COURSE DESCRIPTION

Research Methodology and Ethics

Academic year 2026-2027

1. Programme-related data

1.1. Higher Education Institution	Babeș-Bolyai University, Cluj-Napoca
1.2. Faculty	Chemistry and Chemical Engineering
1.3. Department	Chemistry
1.4. Field	Chemistry and Chemical Engineering
1.5. Level of study	Master
1.6. Degree programme / Qualification	Organic and Biochemical Processes Engineering / Chemical Engineer
1.7. Form of education	Full-time

2. Course-related data

2.1. Course title	**Research Methodology and Ethics**			Course code	**CME6138**
2.2. Course coordinator	Prof. Dr. Niculina Daniela Hădade				
2.3. Seminar coordinator	Prof. Dr. Monica Toșa				
2.4. Year of study	I	2.5. Semester	2	2.6. Type of assessment	Progress check
2.7. Course status	Compulsory			2.8. Course type	Complementary subject

3. Total estimated time (hours per semester of teaching activities)

3.1. Number of hours per week	**3**	of which: 3.2. course	**1**	3.3. seminar/ laboratory/ project	**2**
3.4. Total of hours in the curriculum	42	of which: 3.5. course	14	3.6. seminar/ laboratory	**28**
Time allocation for individual study (IS) and self-taught activities (ST)					**hours**
Learning from textbooks, course materials, bibliography, and notes (IS)					10
Additional research in the library, on subject-specific electronic platforms, and on-site					15
Preparing seminars/ laboratories/ projects, assignments, reports, portfolios, and essays					30
Tutoring (professional guidance)					10
Examinations					16
Other activities					2
3.7. Total hours of individual study (IS) and self-taught activities (ST)				**83**	
3.8. Total hours per semester				**125**	
3.9. Number of credits				**5**	

4. Prerequisites (where applicable)

4.1. curriculum-related	Not applicable
4.2 skills-related	Not applicable

5. Specific conditions (where applicable)

5.1. course-related	The students will have access to databases (acquired by the faculty/ university/ main library) The interactive participation is encouraged The mobile phones should be off during the lecture
5.2. seminar/laboratory-related	The mobile phones should be off during seminars

6.1. Competencies resulting from the completion of the degree programme *(as referred to in the curriculum)*[1]

[1] The professional and/or transversal skills targeted by the subject for which the course description is prepared will be copied from the curriculum of the degree programme. For each competency, the complete entry, including

Professional competencies	
Competency code	**Competency**
PC1	Description, analysis and use of fundamental concepts and theories in the field of organic chemistry, biochemistry, microbiology, genetics and molecular biology.
PC4	The operation of installations and processes in the field of organic and biochemical processes.
PC5	Modeling biological systems/bioengineering structures and processes of fine organic synthesis.
Transversal competencies	
Competency code	**Competency**
TC2	Planning, monitoring, and assuming the duties of a subordinate professional group. Demonstrating the capacity of coordination, analytical thinking, adaptability and flexibility, collaboration with team members.
TC3	Self-assessment of professional performances and determining the continuous training needs, permanent information and documentation in the field of activity and related areas, according to the needs of the labour market.

6.2. Learning outcomes relevant to the degree programme (as referred to in the curriculum)[2]

Learning outcomes targeted by the subject		
Competency code	**Knowledge and comprehension**	**Specific academic skills**
TC2, TC3	Knowledge of scientific research strategies, setting the program of experiments and simulations, explanation and interpretation of the results for the elaboration of research projects	Use of fundamental and applied concepts of scientific investigation in order to develop research projects for the development of new products/technologies with practical applications.

7. Subject-specific learning outcomes

Knowledge and comprehension
1. Explains the principles, stages, and logic of scientific inquiry and distinguishes among the types of research relevant to the field of chemistry, including fundamental, applied, and frontier research.
2. Describes the norms of research ethics and integrity, including breaches of good scientific conduct, authorship/co-authorship rules, conflicts of interest, and the requirements for the proper use of sources.
3. Explains the role and specific features of scientific publications, databases, primary literature, and patents in the documentation of a research topic.
4. Understands the structure and function of the main components of a research project and a scientific manuscript: the current state of knowledge, objectives, methodology, results, conclusions, and scientific presentation.
Specific academic skills
1. Searches for, selects, and critically evaluates relevant scientific information from databases, original articles, and patents for a research topic in chemistry.
2. Formulates research questions and objectives and drafts essential sections of a research project or scientific manuscript, using appropriate academic language and argumentation.
3. Analyzes, synthesizes, and communicates scientific results in written and oral form through reports, posters, projects, and presentations, while observing the principles of academic integrity.

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the competency code, will be copied with the exact wording that appears in the curriculum, without any changes. If no competency is copied from either of the two categories, the row corresponding to that category is deleted from the table.

[2] The learning outcomes relevant for the degree programme and targeted by the subject for which the course description is prepared will be listed. The entries, copied without any changes from the Curriculum by subject type (Core Subject/Specialisation Subject/Complementary Subject), are listed under the corresponding competency.

