COURSE DESCRIPTION

1. Programme Identification Data

1.1 Higher Education Institution	**„ALEXANDRU IOAN CUZA" UNIVERSITY OF IAȘI**
1.2 Faculty	**FACULTY OF CHEMISTRY**
1.3 Department / Doctoral School	**DOCTORAL SCHOOL OF CHEMISTRY**
1.4 Field of Study	**CHEMISTRY**
1.5 Cycle of Studies	**DOCTORATE**
1.6 Study Programme / Qualification	**ADVANCED UNIVERSITY STUDIES – DOCTORAL SCHOOL OF CHEMISTRY / PhD IN CHEMISTRY**

2. Course Identification Data

2.1 Course Title			**[COURSE TITLE] – [Module I / Module II, if applicable]**				
2.2 Course coordinator (lectures)			**[NAME, ACADEMIC TITLE]**				
2.3 Seminar coordinator			**[NAME, ACADEMIC TITLE] (if applicable)**				
2.4 Year of study	**I**	**2.5** Semester	**1**	**2.6** Type of assessment	***[E / C]**	**2.7** Disciple regime	****[CC / OC]**

*[E – exam / C – colloquium] **[CC = Compulsory Course / OC = Optional Course]

3. Estimated Total Workload (hours per semester)

3.1 Hours per week		**3.2** Lectures		**3.3** Seminars	
3.4 Total hours according to the curriculum		**3.5** Lectures		**3.6** Seminars	
Time allocation					hours
Study based on textbooks, course materials, bibliographic sources, and other relevant resources					
Additional research in the library, on specialized electronic platforms, and in the field					
Preparation for seminars, assignments, papers, portfolios, essays					
Academic tutoring					
Assessment activities					
Other activities					

3.7 Total hours of individual study	
3.8 Total hours per semester	
3.9 Number of credits	

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites	Completion of a Master's degree (or equivalent) and enrolment in the doctoral study programme in Chemistry, according to the regulations of the Doctoral School. (Previous courses/modules may be mentioned, if applicable.)
4.2 Competences prerequisites	Basic competences in scientific language use, ability to analyse and interpret scientific literature, documentation skills, and use of IT tools relevant to research.

5. Conditions (if applicable)

5.1 Conditions for lectures	Appropriate teaching spaces for doctoral activities, equipped with multimedia tools and access to specialised bibliographic and digital resources. Compliance with institutional regulations regarding the organization of doctoral studies.
5.2 Conditions for seminars	[To be completed, if applicable.]

6. Specific competences accumulated

Professional competences	• Knowledge, understanding and use of specific scientific language Advanced and systematic knowledge of concepts, research methods, scientific debates and new hypotheses specific to the field, and the ability to communicate effectively with specialists from related fields. • Explanation and interpretation Use of advanced principles and methods to explain and interpret, from multiple perspectives, new and complex theoretical and practical situations and problems specific to the field. • Application, transfer and problem solving Selection and application of advanced principles, theories and methods, transfer of methods between fields, and use of interdisciplinary approaches to solve new and complex theoretical and practical problems. • Critical and constructive reflection Critical and constructive evaluation of research projects and results, assessment of the theoretical and methodological state of knowledge, and identification of research and application priorities in the field. • Creativity and innovation Design and conduct of original research based on advanced methods, contributing to the development of scientific and technological knowledge and/or research methodologies.
Transversal competences	• Autonomy and responsibility Independent assumption of responsibility for initiating, conducting and evaluating scientific research activities, as well as for professional decision-making in complex academic and research contexts. • Social interaction Ability to collaborate, coordinate and communicate effectively within research teams and the academic community, including interdisciplinary and international contexts, while respecting professional conduct standards. • Personal and professional development Continuous development of professional and personal competences through critical reflection, creativity and the assumption of the researcher's role, in order to adapt to the dynamic academic and scientific environment.

7. Course Objectives (derived from the acquired competences)

7.1. General objective	To develop advanced competences of doctoral students for conducting and capitalising on scientific research activities, in accordance with academic, methodological and ethical standards in the field of Chemistry.
7.2. Specific objectives	Upon successful completion of the course, the doctoral student will be able to: • apply advanced knowledge and methods specific to the course; • critically analyse and evaluate research results and approaches; • communicate research results in a coherent, responsible and ethical manner.

8. Content

8.1	**Lecture Topics**	**Teaching methods***	**Notes** (hours / references)
1.	[Topic 1]	Interactive lecture, explanation, discussion, demonstrative analysis, problem-based learning	([ ] hours, [ ])
2.	[Topic 2]	Interactive lecture, explanation, discussion, demonstrative analysis, problem-based learning	([ ] hours, [ ])

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*In cases of force majeure, teaching activities may be conducted online, in accordance with current legislation.

