

## FIȘA DISCIPLINEI

### 1. Data about program

1.1 Institution	Babeș-Bolyai University, Cluj-Napoca
1.2 Faculty	Chemistry and Chemical Engineering
1.3 Department	Chemical Engineering
1.4 Studies domain	Chemical Engineering
1.5 Studies cycle	Master
1.6 Studies Program / Qualification	All lines of studies / master degree

### 2. Data about the discipline

2.1 Name of discipline	<b>Research Methodology and Ethics – CME6138 (CA, CCI, CCr, IMPM, IPOB, ICAP, PCA, CINB, TMSC, MMCB)</b>						
2.2 Appointed person for lecture	Acad. Prof. Dr. Cristian Silvestru						
2.3 Appointed person for seminar	Acad. Prof. Dr. Cristian Silvestru Prof. Dr. eng. Anca Silvestru Conf. Dr. Ciprian I. Raț Lect. Dr. Alexandra Pop						
2.4 Year of studies	I	2.5 Semester	2	2.6. Type of evaluation	C	2.7 Discipline regime	FD, SD <sup>a</sup>

<sup>a</sup>FD = fundamental discipline; SD = specialized discipline

### 3. Total time estimated (hours per semester, didactic activities)

3.1 Hours per week	3	Of which: 3.2 lecture	1	3.3 seminar/laboratory	2
3.4 Total No. of hours in the studies plan	42	Of which: 3.5 lecture	14	3.6 seminar/laboratory	28
Distribution of time:					h
Studies upon manual, lecture support, bibliography, and personal notes					10
Supplementary documentation in library or on specialized websites					15
Preparation of seminars/ themes, reports, essays					30
Tutorial activities					10
Exams (oral)					18
Other: .....					-
3.7 Total hours of individual study	83				
3.8 Total hours per semester	125				
3.9 Number of credit points	5				

### 4. Preliminary conditions (where applied)

4.1 of curricula	<ul style="list-style-type: none"> <li>no need</li> </ul>
4.2 of competencies	<ul style="list-style-type: none"> <li>no need</li> </ul>

### 5. Conditions (where applied)

5.1 For lecture	<ul style="list-style-type: none"> <li>The students will have access to databases (acquired by the faculty/ university/ main library)</li> <li>The interactive participation is encouraged</li> <li>The mobile phones should be off during the lecture</li> </ul>
5.2 For seminar/ practical work	<ul style="list-style-type: none"> <li>The mobile phones should be off during seminars</li> <li>No delay is permitted</li> </ul>

## 6. Specific competences acquired

Professional competences	<p><b>C5. Identification, definition, and development of a research subject in the field of Chemistry and Chemical Engineering.</b></p> <ul style="list-style-type: none"> <li>• C5.1 Extended bibliographic study regarding the chosen research subject, organizing and synthesizing the acquired data in connection with the specific terminology; acquiring and using general and specific research methods.</li> <li>• C5.2 Using specialized knowledge for choosing the suitable research strategy, realizing the experimental work, and interpreting the obtained results.</li> <li>• C5.3 Using suitable research concepts and methodology for new approach in chemical synthesis and environmental protection.</li> <li>• C5.4 Selection and using the appropriate research methods for a correct assessment of the obtained results and pertinent conclusions.</li> <li>• C5.5. Using fundamental and applied concepts in realizing and developing a research project.</li> </ul>
Crosswise competences	<ul style="list-style-type: none"> <li>• CT.1. Executing complex professional duties, by respecting the ethical, moral, and specific rules, by following a personal research plan and proposing innovative solutions to specific problems.</li> <li>• CT.2. Planning, monitoring and assuming the professional duties of one or more professional supervised groups. Acquiring theoretical skills in coordinating a research group, by analytical general view, adaptability and flexibility, cooperation with the whole research team.</li> </ul>

## 7. Specific objectives (pointed out from the acquired competences)

7.1 General objectives	<p>The objectives of the lecture are:</p> <ul style="list-style-type: none"> <li>• Becoming familiar with general terms related to scientific research;</li> <li>• Presentation of the ethic and of the correct behavior in research;</li> <li>• Information about scientific specialized bibliographic search;</li> <li>• Elaboration of a research project;</li> <li>• Writing a scientific work/ paper.</li> </ul>
7.2 Specific objectives	<ul style="list-style-type: none"> <li>• Research as human activity. Scientific methods. Fundamental and applied research. Frontier and integrated research.</li> <li>• Motivation and qualification of researchers. Research environment. Ethical and the correct behavior in research.</li> <li>• Scientific papers and literature search. Reading a scientific paper. Writing a scientific paper.</li> <li>• Scientific research in Romania.</li> </ul>

