

SYLLABUS

Academic year 2023 - 2024

1. Details about the program

1.1. Higher Education Institution	„Lucian Blaga” University of Sibiu
1.2. Faculty	Faculty of Sciences
1.3. Department	Environmental Sciences, Physics, Physical Education and Sports
1.4. Field of study	BIOLOGY
1.5. Study cycle ¹	BACHELOR
1.6. Specialization	BIOLOGY

2. Details about the course

2.1. Course name	General Chemistry			Code	FSTI.MFE.BIOEN.L. CO.1.1110.C-4.5
2.2. Course coordinator	Associate Prof. PhD. Crețu Carmen Monica				
2.3. Practical activity coordinator	Associate Prof. PhD. Crețu Carmen Monica				
2.4. Year of study ²	1	2.5. Semester ³	1	2.6. Type of assessment ⁴	C
2.7. Type of discipline ⁵	O	2.8. Formative category of the discipline ⁶	F		

3. Estimated total time

3.1. Proportion of the discipline within the curriculum – <i>number of hours / week</i>					
3.1.a.Lecture	3.1.b. Seminar	3.1.c. Laboratory	3.1.d. Project	3.1.e Other	Total
1	1	1	-	-	3
3.2. Proportion of the discipline within the curriculum – <i>number of hours / week</i>					
3.2.a.Lecture	3.2.b. Seminar	3.2.c. Laboratory	3.2.d. Project	3.2.e Other	Total ⁷
14	14	14	-	-	42
Allocation of time budget for individual study⁸					No. hours
Study based on textbook, lecture notes, bibliography and course notes					28
Additional research: library, specialized electronic platforms and field or on-site investigation and documentation					3
Preparing for the seminar / laboratorires, home assignments, reports, portfolios and essays					14
Tutoring ⁹					7
Examinations ¹⁰					6
3.3. Total number of hours for individual study¹¹ (NOSI_{sem})					58
3.4. Total number of hours in the curriculum (NOAD_{sem})					42
3.5. Total number of hours per semester¹² (NOAD_{sem} + NOSI_{sem})					100
3.6. No of hours / ECTS					25
3.7. Number of credits¹³					4

4. Prerequisites (if applicable)

4.1. Prerequisite courses for enrollment to this subject (from the curriculum) ¹⁴	mathematics, physics
4.2. Competencies	- identification and operational use of the fundamental concepts of the general chemistry discipline - mathematical skills, computer operation (Word, Internet Explorer)

5. Requirements (wherever applicable)

5.1. Lecture organization and structure ¹⁵	PC, projector, teaching material, PowerPoint presentation/online google classroom
5.2. Organization and structure of practical activities (lab/sem/pr/other) ¹⁶	Laboratory-chemical substances, materials of general chemistry laboratory; laboratory reports/ online google classroom

6. Specific competencies¹⁷

Number of credits assigned to the discipline ¹⁸			4	Distribution of credits according to competencies ¹⁹
6.1. Professional competencies	CP1	Operating with concepts, legalities and principles specific to the field.		1
	CP2	Investigating the molecular and cellular basis of organization and functioning of living matter.		0,5
	CP3	The use of models and algorithms for knowing the living world.		0,5
	CP4	Exploration of biological systems.		0,5
	CP5	Inter/transdisciplinary integration of domain specific knowledge.		0,25
	CP6	Developing critical-constructive reflection skills on one's own level of professional training in relation to the standards of the profession.		0,25
6.2. Transversal competencies	CT1	Responsible and efficient accomplishment of tasks related to the professions in the field, respecting the principles of professional ethics.		0,5
	CT2	Identifying the role of a team and taking over the responsibilities corresponding to the professional and personal profile.		0,25
	CT3	Documentation in Romanian and at least in a foreign language for professional and personal development, through continuous training and effective adaptation to new scientific discoveries.		0,25

7. Course objectives (reflected by the framework of specific competencies)

7.1. General objective	- to correctly use sizes and chemical constants - to correctly define specific concepts of general chemistry
7.2. Specific objectives	- to solve problems of general chemistry on the solutions concentration and pH, electronic configuration of chemical elements, reaction enthalpy - to put into practice different labs which depend

