laboratory*** Recognition of fundamental processes in organic synthesis. Writing the general mechanisms for reaction after that take place the presented organic chemical reactions. ***2.Requirements for the maximum grade for passing the laboratory*** Active participation to all seminars. Accurately performing the applications presented . Investigation of the chemical properties of organic compounds and reaction mechanisms.Interpretation of the kinetic and thermodynamic aspects of the respective reaction.	**20 %**

VIII. Learning outcomes:

The student/graduate knows the industrial and research applications of organic chemical compounds in the environment, pharmacy and technology.
The student/graduate applies advanced techniques for the synthesis and characterization of organic chemicals.
The student/graduate integrates experimental and computational methods to elucidate the mechanisms of organic chemical reactions.

Course coordinator,

Şef lucr.dr. ing**. Mioara SEBEŞAN**

COURSE SYLLABUS

University	UNIVERSITY OF ORADEA
Faculty	**FACULTY OF INFORMATICS AND SCIENCES**
Study program	**APPLIED AND STRUCTURAL CHEMISTRY** - Master

I. Course Name: KINETICS OF COMPLEX REACTIONS

II. Course Details

No of hours/week: **4**						
Code	Semester	Credits	Lecture	Seminar	Laboratory	Project
STII-0658	01	7	2	1	1	-

III. Course coordinator: associate professor dr. eng. **OANA DELIA STĂNĂŞEL**, ostanasel@uoradea.ro

IV. Course objectives

Ensuring that Master's students understand the problems arising during the course of complex reactions through a gradual and detailed approach to theoretical concepts.

Acquiring skills in the theory and practice of various reactions whose mechanisms are investigated in specialized laboratories.

V. Course content	**No. of hours**
V.1. Lecture (chapters/subchapters and paragraphs)	
Reaction rate. Reaction order and molecularity. Activated complex theory.	2
Reversible reactions. First-order reactions in both directions. First-order reaction from left to right and second-order in the reverse direction	2
Parallel reactions. Establishing the dependence between rate constants. Integration of the rate equations. Dependence of product concentrations on the rate constants corresponding to their formation.	2
Concurrent reactions. Integration of the rate equations. Special cases.	2
Consecutive reactions. The variation of components concentrations in time. The time at which the intermediate concentration reaches its maximum. Limiting cases.	2
The Steady-State Approximation. Application of the steady-state approximation to consecutive reactions proceeding via a first-order mechanism. Application of the steady-state approximation to consecutive reactions proceeding via a second-order mechanism.	2
Chain reactions. Straight-chain reactions. Branched-chain reactions or explosions.	2
Polycondensation reactions. Reaction rate and the calculation of the degree of polycondensation. Statistical analysis of polycondensation.	2
Photochemical reactions	2
Chaotic reactions	2
Homogeneous catalysis. Specific catalysis by protons. Specific catalysis by hydroxyl ions.	2
Heterogeneous catalysis. Physical adsorption and chemical adsorption. The Langmuir adsorption isotherm. Proposed mechanisms for gas-solid heterogeneous catalysis.	2
Autocatalysis. Reaction rate of the autocatalytic process. Oscillatory reactions	2
Aspects regarding the depletion of the ozone layer	2
V.2. Laboratory/*Seminar*:	
Presentation and interpretation of experimental results	2
Kinetic determination of certain pollutants	2
Kinetic study of the isopropyl alcohol oxidation reaction	2
Determination of the kinetic parameters for the reaction between hydrogen peroxide and potassium iodide	2
Determination of trace amounts of heavy metals using the kinetic method	2
Kinetic study of the halogen exchange reaction	2
Recovery session of laboratory	2
Applications of reversible reactions	2
Applications of parallel reactions	2
Applications of concurrent reactions	2
Applications of consecutive reactions	2
Applications of polymerization reactions	2
Applications of polycondensation reactions	2
Applications of catalyzed reactions	2

VI. Bibliography

Atkins P., Paula J., Keeler J. - *Physical Chemistry*, Oxford University Press, 2022.
Stănășel, O – *Cinetica reacţiilor complexe* - curs, seminar, lucrări practice, https://e.uoradea.ro/.

VII. Grading criteria

Activities	Assesment	% of final grade
Exam	Written exam	50
Laboratory	Practical application	20
Seminar	Continuous assessment	30

VIII. Learning outcomes:

Assimilation of the kinetic aspects regarding the different types of complex reactions.
The student/graduate assumes responsibility for complex laboratory experiments and for the validity of the results obtained.
The student/graduate demonstrates autonomy in designing and managing applied activities in research or industry.

COURSE SYLLABUS

University	**UNIVERSITY OF ORADEA**
Faculty	**FACULTY OF INFORMATICS AND SCIENCES**
Study program*	**APPLIED AND STRUCTURAL CHEMISTRY**

I. Course Name: HIGH PERFORMANCE CHROMATOGRAPHIC TECHNIQUES

II. Course Details

No of hours/week						
Code	Semester	Credits	Lecture	Seminar	Laboratory	Project
STII-0781	**1**	**7**	**2**		**2**	

III. Course coordinator (title, name, surname, e-mail): LECTURER, DR.ENG. HODISAN SORIN sorin.hodisan@yahoo.com

IV. Course objectives

Transmitting fundamental theoretical and practical knowledge in the field of chemistry and their application in concrete situations.
Training of capacities, skills and experimental work habits.
Training and development of capacity and skills for using modern laboratory equipment in scientific activity.
Acquiring concepts related to the development and investigation of methods for presenting and processing experimental data.
Acquisition of theoretical knowledge specific to the field of very low concentrations.
Knowledge of the principles of sample collection, storage and processing in trace analysis.
Develop skills in applying special analytical techniques used in trace analysis.
Develop practical skills in applying spectral and chromatographic analysis methods that can be used in trace analysis.
Applying cutting-edge techniques in instrumental analysis necessary to acquire specialized technical skills used in laboratory analysis;
Using appropriate methods for technical quality control;
Performing professional tasks according to specific ethical principles in the exercise of the profession.

V. Course content	**No. of hours**
V.1. Presentation of the discipline, bibliography and other aspects regarding chromatographic analysis methods	**2**
V.2.. Introductory aspects regarding chromatographic analysis methods	2
V.3. Basic characteristics of chromatographic processes	2
V.4. Gas-liquid partition chromatography (GLP).	2
V.5. Chromatography based on adsorption at the gas-solid interface (CGS).	2
V.6. Size exclusion chromatography (SEC).	2
V.7. High-performance liquid chromatography (HPLC). Chromatographic techniques	2
V.8. Separation by membranes	2
V.9. Aspects of separation equilibrium. Mass transfer.	2
V.10. Column partition chromatography.	2
V.11. Ion exchange chromatography	2
V.12. Affinity chromatography.	2
V.13. Thin layer chromatography (TLC).	2
V.14. Ion chromatography	2

V.2. Laboratory: **V.2.1.** Labor protection in the laboratory. Presentation of the subject matter of trace analysis. Presentation of laboratory work. Introductory concepts.	**2**
V.2.2. Presentation of the utensils and laboratory equipment used in chromatography work	**2**
V2.3. Thin layer chromatography. Preparation of chromatographic plates	**2**
V2.4. Distribution of I_2 between an organic solvent and aqueous I^- solution	**2**
V2.5. Preparation of an adsorbent column (silica gel).	**2**
V2.6 Preparation of alumina and silica gel with different degrees of activity.	**2**
V2.7. Control of the aspirin production process by TLC	**2**
V2.8. Separation of phenol and salicylic acid on silica gel.	**2**
V.2.9. Selection and optimization of mobile phase systems for the separation of active steroid isomers by the "Simplex" method	**2**
V.2.10. Selection and optimization of mobile phase systems for the separation of active steroid isomers by the "Prisma" method.	**2**
V 2.11. Pretreatment of technical ion exchange resins.	**2**
V.2.12. Separation of CrO_4^{2-} Br^-, SCN^- anions on microcrystalline cellulose.	**2**
V.2.13. Separation of Ni^{2+}, Co^{2+} and Fe^{3+} ions on neutral alumina. .	**2**
V.2.14. Laboratory work recovery session	**2**

