



DISCIPLINE ACADEMIC SHEET
ACADEMIC YEAR 2025 – 2026

1. PROGRAMME DATA

1.1. Higher Education Institution	UNIVERSITY OF CRAIOVA
1.2. Faculty	Automation, Computers and Electronics
1.3. Department	Computers and Information Technology
1.4. Field of Study	Computers and Information Technology
1.5. Study level	L(License / Undergraduate)
1.6. Organizational form	IF
1.7. Study Program (name/code) /Qualification	Computers / L2060101010

2. DISCIPLINE DATA

2.1 Discipline Name	Chemistry						
2.2 Course Activities Holder	Lect.univ.dr. ing. Elena Badea						
2.3. Practical Activities Holder	Lect.univ.dr. ing. Elena Badea						
2.4. Study Year	1	2.5. Semester	1	2.6. Evaluation type	E	2.7. Discipline regime	DFA

3. ESTIMATED TOTAL TIME (hours per semester of teaching activities)

3.1. Number of hours per week	3	in which: 3.2 course	2	3.3. sem./lab./pr.	1
3.4. Total hours of curriculum	42	in which: 3.5 course	28	3.6. sem./lab./pr.	14
3.7. Time distribution - hours/week					hours
Study after manual, course support, bibliography and notes					21
Additional documentation in library, on specialized electronic platforms and field					2
Training seminars / labs, homework, portfolios and essays					8
Tutorial					-
Examinations					2
Other activities.....					-
Total hours per individual activities					33
3.8. Total hours per semester					75
3.9. Number of credits					3

4. PRECONDITIONS (where appropriate)

4.1. of curriculum	Students must possess specialized knowledge acquired in the following high-school subjects: Chemistry; Physics (molecular physics and thermodynamics, atomic physics, radiation, electricity); Algebra and mathematical analysis.
4.2. of competence	Performing calculations. Analytical and synthesis skills.

5. CONDITIONS (where appropriate)

5.1. of the course	An adequately equipped lecture hall (with writing board and video projector). The course is taught using the video projector. The board is used for explanations, examples, some demonstrations and answers to questions from the audience. Course support in electronic format and access to up-to-date documentation are provided. The teaching process has the following structure:
5.2. of seminar/ laboratory/project	

6. COURSE OBJECTIVES – expected learning outcomes that are supported by completing and passing the course

Knowledge	The student/graduate: Identifies and describes basic concepts, principles and methods from mathematics, physics, chemistry, technical drawing, economics and computer science. Explains and interprets theoretical and experimental results from mathematics, physics, chemistry, economics, technical drawing and computer science.
Skills (Abilities)	The student/graduate operates with basic concepts, principles and methods from mathematics, physics, chemistry, technical drawing, economics and computer science. The student/graduate solves mathematics, physics and chemistry problems with applicability in engineering and validates the obtained solution. The student/graduate performs engineering and economic calculations of medium complexity and associates them with hand-drawn or CAD-specific graphical representations. The student/graduate describes physico-chemical and economic phenomena and processes. The student/graduate applies evaluation criteria and methods for the identification, modeling, experimentation, analysis and qualitative and quantitative assessment of the phenomena and processes specific to the fundamental field, including by using digital technologies. The student/graduate acquires and processes data, interprets theoretical and experimental results. The student/graduate designs solutions, complying with relevant standards, for engineering problems of medium complexity that meet the specified needs, observing public health, safety, welfare, environmental, sustainability and economic requirements, as well as other specific constraints. The student/graduate produces detail and assembly technical drawings, hand-drawn or computer-aided. The student/graduate applies modern project management techniques, economic and decision-making techniques, including in a multidisciplinary framework.
Responsibility and autonomy	The student/graduate applies the values of the ethics and deontology of the engineering profession. The student/graduate practices logical reasoning, evaluation and self-assessment in decision-making. The student/graduate communicates effectively about engineering activities with a wide range of audiences. The student/graduate is engaged in lifelong learning for acquiring and implementing knowledge, as needed, using appropriate learning strategies. The student/graduate promotes dialogue, cooperation, respect for others and interculturality.

7. CONTENT

7.1. Course	The method of implementation	Teaching methods	Allocated time (hours)
1. Introduction to chemistry. Fundamental elements: atom,		The course is taught using the video projector. 80% theoretical presentation,	2

element, molecule, chemical compound, mixtures, chemical reaction. Definitions, examples.		based on the course support (slides). 20% interactive activity (discussions with students). The necessary materials are made available to students in electronic format.	
2. The atomic theory of matter; The atomic-molecular theory; Particle-wave dualism. Notions of quantum mechanics. Atomic orbitals. Quantum models of the atom. The structure of the periodic table; Metals and non-metals – general characteristics			6
3. Matter and chemical substances; The aggregation states of matter; Thermodynamic system. Phase transitions: examples. The phase diagram of water. The anomalies of water. The water cycle in nature – water as a resource.			4
4. The fundamental laws of chemistry; Chemical bonds; The correlation between chemical bond, structure and material properties. Chemical reactions. Examples of chemical compounds with applications in electronics (in crystalline, amorphous, liquid and liquid-crystal state).			6
5. Surface phenomena. Colloids. Sol-gel processes. Micro- and nano-dispersions. Membrane processes. The influence of			6