8. Course description

8.1. Lecture²⁰	Teaching methods²¹	No. of hours
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Lecture 1 Chemistry development. Substances. Chemical constants. Chemical reaction. The law of mass conservation. Avogadro's number. Molar volume	lecture, conversation, explication, modelation, algorithmization, exercise, demonstration	2
Lecture 2 Aggregation states of substances. The gaseous state - perfect gas laws. Liquid state. Solid state	lecture, conversation, explication, modelation, algorithmization, exercise, demonstration	2
Lecture 3 Solutions. Clasification. Concentration. Numerical applications.	lecture, conversation, explication, modelation, algorithmization, exercise, demonstration	2
Lecture 4 Electrolytes. Electrolytic dissociation. Degree of dissociation. Strong electrolytes, weak electrolytes. Definition of acids and bases. Electrolytic dissociation of water.	lecture, conversation, explication, modelation, algorithmization, exercise, demonstration	2
Lecture 5 Electrolytes. Notion of pH and pOH. The calculation of pH and pOH for solutions of strong acids and strong bases. Buffer solutions. Neutralization reaction. Hydrolysis reaction of salts	lecture, conversation, explication, modelation, algorithmization, exercise, demonstration	2
Lecture 6 Thermodynamic aspects of chemical reactions. Reaction enthalpy. Reaction entropy. Free enthalpy of reaction. The laws of thermochemistry Kinetic of chemical reactions. Reaction rate. Law of rate. Arrhenius equation.	lecture, conversation, explication, modelation, algorithmization, exercise, demonstration	2
Lecture 7 Chemical equilibrium. The law of mass action Electrochemistry notions. Redox reaction. Electrode potential. Faraday's law of electrolysis; Numerical applications.	lecture, conversation, explication, modelation, algorithmization, exercise, demonstration	2
Total number of lecture hours:		14

8.2. Practical activities (8.2.a. Seminar ²² / 8.2.b. Laboratory ²³ / 8.2.c. Project ²⁴ / 8.2.d. Other practical activities ²⁵)	Teaching methods	No. of hours
Act.1 S1 Electronic configuration of chemical elements. Relations between the electronic configuration of chemical elements and their place in the periodic system L1 Training on labor protection and fire protection. Presentation of the glassware and apparatus used in the general chemistry laboratory. General presentation of laboratory work. Processing of experimental results graphically.	conversation, explication, modelation, algorithmization, exercise, laboratory experiments	2 2
Act.2 S2 The electrochemical character and the valence of chemical elements. Chemical bonds. L2 Laboratory operations. Determining the density of solids.	conversation, explication, modelation, algorithmization, exercise, laboratory experiments	2 2
Act.3 S3 Concentration of solutions. Numerical applications. L3 Concentration of solutions. Preparations of 0,2 % NaCl, 0,1 M HCl, 0,1 N HCl solutions	conversation, explication, modelation, algorithmization, exercise, laboratory experiments	2 2
Act.4 S4 Water-hardness, demineralization, softening. L4 Water analysis - Determination of hardness of drinking water and distilled water	conversation, explication, modelation, algorithmization, exercise, laboratory experiments	2 2
Act.5 S5 pH and pOH for solutions of strong acids and strong bases. Numerical applications. Hydrolysis reaction of salts. L5 pH determination of solutions by indicators and colorimetric	conversation, explication, modelation, algorithmization, exercise, laboratory experiments	2 2

Act.6 S6 Reaction rate. Calculation of reaction enthalpy L6 Influence of concentration on reaction rate	conversation, explication, modelation, algorithmization, exercice, laboratory experiments	2 2
Act.7 S7 Redox reaction. Electrolysis. Applications L7 Laboratory recovery. Analysis and verification of the results of laboratory work. Laboratory test.	conversation, explication, modelation, algorithmization, exercice, laboratory experiments	2 2
Total number of hours: seminar/laboratory		14/14

9. Bibliography

9.1. Recommended references	Crețu C.M., <i>Chimie generală</i> , Editura Universității Lucian Blaga din Sibiu, 2015.
	Crețu C.M., Oprea O.H., <i>Îndrumar de lucrări practice de chimie generală</i> , Editura Universității Lucian Blaga din Sibiu., 2010
9.2. Additional references	Ifrim S., Roșca I., <i>Chimie generală</i> , Editura Didactică și Pedagogică, București, 1990.

10. Correlating the course description with the expectations and requirements of representatives of the epistemic community, professional associations and significant employers and stakeholders related to the study program and the specific area²⁶

It is done through regular contacts with them in order to analyze the problem.

11. Evaluare

Type of activity	11.1 Assessment criteria	11.2 Assessment methods		11.3 Percentage of the final grade	Notes. ²⁷
11.4a Exam / Coloquium	• Theoretical and practical knowledge (quantity, correctness, accuracy)	Midterm / ongoing assignments ²⁸ :	%	70 % (minimum 5)	CPE
		Home assignments:	%		
		Other activities ²⁹ :	%		
		Final assessment: written colloquium	70 % (min. 5)		
11.4b Seminar	• Frequency/relevance of contributions or answers	Proof of contributions, home assignments – numerical applications		10 % (minimum 5)	CEF
11.4c Laboratory	• Knowledge of equipment, methods of using specific instruments and tools; assessment of tools or achievements, processing and interpretation of results	• Written test of laboratory • Reports of laboratory		20 % (minimum 5)	CEF
11.4d Project	• Quality of achieved project, accuracy of project documentation, rationale and evidence of selected solutions	• Self-assessment, project submission and/or defense • Critical assessment of a project		- % (minimum 5)	
11.5 Minimum performance standard ³⁰ - 5 note to written colloquium - complete the laboratory work (100% presence), 75% presence to seminar, 50% presence to course - average 5 to laboratory and seminar: reports of laboratory, written test of laboratory, home assignments					

The course description includes components adapted to SEN (Special Educational Needs) persons, according to their type and degree, at all curricular elements and dimensions (competencies, objectives, course description, teaching methods, alternative assessment), in view of providing and ensuring equitable and fair opportunities to academic education for all students, with special attention to special educational needs.