VI. Bibliography

1. E. Katz, (Ed.), Quantitative Anallysis Using Chromatographic Techniques, Wiley, New York 1987.
2. S. Ahuja, in Chemical Analysis, Vol. 115, Trace and Ultratrace Anallysis by HPLC,J.P. Winefordner, ed., Wiley, New York, 1992.
3. L.R.Snyder, J.J.Kirkland si J.L.Glajch, Practical HPLC Method Development, 2d, ed. New York, 1997.
4. J.E.Knoll, J. Chromatogr. Sci., 23 (1985) 73.
5. J.P.Foley si J.G. Dorsey, Chromatographia, 18 (1984) 503.
6. Simion GOCAN, Cromatografie de înaltă performanţă, Partea a II-a, Cromatografia de lichide pe coloană, Editura Risoprint, Cluj-Napoca, 2002.
7. Mihail Simion BELDEAN-GALEA, Analiza probelor de mediu. Teorie şi aplicaţii practice, Editura Casa Cărţii de Ştiinţă, Cluj-Napoca, 2016
8. H.I.Nascu,L.Jantschi, Chimie analitica si instrumentala, Academic Pres & AcademicDirect,2009,
9. **Sorin Hodisan,Note de curs (format electronic) pe platforma de e-learning a universitatii(www.e.uoradea.ro).**
10. E. Katz, (Ed.), Quantitative Anallysis Using Chromatographic Techniques, Wiley, New York 1987.
11. S. Ahuja, in Chemical Analysis, Vol. 115, Trace and Ultratrace Anallysis by HPLC,J.P. Winefordner, ed., Wiley, New York, 1992.
12. L.R.Snyder, J.J.Kirkland si J.L.Glajch, Practical HPLC Method Development, 2d, ed. New York, 1997.
13. J.E.Knoll, J. Chromatogr. Sci., 23 (1985) 73.
14. J.P.Foley si J.G. Dorsey, Chromatographia, 18 (1984) 503.
15. S.Ebel, H.Kuhnert si W.Munk, Chromatographia, 23(1987) 934.
16. 7. L.Roman, M.Bojita si R.Sandulescu, Validarea metodelor de analiza si control, Editura Medicala, 1998.
17. **Sorin Hodisan,Lucrari laborator (format electronic) pe platforma de e-learning a universitatii(www.e.uoradea.ro).**

VII. Grading criteria

Activities	Assesment	% of final grade
Exam	Elaboration of a documentary essay on a given topic Understanding some terms and general concepts specific to chemistry Using appropriate specialized language. Identifying the type of chemical reactions. Knowing the ways of expressing the concentration of solutions. Defining dissolution and knowing the factors that influence the dissolution	Essay 30%

	of substances.Classifying chemical reactions and presenting them. Knowledge of the factors that influence the course of chemical reactions. Definition, classification and knowledge of the properties of solutions. Operation with the different types of expression of the concentration of solutions.Understanding the factors that influence the dissolution phenomenon depending on the nature of the solvate and the solvent as well as external factors.Notions about the equilibrium constant and its modification. Solving some solution problems Thorough knowledge of chromatographic techniques for the separation and identification of certain compounds (amino acids, pesticides), from plants, food products, soil, wastewater, etc.	exam 50%
Laboratory	Recognizing specific chemistry tools. Knowing basic operations in the chemistry laboratory Preparing solutions of different concentrations Using specific chemistry tools. Performing basic operations in the chemistry laboratory Recognizing and selecting the most appropriate methods for solving problems related to the concentration of solutions. Knowledge and use of equipment specific to trace analysis. Sample preparation for trace analysis. Knowledge of how to prepare the stable phase on chromatographic plates	check along the way 20%

VIII. Learning outcomes:

• acquiring specific terms;
• acquiring the knowledge mentioned for grade 5

Course coordinator,
LECTURER, DR. ENG. HODISAN SORIN

COURSE SYLLABUS

University	UNIVERSITY OF ORADEA
Faculty	**FACULTY OF INFORMATICS AND SCIENCES**
Study program*	STRUCTURAL AND APPLIED CHEMISTRY

I. Course Name: ETHICS AND INTEGRITY IN SCIENTIFIC RESEARCH

II. Course Details

No of hours/week						
Code	Semester	Credits	Lecture	Seminar	Laboratory	Project
STII-0766	1	2	2			

III. Course coordinator (title, name, surname, e-mail):
Assoc.prof.PhD Vasile-Aurel CĂUȘ, vcaus@uoradea.ro

IV. Course objectives

Acquiring competencies that meet the demands of the labour market. Carrying out professional duties in accordance with the deontological principles specific to the exercise of the profession.

V. Course content	**No. of hours**
V.1. Lecture (chapters/subchapters and paragraphs)	
V1.1. Introductory notions	2
V.1.2. Academic responsibilities and rights. Intellectual property and copyright	2
V.1.3. Scientific research and its standards in Romanian legislation	2
V.1.4. University codes of ethics. The Code of Ethics of the University of Oradea	2
V.1.5. Plagiarism and its forms. Identifying plagiarism in scientific works	2
V.1.6. Other types of breaches of academic integrity	2
V.1.7. Consequences and sanctions for the lack of academic honesty as provided by Romanian legislation	2
V.2. Laboratory/Seminar/Project: -	

VI. Bibliography

The European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers
Chelcea, S. How to Write a Bachelor's Thesis, a Doctoral Dissertation, and a Scientific Article in the Field of Socio-Human Sciences, Comunicare.ro Publishing House, Bucharest, 2007
Law No. 199/2023 on Higher Education
Law No. 206/2004 on Good Conduct in Scientific Research, Technological Development and Innovation
Law No. 319/2003 on the Status of Research and Development Personnel
Law No. 8/1996 on Copyright and Related Rights

VII. Grading criteria

Activities	Assessment	% of final grade
Colloquium	Essay: 1. Requirements in order to get the minimum grade for passing the exam: knowledge of the main concepts 2. Requirements for the maximum grade: Understanding the main concepts and providing examples thereof.	100%
Sem./Lab./Pr.	-	

VIII. Learning outcomes:

The students learn how to design and write scientific articles in compliance with the rules of professional ethics specific to research activity.

Course coordinator,

COURSE SYLLABUS

University	UNIVERSITY OF ORADEA
Faculty	FACULTY OF INFORMATICS AND SCIENCES
Study program	APPLIED AND STRUCTURAL CHEMISTRY

I. Course Name: TECHNOLOGICAL CHEMISTRY

II. Course Details

No of hours/week 3						
Code	Semester	Credits	Lecture	Seminar	Laboratory	Project
	II	5	2		1	

III. Course coordinator: Lecturer phD. eng. Claudia-Mona MORGOVAN

IV. Course objectives

Correlation of technological operations with the basic technological processes in the chemical industry, of the efficiency of a technological process with the optimal conditions for its realization (temperature, pressure, concentration) as well as of the characteristics of the machines in which the different phases of the technological process are carried out, the influence of thermodynamic parameters on the optimization of the proposed technology.

V. Course content	**No. of hours**
V.1. Lecture (chapters/subchapters and paragraphs)	
1. Generality-Fundamentals in Technological Chemistry	2
2. Technological processes, production processes	2
3. Technological flow. Criteria for choosing technological processes	2
4. Quantities characterizing industrial chemical processes	2
5. Classification of technological processes	2
6. Technical symbols and technological diagrams	2
7. Water Treatment Technology	2
8. Quality conditions for drinking water	2
9. Natural water treatment for drinking water	2
10. Industrial waters. Water softening and demineralization	2
11. Sulfuric acid technology	2
12. Fundamentals in Organic Technological Chemistry	2
13. Processing of the main natural raw materials and their transformation into basic products of the chemical industry	4
V.2. Laboratory/Seminar/Project:	
1. Protection and technology of occupational safety.	2
2. Determination of ammonia in water	2
3. Determination of hydrogen sulfide in waters	2
4. Determination of nitrates by the Lombard method	2
5. Spectrophotometric determination of zinc	2
6. Spectrophotometric determination of petroleum products	2
7. Lab Colloquium / Lab Recoveries	2

VI. Bibliography

1. C. Morgovan – Chimie tehnologică – curs platforma Moodle euoradea.ro, 2020
2. G. Jinescu – Procese hidrodinamice şi utilaje specifice în industria chimică, 1983, Editura Didactică şi Pedagogică, Bucureşti
3. I. Răşenescu – Fenomene de transfer, Editura Didactică şi Pedagogică, 1989, Bucureşti
4. E.Pincovski, M A. Blaga, M. Popescu, M.Stroescu – Tehnologie chimică generală şi procese tip, 1983, Editura Didactică şi Pedagogică, Bucureşti
5. Floarea, P. Baltă – Tehnologie chimică generală, 1977, Editura Didactică şi Pedagogică, Bucureşti
6. Cotton S.A. *Progress in inorganic Chemistry*, Interscience, Publishers, vol.I-VIII New-York, John Wiley and sons INC, 1959-106
7. T.D.Iionescu şi colab. Tehnologie chimică generală. Lucrări practice. Institutul Politehnic, 1982, Bucureşti
8. C. Morgovan – Chimie tehnologică – lucrări laborator, platforma Moodle euoradea.ro, 2020

VII. Grading criteria

Activities	Assessment	% of final grade
Exam	Written exam: 1. Requirements in order to get the minimum grade for passing the exam: elaboration of a documentation essay on an imposed theme 2. Requirements for the maximum grade: written exam dealing with some topics from the course theme	70
Seminar/Laboratory/Project	1. Active participation in laboratory classes 2. Skills training and acquiring all the knowledge acquired during practical work	30

VIII. Learning outcomes:

Knowledge	The student/graduate knows the industrial and research applications of chemical compounds in the environment, pharmacy and technology.
Skills	The student/graduate integrates experimental and computational methods for elucidating chemical mechanisms.
Responsibility and autonomy	The student/graduate complies with the rules of chemical safety and the principles of professional ethics. The student/graduate capitalizes on the research results by applying them in fields such as pharmaceuticals, environmental protection or the materials industry.