chemical structure on the electrical, magnetic and optical properties of substances. Applications in the field of sensors. Organic polymers of importance in the electronics industry. Organic and inorganic semiconductors.			
6. The materials of the 21st century: alloys, ceramics and composites, polymers, nanomaterials (hybrid materials), metamaterials			4
Bibliography:			
Asimov, A Short History of Chemistry (1965) D. A. McQuarrie and P. A. Rock, General Chemistry (1984) L. Pauling, General Chemistry (3d ed. 1991) R. C. Weast, ed., CRC Handbook of Chemistry and Physics (published annually) https://constantinluca.wordpress.com/curs-chimie-general/ http://lori.academicdirect.org/courses/Chimie_Generala_2013.pdf Concept of Chemical Periodicity: from Mendeleev Table to Molecular Hyper-Periodicity Patterns http://www.chem.msu.ru/eng/misc/mendeleev/hyper/			
1.			

7.2. Seminar/laboratory/project	The method of implementation	Teaching methods	Allocated time (hours)
1. Understanding the atomic model. Group exercises.		The seminars are carried out together with the students. Explanations and guidance are given and practical applications and exercises are solved. Students are provided with model applications, solved exercises and a theoretical summary in electronic format. Activities: 80% actual conduct of the seminar, 20% interpretation of the results and discussions with the students	2
2. Understanding the periodic table. Group exercises.			2
3. Metallic structures: the metallic bond. The properties of metals. Applications.			2
4. Conductors and insulators. Superconductivity - superconductors. Applications.			2
5. Compounds and mixtures. Solutions. Colloidal systems. Properties.			2

Applications			
6. Alloys, ceramics, composites, polymers, nanomaterials. Properties. Applications.			2
7. Renewable and non-renewable natural resources. The circular economy.			2
Bibliography:			
The LibreTexts libraries by the Department of Education Open Textbook Pilot Project, the UC Davis Office of the Provost, the UC Davis Library, the California State University Affordable Learning Solutions Program https://chem.libretexts.org/ https://www.ck12.org/c/chemistry/ https://www.khanacademy.org/science/chemistry			

8. Correlating the content of the discipline with the expectations of representatives from the epistemic community, professional associations and representative employers in the field related to the program

Chemistry studies substances with their structure and properties, while also following the changes produced in them through chemical reactions. The electronic devices industry has progressed rapidly in the last decades, so that only a few decades have passed from the appearance of the first transistor to complex integrated circuits, in which the dimensions of the elements go down to the level of tens of nanometers. This progress is due to the development of the technology for obtaining materials with reliability, longevity, precision, reduced weight and special properties. To obtain these performances, knowledge about the structure and properties of materials, the possibility of spontaneous evolution of chemical or physico-chemical processes, the thermal effects accompanying these processes, as well as about the natural resources used and the possibilities of obtaining renewable energy, are essential. The Chemistry course provides an introduction to the main concepts needed to train an engineer able to adapt to the current requirements of transdisciplinarity and to the rapid evolution of technologies, thus providing graduates with competences adequate to the needs of current qualifications and a modern, high-quality and competitive scientific and technical training, allowing them to be employed quickly after graduation. Through its content and structure, the course offers students an international perspective.

9. EVALUATION

Activity Type	9.1. Evaluation criteria	9.2. Evaluation methods	9.3. Final mark weight
9.4. Course	- Understanding the theoretical fundamentals according to the specific objectives of the discipline. - The ability to make connections between the notions learned. - The capacity for analysis and synthesis in a concrete situation.	Final written exam. Scientific report	40% 30%

9.5. Seminar/laboratory/project	- Interpretation of the results. - The solutions of the applications are presented and discussed within the group. The ability to find solutions to concrete problems.	Ongoing assessment	30%
9.6. Minimum standard of performance			
Obtaining at least 50% of the score of the ongoing assessments (within the seminar), the scientific report and the final exam. The final grade is calculated by rounding the final score to a whole grade.			

Date of Completion	Signature of the Course Activities Holder,	Signature of the Practical Activities Holder,
23.08.2025	Lect.univ.dr. ing. Elena Badea	Lect.univ.dr. ing. Elena Badea

Date of Approval in the Department	Signature of the Department Director,
25.08.2025	Ș.l.dr.ing. Nicolae ENESCU

Date of Approval in the Faculty	Signature of the Dean,
	Prof.dr.ing. Dorin ȘENDRESCU