Bibliography – Reference Models

1. Book
[Author(s)], [Book title], [Publisher], [Place of publication], [**Year**].
Example:
Smith, J.; Brown, A., Advanced Research Methods in Chemistry, Springer, Berlin, **2021**.
2. Scientific Article
[Author(s)], [Article title], [Journal title], Volume(Issue), [First page–Last page], [**Year**].
Example:
Popescu, M.; Ionescu, R., Data integrity in chemical research, Journal of Chemical Education, 98(4), 1123–1131, **2021**.
3. Guide / Manual / Technical Report
[Author / Institution], [Title of the guide / report], [Issuing institution / Publisher], [Place], [**Year**].
Example:
European Commission, Guidance on Research Integrity, Publications Office of the European Union, Luxembourg, **2020**.
4. Software / Database
[Developer / Organization], [Software or Database name], version [x.x] (if applicable), [short description – optional], Available online at: [URL] (accessed for educational purposes).
Example:
WaveMetrics, Igor Pro, version 9.0, scientific data analysis and visualization software, Available online at: https://www.wavemetrics.com, (accessed for educational purposes).
Example (database):
Wiley, KnowItAll® Spectral Database, Available online at: https://sciencesolutions.wiley.com, (accessed for educational purposes).

8.2	**Seminar Topics**	**Teaching methods***	**Notes** (hours / references)
1.	[Topic 1]	Discussion, explanation, applied analysis, problem-based learning	([ ] hours, [ ])
2.	[Topic 2]	Discussion, explanation, applied analysis, problem-based learning	([ ] hours, [ ])
....			

*In cases of force majeure, seminar activities may be conducted online, in accordance with current legislation.

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1. Book
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Example:
European Commission, Guidance on Research Integrity, Publications Office of the European Union, Luxembourg, **2020**.
4. Software / Database
[Developer / Organization], [Software or Database name], version [x.x] (if applicable), [short description – optional], Available online at: [URL] (accessed for educational purposes).
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WaveMetrics, Igor Pro, version 9.0, scientific data analysis and visualization software, Available online at: https://www.wavemetrics.com, (accessed for educational purposes).
Example (database):

Wiley, KnowItAll® Spectral Database, Available online at: https://sciencesolutions.wiley.com, (accessed for educational purposes).

9. Learning Outcomes

Knowledge and understanding	• demonstrate advanced and systematic knowledge of concepts, principles, theories and methods specific to the course; • understand relevant theoretical, methodological and regulatory frameworks; • know academic, methodological and ethical standards applicable to doctoral research.
Application and analysis	• apply advanced principles, methods and tools in scientific research contexts; • critically analyse and interpret research data and results using appropriate approaches; • identify methodological limits, risks and implications.
Critical Assessment and Accountability	• critically and constructively evaluate the quality, relevance and impact of research results; • demonstrate autonomy and professional responsibility in doctoral research; • apply principles of ethics, academic integrity and good research conduct.
Academic communication	• communicate research results, conclusions and scientific opinions clearly and rigorously; • use correct scientific language and terminology; • participate actively and argumentatively in academic discussions and debates.

10. Correlation of the course content with the expectations of community representatives, professional associations, and representative employers in the field related to the program.

The content of the course [COURSE TITLE] – [Module I / Module II, if applicable] is designed in line with academic and professional expectations, by developing competences specific to doctoral studies required for advanced scientific research. The course supports doctoral students in applying appropriate knowledge and methods, critically evaluating research results, and communicating responsibly and ethically in academic and professional contexts, in accordance with quality, ethics and academic integrity standards.

11. Assessment

Activity	**11.1 Assessment criteria**	**11.2 Assessment methods**	**11.3 Weight in final grade (%)**
11.4 Lectures	Accuracy, coherence, analytical and interpretative skills related to course topicsi	Colloquium – oral presentation and/or structured discussion on course-specific topics	[60–100] *Weights are set according to the specific nature of the course and curriculum structure.*
11.5 Seminars	Application of knowledge, critical analysis, active participation, compliance with academic norms	Continuous assessment: case studies, applied exercises, presentations, guided discussions	[0–40] *Weights are set according to the specific nature of the course and curriculum structure.*
11.6 Minimum performance standard			
To pass the course, the doctoral student must demonstrate: • correct application of knowledge and methods specific to the course in research and analysis contexts; • coherent and well-argued interpretation of results based on recognised academic standards; • compliance with principles of ethics, academic integrity and professional conduct; • ability to integrate feedback to improve academic work.			

Date of completion Course coordinator Seminar coordinator

Date of approval

Director of the Doctoral School of Chemistry
Prof. univ. dr. habil. Cecilia ARSENE