Course coordinator,

Lecturer phD. eng. Claudia-Mona MORGOVAN

COURSE SYLLABUS

University	UNIVERSITY OF ORADEA
Faculty	**FACULTY OF INFORMATICS AND SCIENCES**
Study program	**APPLIED AND STRUCTURAL CHEMISTRY** - Master

I. Course Name: ENZYME KINETIC

II. Course Details

No of hours/week: **3**						
Code	Semester	Credits	Lecture	Seminar	Laboratory	Project
STII-0250	02	7	2	-	1	-

III. Course coordinator: lecturer dr. eng. **Sanda Rodica BOTA**, sbota@yahoo.com

IV. Course objectives

In-depth study of theoretical and practical knowledge in the field of enzyme kinetics.
Utilization of specialized scientific language based on current concepts and theories.

V. Course content	**No. of hours**
V.1. Lecture (chapters/subchapters and paragraphs)	
Enzymes. Definition. Modern concepts regarding the chemical structure of enzymes. Classification. Nomenclature. Enzyme symbolism.	2
Molecular organization of enzymes.	2
Enzyme structure.	2
Specificity of enzyme action. Absolute specificity. Absolute group specificity. Relative group specificity. Stereochemical specificity.	2
Mechanisms of enzymatic action.	2
Kinetics of enzymatic reactions. The Michaelis-Menten equation.	2
Factors influencing the rate of enzymatic reactions. The influence of enzyme concentration, substrate concentration, pH, and temperature on enzymatic reactions. Enzyme effectors.	4
Acid-base catalysis. Covalent catalysis.	2
Metal-ion catalysis. Electrostatic catalysis through orientation effects and transition states.	2
Enzyme inhibition.	4
Representative enzymes.	4
V.2. Laboratory:	
Determination of urease enzymatic activity.	2
Determination of the enzymatic reaction kinetics of catalase.	2
Spectrophotometric determination of amylase enzymatic activity.	2
Determination of alcohol dehydrogenase reaction rate using fiber-optic laser spectrophotometry.	2
Determination of protease activity.	2
Influence of temperature and pH on enzymatic reactions.	2
Applications of the Michaelis–Menten equation. Influence of substrate concentration, enzyme concentration, and effectors on enzymatic reactions.	2

VI. Bibliography

Cărăban A. - Biocatalizatori şi cinetică enzimatică, Editura Universităţii din Oradea, 2006.
Cărăban A. - Introducere în cataliza enzimatică, Editura Universităţii din Oradea, 2009.
Bota S. – Cinetică enzimatică, Platforma e-Learning UO, 2025.
Cărăban A. Cinetică enzimatică. Lucrări practice, Universitatea din Oradea, format electronic şi litografiat, 2015.
Cărăban A. – Biocatalizatori şi cinetică enzimatică. Lucrări practice, Universitatea din Oradea, 2005.
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VII. Grading criteria

Activities	Assesment	% of final grade
Exam	Written exam	50
	Practical application	20
	Scientific report on a specific topic	30

VIII. Learning outcomes:

To acquire a system of knowledge regarding the study of enzyme kinetics and the factors that influence the rate of enzymatic reactions.
To interpret experimental results and establish conclusions regarding enzyme kinetics.

COURSE SYLLABUS

University	UNIVERSITY OF ORADEA
Faculty	**FACULTY OF INFORMATICS AND SCIENCES**
Study program	**APPLIED AND STRUCTURAL CHEMISTRY** - Master

I. Course Name: BIOCATALYSTS

II. Course Details

No of hours/week: **4**						
Code	Semester	Credits	Lecture	Seminar	Laboratory	Project
STII-0247	02	7	2	-	2	-

III. Course coordinator: lecturer dr. eng. **Sanda Rodica BOTA**, sbota@yahoo.com

IV. Course objectives	
In-depth study of theoretical and practical knowledge in the field of biochemistry, application of interdisciplinary knowledge for the complex treatment of biochemical phenomena.	
V. Course content	**No. of hours**
V.1. Lecture (chapters/subchapters and paragraphs)	
General overview of biocatalysts (vitamins, hormones, enzymes). Vitamins: general principles, classification, nomenclature, provitamins, avitaminosis, hypovitaminosis, hypervitaminosis.	2
Fat-soluble vitamins. Vitamin A. Vitamin E.	2
Vitamin D. Vitamin K. Vitamin F.	2
Thiamine. Folic acid.	2
Water-soluble vitamins. Riboflavin. Pantothenic acid.	2
Niacin. Pyridoxine. Biotin.	2
Vitamin B12. Vitamin C.	2
Bioflavonoids. Lipoic acid. Pangamic acid. Meso-inositol. Choline. Para-aminobenzoic acid.	2
Hormones. Introduction. Mechanism of hormone action.	2
Amino acid-derived hormones. Adrenal medullary hormones. Thyroid hormones. Other amino acid-derived hormones.	2
Protein and polypeptide hormones. Pituitary hormones. Parathyroid hormones. Pancreatic hormones.	2
Steroid hormones. Sex hormones. Adrenal cortical hormones.	2
Tissue hormones. Pheromones. Phytohormones.	2
Enzymes. General concepts. Definition, classification, nomenclature, biochemical role.	2
V.2. Laboratory:	
Occupational health and safety regulations in biochemistry laboratories. Identification reactions for water-soluble and fat-soluble vitamins.	2
Spectrophotometric determination of Vitamin A.	2
Determination of carotene (provitamin A).	2
Spectrophotometric determination of Vitamin E.	2
Identification of Vitamins B2 and B6.	2
Determination of Vitamin PP.	2
Determination of Vitamin B12.	2
Spectrophotometric determination of Vitamin C.	2
Determination of Vitamin B1.	2
Identification reactions for various hormones.	2
Chemical determination of adrenaline in protein solutions.	2
Determination of total estrogens.	2
Determination of insulin activity.	2
Colorimetric determination of catalase activity.	2

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Cărăban A. - Biocatalizatori şi cinetică enzimatică, Editura Universităţii din Oradea, 2006.
Bota S. – Biocatalizatori, Platforma e-Learning UO, 2025.
Cărăban A. - Biocatalizatori. Lucrări practice, Universitatea din Oradea, format electronic şi litografiat, 2017.
Groze A. – Biocatalizatori – lucrări de laborator, Platforma e-Learning UO, 2025.

VII. Grading criteria

Activities	Assesment	% of final grade
Exam	Written exam	50
	Practical application	20
	Scientific report on a specific topic	30

VIII. Learning outcomes:

To acquire and understand a system of knowledge regarding the correlation between the chemical structure of water-soluble and fat-soluble vitamins and their physical, chemical, and physiological properties in the organism; the relationship between hypo-, hyper-, and avitaminosis and their related pathological conditions; as well as the presentation, classification, and correlation of the chemical structure of hormones with their physiological roles in the organism.

Application of fundamental concepts to solve problems associated with the structure and reactivity of biocatalysts.

Preparation of scientific reports regarding the qualitative and quantitative analysis of biocatalysts.

To interpret experimental results and establish conclusions regarding the chemical structure and biochemical role of biocatalysts.

COURSE SYLLABUS

University	**UNIVERSITY OF ORADEA**
Faculty	**FACULTY OF INFORMATICS AND SCIENCES**
Study program*	**APPLIED AND STRUCTURAL CHEMISTRY**

I. Course Name: SPECTRAL METHODS OF ANALYSIS

II. Course Details

No of hours/week						
Code	Semester	Credits	Lecture	Seminar	Laboratory	Project
STII-0236	**2**	**7**	**2**		**2**	

III. Course coordinator (title, name, surname, e-mail): LECTURER, DR.ENG. HODISAN SORIN
sorin.hodisan@yahoo.com
CONF. UNIV. DR. ING. STANASEL OANA DELIA
ostanasel@yahoo.com

IV. Course objectives

Transmitting fundamental theoretical and practical knowledge in the field of chemistry and their application in concrete situations.
Training of capacities, skills and experimental work habits.
Training and development of capacity and skills for using modern laboratory equipment in scientific activity.
Acquiring concepts related to the development and investigation of methods for presenting and processing experimental data.
Acquisition of theoretical knowledge specific to the field of very low concentrations.
Knowledge of the principles of sample collection, storage and processing in trace analysis.
Develop skills in applying special analytical techniques used in trace analysis.
Develop practical skills in applying spectral analysis methods that can be used in trace analysis.
Acquiring theoretical concepts related to modern spectral analysis methods, which are the basis for the analysis of any type of sample in all analysis laboratories;