8.1. Course	Teaching and learning methods	Remarks[3]
8.1.1. Research as human activity. Scientific methodology. Fundamental and applied research. Frontier and integrated research. Risks for non-valuable research.	lecture, explanation, conversation, description	1 hour
8.1.2. Motivation and qualification of a researcher.	lecture, explanation, conversation, description	1 hour
8.1.3. Research environment: why, who, what, where, when research is made.	lecture, explanation, conversation, description	1 hour
8.1.4. Ethics and correct research conduct: (a) Deviations from ethics: data production; data falsification; plagiarism.	lecture, explanation, conversation, description	1 hour
8.1.5. Ethics and correct research conduct: (b) Publication of the results: the quality of author / co-author; (c) Conflict of interests; (d) Ethical codes of universities, societies and scientific publications.	lecture, explanation, conversation, description	1 hour
8.1.6. Scientific publications and documenting: (a) Types of publications; (b) Ranking of scientific publications. Impact factor.	lecture, explanation, conversation, description	1 hour
8.1.7. Scientific publications and documenting: (c) Types of scientific papers; (d) Data-bases. Electronic information sources; Internet.	lecture, explanation, conversation, description	1 hour
8.1.8. Writing a research project. Current level of knowledge in the field.	lecture, explanation, conversation, description	1 hour
8.1.9. Writing a research project. Objectives and methodology.	lecture, explanation, conversation, description	1 hour
8.1.10. Reading a scientific paper.	lecture, explanation, conversation, description	1 hour
8.1.11. Writing a scientific paper.	lecture, explanation, conversation, description	1 hour
8.1.12. Presenting a scientific paper. (seminar, conference).	lecture, explanation, conversation, description	1 hour
8.1.13. Scientific research in Romania: (a) Laws, organization, financing; (b) Main „Actors" in the Romanian scientific research (institution) and „geography" (territorial repartition) of research.	lecture, explanation, conversation, description	1 hour
8.1.14. Scientific research in Romania: (c) International visibility of the Romanian scientific research; (d) European context. Institutions, programs.	lecture, explanation, conversation, description	1 hour
Bibliography		
1. W.C. Booth, G. G. Colomb, J. M. Williams, J. Bizup , T. M. Friz Gerald, ,The Craft of Research (5th Edition, University of Chicago Press, 2024) 2.H. Selye, De la vis la descoperire, Editura Medicala, Bucureşti, 1968. 3. M.S. Rădulescu, Metodologia cercetării ştiinţifice, Ed. Didactică şi Pedagogică, Bucureşti, 2006. 4. C. Enăchescu, Tratat de teoria cercetării ştiinţifice, Editura Polirom, Bucureşti, 2005. 5. Asociaţia Ad Astra – "Evaluarea cercetării ştiinţifice", revista Ad Astra, nr. 4/2005.		
8.2. Seminar/ laboratory	**Teaching and learning methods**	**Remarks**

[3] For example, organisational aspects, recommendations for students, specific aspects relating to the course/seminar, such as inviting experts in the field, etc.

8.2.1. Using the databases and the primary scientific sources.	explanation, conversation, description	2 hours
8.2.2. Documenting from databases and scientific papers for a specific research subject.	lecture, explanation, conversation, description	2 hours
8.2.3. Use of original scientific literature (articles) in dealing with a specific research topic.	lecture, explanation, conversation, description	2 hours
8.2.4. Use patents in dealing with a specific research topic.	lecture, explanation, conversation, description	2 hours
8.2.5. Writing a research project. Level of knowledge in the field.	explanation, conversation, description	2 hours
8.2.6. Writing a research project. Objectives and research methodology.	explanation, conversation, description	2 hours
8.2.7. Writing a research project. Attracting funds and using them.	explanation, conversation, description	2 hours
8.2.8. Writing a scientific article. Abstract + Introduction.	explanation, conversation, description	2 hours
8.2.9. Writing a scientific article. Original contributions. Results and discussions.	explanation, conversation, description	2 hours
8.2.1o. Writing a scientific article. Conclusions.	explanation, conversation, description	2 hours
8.2.11. Developing an application for patenting research results.	explanation, conversation, description	2 hours
8.2.12. Prezentarea unui poster.	explanation, conversation, description	2 hours
8.2.13. Presentation of the research project.	explanation, conversation, description	2 hours
8.2.14. Presentation of the written scientific manuscript (colloquium)	Oral examination	2 hours
Bibliography 1. W.C. Booth, G. G. Colomb, J. M. Williams, J. Bizup , T. M. Friz Gerald, ,The Craft of Research (5th Edition, University of Chicago Press, 2024) 2. Online resources: author guidelines, template, competition information packages, etc.		

9. Evaluation

Type of activity	9.1 Evaluation criteria[4]	9.2 Evaluation methods[5]	9.3 Percentage in the final grade
9.4. Course	Quality of the answers – appropriate acquiring and understanding of the subjects presented during the lectures	Answers to the exam/seminar Appeals would be solved by the appointed staff	70 %
9.5. Seminar/ laboratory	Quality of the n answers – appropriate acquiring and understanding of the subjects presented during the seminars. Quality of the prepared personal work	Solved subjects for each seminar	30 %
9.6 Minimum standard for passing			
Mark 5 (five).			

[4] The evaluation criteria must directly reflect the learning outcomes targeted at the level of the degree programme respectively at the level of the subject. More specifically, the learning outcomes set out in the expected learning outcomes are assessed.

[5] Both final evaluation methods and ongoing evaluation strategies should be established.

10. SDG labels (Sustainable Development Goals)[6]

	○	Sustainable Development Generic Label

								
○	○	○	X	○	○	○	○	○
								No label applies
○	○	○	○	○	○	○	○	○

Date of entry:
17.04.2026

Signature of course coordinator

Prof. Dr. Niculina Hădade

Signature of seminar coordinator

Prof. Dr. Monica Toşa

Date of approval in the department:
24.04.2026

Signature of the head of department

Prof. Dr. Monica Toşa

[6] Select a single label which, according to the *Implementation of SDG labels in the academic process*, best matches the subject. If the subject addresses sustainable development in a generic manner (i.e. by presenting/introducing the general framework of sustainable development, etc.), then the Sustainable Development generic label may be applied. If none of the labels describe the subject, select the last option: *"No label applies."*