Date of submission: |2|0| / |0|9| / |2|0|2|3|

Date of approval in the Department: |1|9| / |1|0| / |2|0|2|3|

	Degree, title, first name, surname	Signature
Course coordinator	Associate prof.PhD. Carmen-Monica Crețu	
Study program coordinator	Associate prof. Ana-Maria Benedek-Sîrbu PhD	
Director Departament	Lecturer PhD. Gheoca Voichița	

¹ Licență / Master

² 1-4 pentru licență, 1-2 pentru master

³ 1-8 pentru licență, 1-3 pentru master

⁴ Examen, colocviu sau VP A/R – din planul de învățământ

⁵ Regim disciplină: O=Disciplină obligatorie; A=Disciplină opțională; U=Facultativă

⁶ Categoria formativă: S=Specialitate; F=Fundamentală; C=Complementară; I=Asistată integral; P=Asistată parțial; N=Neasistată

⁷ Este egal cu 14 săptămâni x numărul de ore de la punctul 3.1 (similar pentru 3.2.a.b.c.d.e.)

⁸ Liniile de mai jos se referă la studiul individual; totalul se completează la punctul 3.37.

⁹ Între 7 și 14 ore

¹⁰ Între 2 și 6 ore

¹¹ Suma valorilor de pe liniile anterioare, care se referă la studiul individual.

¹² Suma (3.5.) dintre numărul de ore de activitate didactică directă (NOAD) și numărul de ore de studiu individual (NOSI) trebuie să fie egală cu numărul de credite alocate disciplinei (punctul 3.7) x nr. ore pe credit (3.6.)

¹³ Numărul de credite se calculează după formula următoare și se rotunjește la valori vecine întregi (fie prin micșorare fie prin majorare)

$$\text{Nr. credite} = \frac{\text{NOCpSpD} \times C_c + \text{NOApSpD} \times C_A}{\text{TOCpSdP} \times C_c + \text{TOApSdP} \times C_A} \times 30 \text{ credite}$$

Unde:

- NOCpSpD = Număr ore curs/săptămână/disciplina pentru care se calculează creditele
- NOApSpD = Număr ore aplicații (sem./lab./pro.)/săptămână/disciplina pentru care se calculează creditele
- TOCpSdP = Număr total ore curs/săptămână din plan
- TOApSdP = Număr total ore aplicații (sem./lab./pro.)/săptămână din plan
- C_c/C_A = Coeficienți curs/aplicații calculate conform tabelului

Coeficienți	Curs	Aplicații (S/L/P)
Licență	2	1
Master	2,5	1,5
Licență lb. străină	2,5	1,25

¹⁴ Se menționează disciplinele obligatoriu a fi promovate anterior sau echivalente

¹⁵ Tablă, videoproiector, flipchart, materiale didactice specifice, platforme on-line etc.

¹⁶ Tehnică de calcul, pachete software, standuri experimentale, platforme on-line etc.

¹⁷ Competențele din Grilele aferente descrierii programului de studii, adaptate la specificul disciplinei

¹⁸ Din planul de învățământ

¹⁹ Creditele alocate disciplinei se distribuie pe competențe profesionale și transversale în funcție de specificul disciplinei

²⁰ Titluri de capitole și paragrafe

²¹ Expunere, prelegere, prezentare la tablă a problematicii studiate, utilizare videoproiector, discuții cu studenții (pentru fiecare capitol, dacă este cazul)

²² Discuții, dezbateri, prezentare și/sau analiză de lucrări, rezolvare de exerciții și probleme etc.

²³ Demonstrație practică, exercițiu, experiment etc.

²⁴ Studiu de caz, demonstrație, exercițiu, analiza erorilor etc.

²⁵ Alte tipuri de activități practice specifice

²⁶ Legătura cu alte discipline, utilitatea disciplinei pe piața muncii

²⁷ CPE – condiționează participarea la examen; nCPE – nu condiționează participarea la examen; CEF - condiționează evaluarea finală; N/A – nu se aplică

²⁸ Se va preciza numărul de teste și săptămânile în care vor fi susținute.

²⁹ Cercuri științifice, concursuri profesionale etc.

³⁰ Se particularizează la specificul disciplinei standardul minim de performanță din grila de competențe a programului de studii, dacă este cazul.