V. Course content	**No. of hours**
V.1. Introductory aspects regarding spectral analysis methods	**2**
V.2. Atomic absorption spectroscopy (AAS)	2
V.3. Nuclear magnetic resonance spectroscopy	2
V.4. Spectroscopy. Nuclear magnetism.	2
V.5. Molecular absorption spectroscopy	2
V.6. UV-VIS, IR spectrometric methods applied in the control of pharmaceutical products	2
V.7. Microwave spectrometry (rotational spectra)	2
V.8. UV-VIS molecular absorption spectrometry (Frank-Condon Principle)	2
V.9. Low and high frequency conductometry	2
V.10. Mass spectrometry coupled with chromatographic methods. Part 1	2
V.11. Mass spectrometry coupled with chromatographic methods. Part 2	2
V.12. Prism spectrometry	2
V.13. Atomic fluorescence emission spectrometry	2
V.14. Flame photometry	2

V.2. Laboratory:	
V.2.1. Training students on labor protection rules in the spectral analysis methods laboratory.	**2**
V.2.2. Presentation of solid samples (soils, plants, food) for analysis by spectral methods.	**2**
V2.3. Application of atomic absorption spectroscopy technique to the determination of nickel content in wastewater	
V2.4. Application of atomic absorption spectroscopy technique to determine copper content in water.	**2**
V2.5. Application of atomic absorption spectroscopy technique to the determination of cobalt content in aqueous samples.	**2**
V2.6 Comparative study on the UV-VIS absorption spectra of some coordination compounds of the cobalt ion.	**2**
V2.7. Application of atomic absorption spectroscopy technique to the determination of chromium content in aqueous samples.	**2**
V2.8. UV-VIS spectra recording for organic samples and interpretation of spectra	**2**
V.2.9. FT-IR spectroscopy method for liquid organic samples. Interpretation of spectra	**2**
V.2.10. Application of atomic absorption spectroscopy technique to the determination of manganese content in aqueous samples	**2**
V 2.11. Application of atomic absorption spectroscopy technique to the determination of cadmium content in aqueous samples	**2**
V.2.12. Application of atomic absorption spectroscopy technique to determine lithium content in water	**2**
V.2.13. Application of atomic absorption spectroscopy technique to determine cadmium content in water	**2**
V.2.14. Laboratory work recovery session	**2**

VI. Bibliography

Bibliografie

1. C. Luca; Al. Luca; I.Al. Crisan; *Chimie analitica si analiza instrumentala*, EDP, Bucuresti, 1983.
1. Al. Luca; Cl. Calu; *Chimie analitica si analiza instrumentala* I.P. Iasi, 1990.
2. D.A. Skoog; *Principles of instrumental Analysis* 4th; Ed. Sounders College Publishing, New York, 1992.
3. D. Harvey; *Modern Analytical Chemistry*.The Mc Graw-Hill Companies, Inc. 2000.
4. R. Dyer; *Organic Spectral Problems*; Preutice Hall, Inc. Englewood Cliffs, New Jersey, 2000.
5. S. Bungău, F. Bănică, *„Metode de analiză aplicate în fitochimie”*, Ed. Universităţii din Oradea, Oradea, 2010.
6. S. Bungău, V. Merca, L. Copolovici, „*Analiză instrumentală şi metode de separare”,* Ed. Universităţii din Oradea, Oradea, 2004.
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8. Sorin Hodisan, Note de curs (format electronic) pe platform de e-learning a universitatii (www.e.uoradea.ro).
9. T. Frentiu, A.C. Mot, E. Covaci, *Metode instrumentale de analiza*, Presa Universitara Clujeana, 2019.
10. C. Luca;Al. Luca; I.Al. Crisan: *Chimie analitica si analiza instrumentala*, EDP, Bucuresti, 1983.
11. D. Harvey: *Modern Analytical Chemistry*.T he Mc Graw-Hill Companies, Inc. 2000.
12. S. Bungău, D. M. Tiţ : *Metode de extracţie şi analiză instrumentală. Aplicaţii,* Editura Universităţii din Oradea, Oradea, 2010
13. (2018): Perkin Elmer Corp., Analytical Methods for Atomic Absorption Spectrophotometry.
14. (2018): Perkin Elmer Corp., Analytical Methods for Furnace Atomic Absorption Spectrophotometry.
15. O. Stănăşel: *Lucrări de laborator – metode spectrale de analiză* – pentru uzul studenţilor, Platforma e-Learning a Universităţii din Oradea.

VII. Grading criteria

Activities	Assesment	% of final grade
Exam	Elaboration of a documentary essay on a given topic Understanding some terms and general concepts specific to chemistry	Essay 30%

	Using appropriate specialized language. Identifying the type of chemical reactions. Knowing the ways of expressing the concentration of solutions. Defining dissolution and knowing the factors that influence the dissolution of substances.Classifying chemical reactions and presenting them. Knowledge of the factors that influence the course of chemical reactions. Definition, classification and knowledge of the properties of solutions. Operation with the different types of expression of the concentration of solutions.Understanding the factors that influence the dissolution phenomenon depending on the nature of the solvate and the solvent as well as external factors.Notions about the equilibrium constant and its modification.	exam 50%
Laboratory	Recognizing specific chemistry tools. Knowing basic operations in the chemistry laboratory Preparing solutions of different concentrations Using specific chemistry tools. Performing basic operations in the chemistry laboratory Recognizing and selecting the most appropriate methods for solving problems related to the concentration of solutions. Knowledge and use of equipment specific to trace analysis. Sample preparation for trace analysis. Recognizing and selecting the most appropriate methods for solving problems specific to the discipline.	check along the way 20%

VIII. Learning outcomes:

• acquiring specific terms;

• acquiring the knowledge mentioned for grade 5

Course coordinator,

LECTURER, DR.ENG. HODISAN SORIN

CONF. DR. ING. STANASEL OANA DELIA

COURSE SYLLABUS

University	UNIVERSITY OF ORADEA
Faculty	**FACULTY OF INFORMATICS AND SCIENCES**
Study program	**APPLIED AND STRUCTURAL CHEMISTRY** - Master

I. Course Name: PRACTICE

II. Course Details

No of hours/week: 60/ 4.28						
Code	Semester	Credits	Lecture	Seminar	Laboratory	Project
STII-0416	02	3	-	-	4.28	-

III. Course coordinator: associate professor dr. eng. **OANA DELIA STĂNĂŞEL**, ostanasel@uoradea.ro

IV. Course objectives	
To become familiar with laboratory working techniques. To develop skills specific to work in physical-chemical and biochemical analysis laboratories.	
V. Course content	**No. of hours**
V.1. Lecture (chapters/subchapters and paragraphs)	
V.2. Laboratory/*Seminar*:	
General principles of occupational health and safety in physical-chemical and biochemical analysis laboratories.	5
Studying the documentation and performing the practical procedures for sample collection	5
Studying the documentation specific to the use of laboratory equipment	5
Studying the specific documentation for the procedures used to determine chemical, physical-chemical, and biochemical parameters in a laboratory.	10
Performing standardized laboratory work and methods in accordance with established procedures	15
Recording the data obtained from laboratory work in accordance with established procedures	5
Performing calculations, data processing, and interpreting results	5
Organized visits to industrial laboratories, water utility companies, and medical laboratories	10

VII. Grading criteria

Activities	Assesment	% of final grade
Cv	Colloquium	50
	Active participation in practical training	50

VIII. Learning outcomes:

Knowledge in industrial and research applications of chemical compounds in the environment, pharmacy, and technology.

Conducting experiments, rigorously applying analytical methods, and interpreting results while complying with occupational health and safety regulations. An interdisciplinary approach to topics within the fields of chemistry and biochemistry. Abilities to integrate experimental and computational methods.

COURSE SYLLABUS

University	**UNIVERSITY OF ORADEA**
Faculty	**FACULTY OF ENERGY ENGINEERING AND INDUSTRIAL MANAGEMENT**
Study program*	**APPLIED AND STRUCTURAL CHEMISTRY**

I. Course Name: INORGANIC TEHNICAL COMPOUND

II. Course Details

No of hours/week						
Code	Semester	Credits	Lecture	Seminar	Laboratory	Project
STII-0228	I	7	2		1	

III. Course coordinator (title, name, surname, e-mail):

IV. Course objectives	
General objective of the discipline Explanation and interpretation of some properties, concepts, approaches, theories, models and fundamental notions of the structure and reactivity of chemical compounds and their use in technology Application of fundamental notions to solve problems associated with the structure and reactivity of chemical compounds and their practical applicability Knowledge of methods for the synthesis of inorganic compounds Specific objectives To know, understand and use the general terms and notions specific to chemistry To know the main types of inorganic compounds and their properties with applications in technology To know the natural state of the main inorganic compounds To know the uses in industry and laboratory of the main types of inorganic compounds	
V. Course content	**No. of hours**
V.1. Lecture (chapters/subchapters and paragraphs)	
Metals - properties, production, uses.	2
Non-ferrous materials.	2
Alloys.	2
Noble gases.	2
Nonmetals.	2
Minerals	2
Minerals-halogens	2
Minerals-carbonates, sulfides, sulfates	2
Silicates	2
Inorganic pigments	2
Inorganic binders.	2
Acids and bases.	2
Inorganic compounds used in pyrotechnics.	2
Inorganic compounds used as chemical fertilizers.	2
V.2. Laboratory/Seminar/Project:	
Electric cells	2
Obtaining metals by electrochemical method	2
Obtaining high-purity metals	2
Galvanizing	2
Obtaining non-metals by electrochemical method	2
Obtaining compound substances by electrochemical method	2
Reducing and oxidizing agents	2