## 8. Content

8.1 Lecture	Teaching methods	Observations
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
2. Motivation and qualification of a researcher.	lecture, explanation, conversation, description	1 hour
3. Research environment: why, who, what, where, when research is made.	lecture, explanation, conversation, description	1 hour
4. Ethics and correct research conduct: (a) Deviations from ethics: data production; data falsification; plagiarism.	lecture, explanation, conversation, description	1 hour
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
6. Scientific publications and documenting: (a) Types of	lecture, explanation,	1 hour

publications; (b) Ranking of scientific publications. Impact factor.	conversation, description	
7. Scientific publications and documenting: (c) Types of scientific papers; (d) Data-bases. Electronic information sources; Internet.	lecture, explanation, conversation, description	1 hour
8. Writing a research project. Current level of knowledge in the field.	lecture, explanation, conversation, description	1 hour
9. Writing a research project. Objectives and methodology.	lecture, explanation, conversation, description	1 hour
10. Reading a scientific paper.	lecture, explanation, conversation, description	1 hour
11. Writing a scientific paper.	lecture, explanation, conversation, description	1 hour
12. Presenting a scientific paper. (seminar, conference).	lecture, explanation, conversation, description	1 hour
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 hours
14. Scientific research in Romania: (c) International visibility of the Romanian scientific research; (d) European context. Institutions, programs.	lecture, explanation, conversation, description	2 hours

### References (mandatory)

1. H. Selye, *De la vis la descoperire*, Editura Medicala, Bucuresti, 1968.
2. M.S. Radulescu, *Metodologia cercetării științifice*, Ed. Didactică și Pedagogică, București, 2006.
3. C. Enăchescu, *Tratat de teoria cercetării științifice*, Editura Polirom, București, 2005.
4. Asociația Ad Astra – “*Evaluarea cercetării științifice*”, revista Ad Astra, nr. 4/2005.
5. Legea nr. 206/2004 privind buna conduită în cercetarea științifică, dezvoltarea tehnologică și inovare.

### References (optional)

1. Ionel Haiduc: Cercetarea științifică din România în context internațional. Evoluții recente. Colaborări internaționale, *Academica*, Anul XII, Nr. 2-3, Mai-iunie 2002, p. 56-59.
2. Ionel haiduc: Aspecte etice ale cercetării științifice în chimie, biologie și medicină, *Revista d Politica Științei și Scientometrie* 2005, 3(1) 37-42.

8.2 Seminar	Teaching methods	Observation
1. Using the databases and the primary scientific sources.	explanation, conversation, description	2 hours
2. Documenting from databases and scientific papers for a specific research subject.	lecture, explanation, conversation, description	2 hours
3. Use of original scientific literature (articles) in dealing with a specific research topic.	lecture, explanation, conversation, description	2 hours
4. Use patents in dealing with a specific research topic.	lecture, explanation, conversation, description	2 hours
5. Writing a research project. Level of knowledge in the field.	explanation, conversation, description	2 hours
6. Writing a research project. Objectives and research methodology.	explanation, conversation, description	2 hours
7. Writing a research project. Attracting funds and using them.	explanation, conversation, description	2 hours
8. Writing a scientific article. Abstract + Introduction.	explanation, conversation, description	2 hours
9. Writing a scientific article. Original contributions. Results and discussions.	explanation, conversation, description	2 hours
10. Writing a scientific article. Conclusions.	explanation, conversation, description	2 hours
11. Developing an application for patenting research results.	explanation, conversation, description	2 hours

12. Prezentarea unui poster.	explanation, conversation, description	2 hours
13. Presentation of the research project.	explanation, conversation, description	2 hours
14. Presentation of the written scientific manuscript (colloquium)	Oral examination	2 hours

**9. Relationship between the content of the specific discipline with the requirements of the epistemic community, professional associations, and potential employers.**

- By acquiring the theoretical and applied skills included in the content of the discipline “*Research Methodology and Ethics*” the students are acquiring consistent knowledge, corresponding to the competences specified in the Diploma Supplement and the potential jobs from ANC.

**10. Evaluation**

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Contribution to the final mark
10.4 Colloquium	<ul style="list-style-type: none"> <li>• Quality of the given answers – appropriate acquiring and understanding of the subjects presented during the lectures.</li> </ul>	<ul style="list-style-type: none"> <li>• Answers to the exam/seminar</li> <li>• Appeals would be solved by the appointed staff</li> </ul>	70%
10.5 Seminar	<ul style="list-style-type: none"> <li>• Quality of the given answers – appropriate acquiring and understanding of the subjects presented during the seminars.</li> <li>• Quality of the prepared personal work</li> </ul>	<ul style="list-style-type: none"> <li>• Solved subjects for each seminar</li> </ul>	30%
10.6 Minimum standard of performance			
<ul style="list-style-type: none"> <li>• Mark 5 (five).</li> </ul>			

Date,  
March 14<sup>th</sup>, 2024

Signature,  
Appointed person for lecture



Signature,  
Appointed person for seminar



Date,  
Approval in Department

16.04.2024

Signature,  
Head of Chemistry Department  
Prof. Dr. habil. eng. Monica Ioana Toşa