VI. Bibliography

1. G. Hollis, Modern Inorganic Chemistry, NY Research Press, 2017
2.D.L. Perry, Handbook of Inorganic componds, CRC Press, 2011
3. A. Fodor, *Compuşi tehnici anorganici*, Ed. Univ. Oradea, 2011-postata si pe platforma elearning Univ.Oradea
4.A. Fodor, A. Petrehele, *Chimie anorganică generală*, Ed. UNiv. Oradea, 2011
5.A. Fodor, A. Şuteu , *Chimia anorganică. Nemetale*, Ed. Univ. Oradea, 2000
6.A. Fodor, A. Şuteu , *Chimia anorganică. Metale*, Ed. Univ. Oradea, 2000
7. e learning uoradea platform

VII. Grading criteria

Activities	Assesment	% of final grade
Exam	Written exam	40%
Weekly homework	check along the way	20%
Documentary essay	Documentary essay on a topic of your choice from a given list	20%
Seminar/Laboratory/Project		20%

VIII. Learning outcomes:

Knowledge	The student/graduate possesses in-depth knowledge of the structure and reactivity of inorganic and organic compounds.
Skills	The graduating student is able to document the applicability of the properties of inorganic and organic compounds.
Responsibility and autonomy	The student/graduate documents and prepares reports on the areas of use of inorganic and organic compounds.
Additional results	The student/graduate develops research projects in structural and applied chemistry, using rigorous scientific methodologies.

Course coordinator,
Assitent professor dr. Fodor Alexandrina

COURSE SYLLABUS

University	**UNIVERSITY OF ORADEA**
Faculty	**FACULTY OF INFORMATICS AND SCIENCES**
Study program*	**APPLIED AND STRUCTURAL CHEMISTRY**

I. Course Name: **ORGANIC TECHNICAL COMPOUNDS**

II. Course Details

No of hours/week						
Code	Semester	Credits	Lecture	Seminar	Laboratory	Project
STII 0229	**III**	**7**	**2**	**-**	**1**	

III. Course coordinator (title, name, surname, e-mail): Şef lucr.dr. ing**. Mioara SEBEŞAN**
msebesan@uoradea.ro

IV. Course objectives

Acquisition of theoretical concepts related to organic substances used in the technical industry and understanding the chemical structure of organic technical substances obtained through synthesis or isolated from natural compounds, such as drugs and dyes of particular importance.
Acquisition of knowledge and concepts related to the design, management, and efficiency analysis of technological processes.
Acquisition of concepts related to the development and investigation of methods for presenting and processing experimental data.

V. Course content	**No. of hours**
V.1. Lecture (chapters/subchapters and paragraphs)	
5.1.1. Antibiotics	2
5.1.2. Sulfonamides	2
5.1.3. Anesthetic drugs	2
5.1.4. Cardiovascular drugs	2
5.1.5. Hypoglycemic and diuretic drugs	2
5.1.6. Antiseptic drugs	2
5.1.7. Cytostatic drugs (sau *Antineoplastic agents*)	2
5.1.8. Anticonvulsant (antiepileptic) drugs	2
5.1.9. Autonomic nervous system drugs	2
5.1.10. Antituberculosis drugs	2
5.1.11. Antimalarial drugs	2
5.1.12. Dyes. Azo dyes	2
5.1.13. Anthraquinone and indanthrene dyes	2
5.1.14. Dyes. Triphenylmethane dyes	2
V.2. Laboratory:	
5.2.1. Presentation of occupational health and safety regulations in the organic chemistry laboratory	2
5.2.2. Synthesis of Methylene Blue dye	2
5.2.3. Synthesis and analysis of acetylsalicylic acid (Aspirin)	2
5.2.4. Synthesis and analysis of benzocaine (Anesthezine)	2
5.2.5. Synthesis of Methyl Orange	2
5.2.6. Synthesis and analysis of sulfacetamide	2
5.2.7. Make-up session and final evaluation	2

VI. Bibliography

6.1. C.Oniscu- Chimia şi tehnologia medicamentelor, Ed.tehnică, .Bucureşti, 1988.
6.2. Margareta Avram - Chimie organică, vol. II, Ed. Academiei, 1983.
6.3. Iovu M., *Organic Chemistry*, 6th Edition, Editura Monitorul Oficial, Bucureşti, 2008.
6.3. Hadaruga, D.I., Medicamente de sinteza, Note de curs, Electronic Release, 2011.
6.4. Daescu, C., Chimia si tehnologia medicamentelor, Ed. Politehnica, Timisoara, 2008.
6.5. Daescu, C., Industria medicamentului, Editura Politehnica, Timisoara, 2007.
6.6. Vogel P., Houk K.N., *Organic Chemistry: Theory, Reactivity and Mechanisms in Modern*

Synthesis, 1st Edition, Wiley-VCH, 2019.
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6.11. https://www.organic-chemistry.org/
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VII. Grading criteria

Activities	Assesment	% of final grade
Exam	***Written exam:*** ***1. Requirements in order to get the minimum grade for passing the exam*** Minimum 50% attendance of the total number of lecture hours. Mandatory attendance at all laboratory hours. Knowledge of the main categories of synthetic organic substances presented at the lectures. ***2.Requirements for the maximum grade*** Knowledge of the theories underlying the explanation of the chemical structure of organic technical compounds. Classification and presentation of chemical synthesis reactions for organic technical compounds. Knowledge of the factors influencing the progress of chemical reactions.	**80%**
Seminar/Laboratory/Project	***1.Requirements in order to get the minimum grade for passing the laboratory*** At least 80% attendance of the total number of laboratory hours. Knowledge of fundamental operations in the organic chemistry laboratory. Identification of specific chemistry tools and laboratory equipment. Performing the synthesis of organic technical compounds in the organic chemistry laboratory. ***2.Requirements for the maximum grade for passing the laboratory*** Active participation in all laboratory hours. Accurate performance of organic syntheses in the chemistry laboratory. Investigation of the chemical properties of organic technical compounds.	**20%**

VIII. Learning outcomes:

The student/graduate is familiar with the industrial and research applications of organic technical compounds in the fields of environment, pharmacy, and technology.
Student describes the structure, properties and reactivity of chemical organic compounds, so as to be able to correctly transmit knowledge from the field of organic chemistry, in a scientific manner, to pupils, students and other interested socio-economic categories.
The student identifies and describes the basic and modern experimental techniques used in the analysis and characterization of organic chemical compounds.

Course coordinator,

Şef lucr.dr. ing**. Mioara SEBEŞAN**

COURSE SYLLABUS

University	UNIVERSITY OF ORADEA
Faculty	**FACULTY OF INFORMATICS AND SCIENCES**
Study program	**APPLIED AND STRUCTURAL CHEMISTRY**

I. Course Name: ENVIRONMENTAL DEPOLLUTION TECHNIQUES

II. Course Details

No of hours/week 4						
Code	Semester	Credits	Lecture	Seminar	Laboratory	Project
	III	8	2		2	

III. Course coordinator: Lecturer phD. eng. Claudia-Mona MORGOVAN

IV. Course objectives

Transmission of fundamental theoretical and practical knowledge in the field of environmental quality protection and the global phenomenon of pollution with their application in concrete situations. Assimilation of the notions of priority pollutants, environmental monitoring, analysis and control methods for specific and global parameters of water, air, soil quality, systematization of purification methods and techniques according to the requirements of safe water, in conjunction with the environmental legislation.

V. Course content	**No. of hours**
V.1. Lecture (chapters/subchapters and paragraphs)	
6. 1. INTRODUCTION Environment (etymology, terms, definition) Sources of water, air and soil pollution	2
6. 2. WATER POLLUTION Water categories. Water quality Identification of water pollutants Chemical water pollution Water treatment and purification methods	6
6. 3. SUPERVISION AND CONTROL OF THE QUALITY OF NATURAL WATERS Collection of water samples for physicochemical and microbiological analysis Determination of chemical indicators of natural waters	4
6. 4. SOIL POLLUTION Pesticide pollution Pollution with chemical fertilizers Heavy metal pollution and wastewater Ways of assessing soil pollution	4
6. 5. SOIL DEPOLLUTION TECHNIQUES Physical methods Chemical methods Thermal methods Biological methods	4
6.6. AIR POLLUTION Chemical pollution of the atmosphere Prevention of air pollution	4
6.7. TECHNIQUES AND METHODS OF DEPOLLUTION OF THE ATMOSPHERE Air Sample Collection Air Quality Monitoring Air pollution techniques	4
V.2. Laboratory/Seminar/Project:	

1. Protection and technique of occupational safety.	2
2. Depolluting chemical processes: neutralization and precipitation of nickel ion	2
3. Depolluting chemical processes: reduction of hexavalent chromium in used solutions	2
4. Purification of zinc ion from used solutions; as zinc oxalate	2
5. Optimizing zinc extraction according to pH	2
6. Dosing of iron ion from wastewater, by the complexonometric method	2
7. Removal of heavy metals from waters by adsorption on activated carbon	4
8. Removal of heavy metals from wastewater by ion exchange adsorption on cations	4
9. Removal of nitrates from wastewater by ion exchange adsorption on cations	2
10. Electrochemical methods of wastewater treatment	4
11. Lab Colloquium / Lab Recovery	2

VI. Bibliography

1. C. Morgovan – Tehnici de depoluare a mediului – curs platforma Moodle euoradea.ro, 2020
2. Henry G. J., Heinke W.G., - *Environmental Science and Engineering*, Prentice Hall, 1996, New Jersey, S.U.A
3. Georgeta Gavriş: *Chimia mediilor poluate*, Editura Universităţii din Oradea, **2003**
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7.. Duță A., Poluarea, Monitorizarea și Tratarea Apelor, Editura Transilvania, Brașov, 2001

VII. Grading criteria

Activities	Assessment	% of final grade
Exam	Written exam: 1. Requirements in order to get the minimum grade for passing the exam: elaboration of a documentation essay on an imposed theme 2. Requirements for the maximum grade: written exam dealing with some topics from the course theme	70
Seminar/Laboratory/Project	1. Active participation in laboratory classes 2. Skills training and acquiring all the knowledge acquired during practical work	30

VIII. Learning outcomes:

Knowledge	The student/graduate understands the principles of spectroscopy, chromatography, and other modern methods of chemical characterization.
Skills	The student/graduate uses modern laboratory equipment for the analysis of the structure and properties of compounds.
Responsibility and autonomy	The student/graduate demonstrates autonomy in the design and management of applied activities in research or industry. The student/graduate develops research projects in structural and applied chemistry, using rigorous scientific methodologies.

Course coordinator,

Lecturer phD. eng. Claudia-Mona MORGOVAN

COURSE SYLLABUS

University	**UNIVERSITY OF ORADEA**
Faculty	**FACULTY OF INFORMATICS AND SCIENCES**
Study program	**APPLIED AND STRUCTURAL CHEMISTRY**

I. Course Name: RESEARCH PRACTICAL PERRIOD II

II. Course Details

No of hours/week 2						
Code	Semester	Credits	Lecture	Seminar	Laboratory	Project
STII-0369	IV	5			2	

III. Course coordinator: Professor Habil. phD. Eleonora MARIAN

IV. Course objectives

Research practice aims to acquire competences in order to be able to establish and apply research methods on a given topic. Research practice II aims to acquire skills in order to establish and rigorously apply research methods in the field of chemistry or related field, the ability to work individually and in a team, in compliance with the legislation in force.

V. Course content	**No. of hours**
V.1. Lecture (chapters/subchapters and paragraphs)	
V.2. Laboratory/Seminar/Project:	
5.2.1 Research planning	2
5.2.2. Establishing study methods	2
5.2.3. Bibliographic study	2
5.2.4. Thermodynamic/kinetic methods	2
5.2.5. Analytical methods	2
5.2.6. Preparation of solutions, reagents, laboratory equipment	2
5.2.7. Recording of results	2
5.2.8. Reproducibility and accuracy of results	2
5.2.9. Correlation of results	2
5.2.10. Methods of interpreting the results	2
5.2.11. Methods of interpreting the results	2
5.2.12. Comparison of results	2
5.2.13. Case study	2
5.2.14. Conclusions on the research carried out	2

VI. Bibliography

P.W.Atkins, Tratat de chimie –fizica, Ed. Tehnica, 1996.
D. Harvey, "Modern Analytical Chemistry", McGraw-Hill, 2000.
Excel, Mathcad,
www.sciencedirect.ro, www.springerlink.com

VII. Grading criteria

Activities	**Assessment**	**% of final grade**
Exam		
Seminar/Laboratory/Project	1. Active participation in laboratory classes 2. Skills training and acquiring all the knowledge acquired during practical work Colloquium - Final grade = arithmetic average of the grades for each application	100

VIII. Learning outcomes:

Knowledge	The student/graduate knows the industrial and research applications of chemical compounds in the environment, pharmacy and technology.
Skills	The student/graduate integrates experimental and computational methods for elucidating chemical mechanisms.
Responsibility and autonomy	The student/graduate complies with the rules of chemical safety and the principles of professional ethics. The student/graduate capitalizes on the research results by applying them in fields such as pharmaceuticals, environmental protection or the materials industry.

Course coordinator,

Professor Habil. phD. Eleonora MARIAN

COURSE SYLLABUS

University	UNIVERSITY OF ORADEA
Faculty	FACULTY OF INFORMATICS AND SCIENCES
Study program*	APPLIED AND STRUCTURAL CHEMISTRY

I. Course Name: Corrosion and corrosion protection

II. Course Details

No of hours/week						
Code	Semester	Credits	Lecture	Seminar	Laboratory	Project
STII-0782	4	6	2	-	1	-

III. Course coordinator (title, name, surname, e-mail):

IV. Course objectives

Correlating knowledge with industry issues: notions related to corrosion thermodynamics and kinetics, optimal methods for limiting the corrosion phenomenon.

V. Course content	No. of hours
V.1. Lecture (chapters/subchapters and paragraphs)	
Electrochemical systems. Electrolysis. Electrochemical efficiency.	2
Electrolyte solutions. Electrodes. Transport phenomena in electrolyte solution.	2
General notions of corrosion: definition, classification, theories.	2
Thermodynamics of corrosion.	2
Kinetics of corrosion	2
Methods for quantitative evaluation of corrosion	2
Corrosion in gases	2
Passivity of metals	2
Forms of localized corrosion	2
Anti-corrosion protection. Classification of anti-corrosion protection methods.	2
Anti-corrosion protection by galvanic deposition of some metals and alloys	2
Anti-corrosion protection by using corrosion inhibitors and by using electrochemical methods	2
V.2. Laboratory/Seminar/Project:	
Identification of general and localized forms of corrosion.	2
Determination of electrode potential	2
Determination of corrosion potential	2
Determination of corrosion rate by gravimetric method	2
Aluminum anodizing	2
Anti-corrosion protection by galvanization	2

VI. Bibliography

1. G.E.Badea, Coroziune si protectie anticoroziva, Ed. Universitatii din Oradea, 2022.
2. G.E. Badea, Note de curs. Coroziune si protectie anticoroziva (format electronic) pe platforma de
3. e-learning a universitatii (www.e.uoradea.ro)
4. G.E.Badea, Chimie si Coroziune, Ed.Universitatii din Oradea, 2007.
5. T.Badea si altii, Electrochimie si coroziune, Ed.Matrixrom, Bucuresti, 2005.
6. G.E.Badea, Chimie generala, Lucrari de laborator, 2007.
7. G.E.Badea, Coroziune si protectie anticorozivă-lucrari de laborator (format electronic) pe platforma de e-learning a universitatii (www.e.uoradea.ro)

VII. Grading criteria

Activities	Assesment	% of final grade
Exam	Written 1. Requirements in order to get the minimum grade for passing the exam:Scientific report on a method of anti-corrosion protection.	50%

	2. Requirements for the maximum grade: PPT and oral presentation of the report	25%
Seminar/Laboratory/Project	Participation in activities, processing of experimental data, and preparation of reports.	25%

VIII. Learning outcomes:

The student/graduate knows the industrial and research applications of chemical compounds in the environment and technology.
The student/graduate integrates experimental and computational methods to elucidate electrochemical mechanisms.
The student/graduate respects chemical safety regulations and the principles of professional ethics.
The student/graduate capitalizes on research results by applying them in fields of industry.

Course coordinator,
Prof.dr.ing. Gabriela Elena Badea

COURSE SYLLABUS

University	UNIVERSITY OF ORADEA
Faculty	**FACULTY OF INFORMATICS AND SCIENCES**
Study program*	**APLIEAD AND STRUCTURAL CHEMISTRY**

I. Course Name: TRACE CHEMICAL ANALYSIS

II. Course Details

No of hours/week						
Code	Semester	Credits	Lecture	Seminar	Laboratory	Project
STII-0782	**4**	**6**	**2**		**1**	

III. Course coordinator (title, name, surname, e-mail): LECTURER, DR.ENG. HODISAN SORIN sorin.hodisan@yahoo.com

IV. Course objectives

Transmitting fundamental theoretical and practical knowledge in the field of chemistry and their application in concrete situations.
Training of capacities, skills and experimental work habits.
Training and development of capacity and skills for using modern laboratory equipment in scientific activity.
Acquiring concepts related to the development and investigation of methods for presenting and processing experimental data.
Acquisition of theoretical knowledge specific to the field of very low concentrations.
Knowledge of the principles of sample collection, storage and processing in trace analysis.
Develop skills in applying special analytical techniques used in trace analysis.
Develop practical skills in applying spectral and chromatographic analysis methods that can be used in trace analysis.
Applying cutting-edge techniques in instrumental analysis necessary to acquire specialized technical skills used in laboratory analyses;

V. Course content	**No. of hours**
V.1. Introduction to trace analysis. Specific problems of trace analysis methods	**2**
V.2.. The role of trace impurities.	2
V.3. General aspects of trace analysis.	2
V.4. Instability of concentrations of very dilute solutions.	2
V.5. Sources of losses and impurities.	2
V.6. Chemical purification of some reagents and solvents.	2
V.7. Preconcentration and separation of trace elements.	2
V.8. Methods for separating trace elements.	2
V.9. Optical methods of trace analysis**.**	2
V.10. Electrochemical methods for trace analysis.	2
V.11. Chromatographic methods for trace analysis.	2
V.12. Radiochemical and radiometric methods.	2
V.2. Laboratory:	
V.2.1. Labor protection in the laboratory. Presentation of the subject matter of trace analysis. Presentation of laboratory work. Introductory concepts.	**2**
V.2.2. Selective extraction of metals as dithizonates by pH regulation	**2**
V2.3. Separation of a mixture of heavy metal cations by TLC.	**2**
V2.4. Separation of a mixture of amino acids by HPLC.	**2**
V2.5. Chromatographic analysis of flavonoid compounds by HPLC	**2**
V.2.6. Laboratory work recovery session	**2**

2

VI. Bibliography

1. Dumitrescu,C.Prodanescu, Analiza instrumentala. Aspecte teoretice si practice ale fluorescentei de raze X, Ed.Universitatii Bucuresti, 1998.
2. A.Medvedovici, F.Tache , Notiuni fundamentale si marimi caracteristice in cromatografie, Ed. Universitatii Bucuresti, 1997.
3. C.Liteanu, S.Gocan, A.Bold, Separatologie analitica, Ed. Dacia, Cluj-Napoca, 1981.
4. S.Mager, Analiza structurala organica, Ed. Stiintifica si Enciclopedica, Bucuresti, 1979.
5. Gh.Tanase, Metode instrumentale de analiza. Metode spectrometrice, Ed.Univ.Bucuresti, 1995.
6. Mihail Simion Beldean-Galea, Analiza probelor de mediu. Teorie şi aplicaţii practice, Editura Casa Cărţii de Ştiinţă, Cluj-Napoca, 2016
7. S.Hodisan, Note de curs (format electronic) pe platforma de e-learning a universitatii(www.e.uoradea.ro).
1. V.Dumitrescu,C.Prodanescu, Analiza instrumentala. Aspecte teoretice si practice ale fluorescentei de raze X, Ed.Universitatii Bucuresti, 1998.
2. A.Medvedovici, F.Tache , Notiuni fundamentale si marimi caracteristice in cromatografie, Ed. Universitatii Bucuresti, 1997.
3. C.Liteanu, S.Gocan, A.Bold, Separatologie analitica, Ed. Dacia, Cluj-Napoca, 1981.
4. S.Mager, Analiza structurala organica, Ed. Stiintifica si Enciclopedica, Bucuresti, 1979.
5. Gh.Tanase, Metode instrumentale de analiza. Metode spectrometrice, Ed.Univ.Bucuresti, 1995.
6. Talbot HP. An introductory course of quantitative chemical analysis. OKFN, India,2011
7. S.Hodisan, Lucrari practice (format electronic) pe platforma de e-learning a universitatii(www.e.uoradea.ro).

VII. Grading criteria

Activities	Assesment	% of final grade
Exam	Elaboration of a documentary essay on a given topic Understanding some terms and general concepts specific to chemistry Using appropriate specialized language. Identifying the type of chemical reactions. Knowing the ways of expressing the concentration of solutions. Defining dissolution and knowing the factors that influence the dissolution of substances.Classifying chemical reactions and presenting them. Knowledge of the factors that influence the course of chemical reactions. Definition, classification and knowledge of the properties of solutions. Operation with the different types of expression of the concentration of solutions.Understanding the factors that influence the dissolution phenomenon depending on the nature of the solvate and the solvent as well as external factors.Notions about the equilibrium constant and its modification.	Essay 30% exam 50%
Laboratory	Recognizing specific chemistry tools. Knowing basic operations in the chemistry laboratory Preparing solutions of different concentrations Using specific chemistry tools. Performing basic operations in the chemistry laboratory Recognizing and selecting the most appropriate methods for solving problems related to the concentration of solutions. Knowledge and use of equipment specific to trace analysis. Sample preparation for trace analysis.	check along the way 20%

VIII. Learning outcomes:

• acquiring specific terms;
• acquiring the knowledge mentioned for grade 5

course coordinator,
LECTURER, DR.ENG. HODISAN SORIN

COURSE SYLLABUS

University	**UNIVERSITY OF ORADEA**
Faculty	**FACULTY OF INFORMATICS AND SCIENCES**
Study program*	**APPLIED AND STRUCTURAL CHEMISTRY**

I. Course Name: Research practical perriod I

II. Course Details

No of hours/week						
Code	Semester	Credits	Lecture	Seminar	Laboratory	Project
STII-0368	3	8		-	4	

III. Course coordinator (title, name, surname, e-mail):

IV. Course objectives

"Research Practice" aims to acquire skills in order to establish and rigorously apply research methods in the field of chemistry or a related field, the ability to work individually and in a team, while respecting the legislation.

V. Course content	**No. of hours**
V.1. Lecture (chapters/subchapters and paragraphs)	
-	
V.2. Laboratory/Seminar/Project:	
Research planning	4
Establishing the research topic	4
Bibliographic research - databases	4
Bibliographic research - files	8
Bibliographic research - files	8
Bibliographic research - abstract	4
Choosing research methods	4
Choosing equipment for experimental research	4
Results of experimental research	4
Processing research results	4
Conclusions on the research carried out	4
Ethics of scientific research. Copyright	4

VI. Bibliography

1. P.W.Atkins, Tratat de chimie –fizica, Es. Tehnica, 1996.
2. D. Harvey, “Modern Analytical Chemistry”, McGraw-Hill, 2000.
3. www.sciencedirect.ro,
4. www.springerlink.com
5. https://www.webofscience.com
6. www.scopus.com

VII. Grading criteria

Activities	**Assesment**	**% of final grade**
Exam	Written 1. Requirements in order to get the minimum grade for passing the exam: Scientific report on a specific research topic. 2. Requirements for the maximum grade: PPT and oral presentation of the report	50 25%
Seminar/Laboratory/Project	Participation in activities, processing of experimental data, and preparation of reports.	25%

VIII. Learning outcomes:

The student/graduate knows the industrial and research applications of chemical compounds in the environment and technology.

The student/graduate integrates experimental and computational methods to elucidate chemical mechanisms.

The student/graduate respects chemical safety regulations and the principles of professional ethics.

The student/graduate capitalizes on research results by applying them in fields of industry.

By the end of the course, the student is able to perform advanced searches in academic databases, identifying and critically selecting literature relevant to a chosen research topic.

Course coordinator,
Prof.dr.ing. Gabriela Elena Badea

COURSE SYLLABUS

University	**UNIVERSITY OF ORADEA**
Faculty	**FACULTY OF INFORMATICS AND SCIENCES**
Study program*	**STRUCTURAL AND APPLIED CHEMISTRY** **MASTER'S UNIVERSITY STUDIES - SECOND CYCLE**

I. Course Name: DISSERTATION PREPARATION

II. Course Details

No of hours/week						
Code	Semester	Credits	Lecture	Seminar	Laboratory	Project
SEAQ PE-U. 01	**4**	**5**			**2**	

III. Course coordinator (title, name, surname, e-mail): LECTURER, DR.ENG. HODISAN SORIN sorin.hodisan@yahoo.com

IV. Course objectives

Transmitting fundamental theoretical and practical knowledge in the field of chemistry and their application in concrete situations.

Training of capacities, skills and experimental work habits.

Training and development of capacity and skills for using modern laboratory equipment in scientific activity.

Acquiring concepts related to the development and investigation of methods for presenting and processing experimental data.

Acquisition of theoretical knowledge specific to the field of very low concentrations.

The curriculum of the discipline "Dissertation Writing" was designed to ensure the completion of the final thesis according to internal and national procedures.

"Elaboration of the dissertation" aims to complete a thesis, taking into account the specific requirements in the field of chemistry.

The student/graduate capitalizes on research results by applying them in fields such as pharmaceuticals, environmental protection, or the materials industry.

V. Course content	

V.2. Laboratory: **V.2.1.** Documentation using written documentation resources - specialized books **V.2.2.** Documentation using written documentation resources - specialized journals. **V2.3**. Documentation using written documentation resources - internet, databases **V2.4**. Systematization of selected and obtained information. **V2.5.** Citing bibliographic sources according to copyright law **V2.6** Designing experimental research activities **V2.7**. Presentation of the experimental results obtained **V2.8.** Interpretation of the results obtained **V.2.9.** Establishing conclusions and writing the bibliography **V.2.10.** Technical editing of the paper, in compliance with Aracis requirements **V 2.11**. Writing a dissertation summary **V.2.12**. Presentation of the dissertation for public defense	 **2** **2** **2** **2** **2** **2** **2** **2** **2** **2** **2** **2**

VI. Bibliography

www.uoradea.ro
www.sciencedirect.ro
www.springerlink.com
www.isiknowledge.com
www.edu.ro
www.aracis.ro
S.Hodisan, Note de curs (format electronic) pe platform de e-learning a universitatii(www.e.uoradea.ro).

VII. Grading criteria

Activities	Assesment	% of final grade
Exam	Writing a documentary essay on a given topic	Essay 40%
Laboratory	Grading of each application. The final grade represents the arithmetic mean, rounded. Minimal knowledge of: -the form and content of a dissertation -how to use and cite bibliography -internal standards and procedures for dissertation writing -national standards and procedures for dissertation writing	 check along the way 60%

VIII. Learning outcomes:

• acquiring specific terms;
• acquiring the knowledge mentioned for grade 5

Course coordinator,
LECTURER, DR.ENG. HODISAN SORIN

**Se va completa cu unul din programele de studii de licență sau master gestionat de:*

- ***DTMPI: KNITTING AND CLOTHING TECHNOLOGY, INDUSTRIAL ECONOMICS ENGINEERING, QUALITY MANAGEMENT AND CONSUMER'S PROTECTION IN THE FIELD OF TEXTILES AND LEATHER***

COURSE SYLLABUS

University	**UNIVERSITY OF ORADEA**
Faculty	**FACULTY OF INFORMATICS AND SCIENCES**
Study program*	**APPLIED AND STRUCTURAL CHEMISTRY**

I. Course Name: Experimental data presentation and processing

II. Course Details

No of hours/week						
Code	Semester	Credits	Lecture	Seminar	Laboratory	Project
STII-0252	4	4	1	-	1	-

III. Course coordinator (title, name, surname, e-mail):

IV. Course objectives

"Processing and presenting experimental data" aims to acquire skills in order to establish and rigorously apply research methods in the field of chemistry or a related field, to record and interpret experimental data, to use appropriate graphic and visual methods, while respecting copyright.

V. Course content	**No. of hours**
V.1. Lecture (chapters/subchapters and paragraphs)	
Choosing experimental data.	2
Editing programs.	2
Experimental data processing programs.	2
Experimental data graphic representation programs.	2
Presentation programs.	2
Ethics. Scientific writing and publishing	2
V.2. Laboratory/Seminar/Project:	
Research planning. Choosing a topic.	
Choosing a method. Bibliographic study	
Recording experimental results	
Analyzing experimental results	
Presenting experimental results and conclusions	
Making a presentation	

VI. Bibliography

1. ** Instruire excel (online resources)
2. *** Microsoft PowerPoint (online resources)
3. ***Tehnoredactarea (online resources)
4. *** Cum scriem o prezentare stiintifica (online resources)
5. ***Etica, Scrierea si publicarea stiintifica (online resources)
6. ***Soft-Microsoft Office: Word, Excel, Powerpoint (online resources)
7. www.sciencedirect.com,
8. www.springerlink.com
9. www.anelisplus.ro

VII. Grading criteria

Activities	**Assesment**	**% of final grade**
Exam	Written 1. Requirements in order to get the minimum grade for passing the exam: Scientific report on a specific research topic. 2. Requirements for the maximum grade: PPT and oral presentation of the report	50 25%

Seminar/Laboratory/Project	Participation in activities, processing of experimental data, and preparation of reports.	25%

VIII. Learning outcomes:

The student/graduate knows the industrial and research applications of chemical compounds in the environment and technology.
The student/graduate integrates experimental and computational methods to elucidate chemical mechanisms.
The student/graduate respects chemical safety regulations and the principles of professional ethics.
The student/graduate capitalizes on research results by applying them in fields of industry.
The content of the discipline ensures knowledge of a methodology in approaching a research topic: planning activities, establishing experimental and theoretical research methods, analysis of the results obtained: accuracy, reproducibility, comparison, interpretation, correlating them with literature data from different sources, respecting copyright and presenting these results in an appropriate manner.
Making ppt type presentations.

Course coordinator,
Prof.dr.ing. Gabriela Elena Badea

COURSE SYLLABUS

University	UNIVERSITY OF ORADEA
Faculty	**FACULTY OF COMPUTER SCIENCES AND SCIENCES**
Study program*	**APPLIED AND STRUCTURAL CHEMISTRY**

I. Course Name: **QUALITY CONTROL**

II. Course Details

No of hours/week						
Code	Semester	Credits	Lecture	Seminar	Laboratory	Project
STII-0230	IV	4	12	12		

III. Course coordinator (title, name, surname, e-mail): lecturer dr. Groze Alina – Claudia alinacozma69@yahoo.com; acozma@uoradea.ro

IV. Course objectives	
-Transmission of fundamental theoretical and practical knowledge in the field of quality control - Formation of capacities, aptitudes and skills - Formation and development of capacity and skills for using laboratory equipment in scientific activity	
V. Course content	**No. of hours**
V.1. Lecture (chapters/subchapters and paragraphs)	
V.1.1 Introductory aspects regarding the Basics of Quality Control - Definition and object of study - Elements of quality - Evolution of quality - Quality indices - economic indicators - Quality characteristics - Quality management.	1
8.1.2 Statistical and mathematical methods used in quality control a)- Generalities and definitions; - Theoretical bases of statistical and mathematical methods: empirical distribution and theoretical distribution; types of statistical distributions used in quality control - Methods of presenting experimental data: imposed conditions, elimination of observation errors, rounding of data, grouping of data by classes, tabulating data, graphical representation of data. b)- Processing of experimental data: calculation of the main statistical parameters; verification of data dispersion; verification of the normality of the distribution; estimation of population parameters.	2
V.1.3 Organization of quality control 3.1. Development of the control plan and control objectives; 3.2. Control plan schemes; 3.3. Control of raw materials and packaging.	1
V.1.4 Process Control 4.1. Elementary Controlled Processes; 4.2. Basic Control Stages. 4.3. Process Control; HCCP Method	1
V.1.5 Performing quality control 5.1. Sampling methods; 5.2. Sampling plans; 5.3. Statistical survey in quality control 5.4. Survey error; 5.5 Modern control methods	2

V.1.6 Methods of quality estimation 6.1, Organoleptic methods; 6.2. Physical methods; 6.3. Chemical methods; 6.4. Physico-chemical methods; 6.5. Biochemical methods 6.6. Microbiological methods	2
V.1.7 Organoleptic control, nutritional factors, food spoilage and degradation	1
V.1.8 Control of foreign substances, counterfeits, contamination and pollution of food products	1
V.1.9 Product quality control standards.	1
V.2. Laboratory/Seminar/Project:	
V.2.1 Statistical methods in food quality control	**2**
V.2.2Organization of food quality control	**2**
V.2.3 Sampling for food quality control	**2**
V.2.4 Quality estimation methods	**2**
V.2.5 Food quality control by technological phases	**2**
V.2.6 Organoleptic control, nutritional factors, food spoilage and degradation. Food product standardization, company standard, industry standard, ISO	**2**

VI. Bibliography

1. Dumitru C. - Methods and techniques for controlling food products and public catering, Ceres Publishing House Bucharest 1980
2. Stanescu I. - Food quality control, Ceres Publishing House Bucharest 1996
3. Sas I. - Food quality control, University Publishing House of Galati, 1980
4. Ștefănescu S., Rusu B. - The role of standards in quality assurance, Economica Publishing House, Bucharest, 2001
5. Stanciu I. - Total quality management. Cartea Universitară Publishing House, Bucharest, 2003
6. Pop Cecilia - Quality management. Concepts. Principles. Trends. Tipo Publishing House, Moldova, Iași, 2004
7. Teodoru Traian - Management system auditing. Conteca 94 Publishing House, Bucharest, 2005
8. Pop Cecilia, Pop V. - Management and development. Ed. Tipo Moldova, Iași, 2007
9. Cozma A.C. - Quality Control - Course Notes, University of Oradea e-Learning Platform, 2021.

VII. Grading criteria

Activities	Assesment	% of final grade
Exam	Written exam: 1. Requirements in order to get the minimum grade for passing the exam - Recognition of specific quality control tools 2.Requirements for the maximum grade - Performing basic operations in the chemistry laboratory in order to achieve quality standards - Recognition and selection of the most appropriate methods for performing quality control.	80%
Seminar/Laboratory/Project		10%

VIII. Learning outcomes:

- The student/graduate understands the principles of spectroscopy, chromatography and other modern methods of chemical characterization;
- The student/graduate knows the industrial and research applications of chemical compounds in technology, environment and pharmacy
-The student/graduate uses modern laboratory equipment to analyze the structure and properties of compounds
-The student/graduate integrates experimental and computational methods to elucidate professional chemical mechanisms
-The student/graduate demonstrates autonomy in designing and managing applied activities in research or industry
-The student/graduate respects chemical safety norms and ethical principles

Course coordinator,
Lecturer dr. Groze Alina - Claudia