

## COURSE DESCRIPTION

### *Development activities-applications II*

Academic year 2026 - 2027

#### 1. Programme-related data

1.1. Higher Education Institution	"Babeş-Bolyai" University
1.2. Faculty	Faculty of Chemistry and Chemical Engineering
1.3. Department	Department of Chemical Engineering
1.4. Field	Chemical Engineering
1.5. Level of study	Master
1.6. Degree programme / Qualification	Advanced Chemical Process Engineering
1.7. Form of education	Full time education

#### 2. Course-related data

2.1. Course title	<b>Development activities-applications II</b>			Course code	<b>CME6124</b>
2.2. Course coordinator	Scientific supervisor of the dissertation thesis				
2.3. Seminar coordinator	Scientific supervisor of the dissertation thesis				
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	Specialisation subject	

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

3.1. Number of hours per week	7	of which: 3.2. course		3.3. <del>seminar</del> / laboratory/ <del>project</del>	7
3.4. Total of hours in the curriculum	98	of which: 3.5. course		3.6. <del>seminar</del> / laboratory	98
<b>Time allocation for individual study (IS) and self-taught activities (ST)</b>					<b>hours</b>
Learning from textbooks, course materials, bibliography, and notes (IS)					2
Additional research in the library, on subject-specific electronic platforms, and on-site					8
Preparing seminars/ laboratories/ projects, assignments, reports, portfolios, and essays					14
Tutoring (professional guidance)					-
Examinations					3
Other activities					-
<b>3.7. Total hours of individual study (IS) and self-taught activities (ST)</b>				<b>27</b>	
<b>3.8. Total hours per semester</b>				<b>125</b>	
<b>3.9. Number of credits</b>				<b>5</b>	

#### 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	Not applicable
5.2. seminar/laboratory-related	<ul style="list-style-type: none"> <li>The students will attend the program of preparation of the dissertation paper established by the scientific advisor of the dissertation</li> <li>The students will prepare the documentation using the existing sources both in the specialized libraries, in the international electronic databases, and in those provided by the scientific advisor of the dissertation.</li> </ul>

	<ul style="list-style-type: none"> <li>• The students will attend the laboratory with safety equipment (overall, gloves, goggles).</li> <li>• The students will know the goals, means, phases of preparation of the dissertation paper</li> <li>• The papers will be delivered to the scientific advisor or of dissertation paper</li> </ul>
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#### 6.1. Competencies resulting from the completion of the degree programme (as referred to in the curriculum)<sup>1</sup>

Professional competencies	
Competency code	Competency
PC1	Description, analysis and use of elaborate theories and concepts in the fields of chemistry and process advanced chemical engineering.
PC2	Technological design of processes, equipment and apparatus specific to process engineering for the improvement of performances of biochemical and chemical processes by using computer-assisted instruments (CAD) and principles of longterm development.
PC3	Development and use of mathematical models and simulators in process engineering for diagnosis of problems, analysis of optimum operating systems and control of (bio)chemical processes.
PC4	Development of processes, apparatus and equipment specific to process engineering by promoting new solutions for process intensification, optimum operation and control.
Transversal competencies	
Competency code	Competency
TC1	Independent execution of complex professional assignments and autonomous development of project-research activities by using computer-assisted techniques and by observing the norms of professional ethics and moral conduct.
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)<sup>2</sup>

Learning outcomes targeted by the subject		
Competency code	Knowledge and comprehension	Specific academic skills
PC2 TC1	1. Performing a critical analysis based on CAD tools, to identify possible solutions to complex problems of designing equipment and plants in a chemical process	1. Development of integrated projects, based on CAD tools, for the creative development of the design of devices, equipment and plants in the chemical process industries
PC6 CT2	2. Knowledge of concepts and theories specific to resources and quality management for process engineering, in the context of sustainable development	2. Use of qualitative and quantitative methods for assessing risk factors, operational safety and management, in the development of new projects for resources and quality management

#### 7. Subject-specific learning outcomes

Knowledge and comprehension
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<sup>1</sup> 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 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.

<sup>2</sup> 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.

1. Identifying and defining a research subject in the area of chemical process engineering, elaboration and implementation of a plan to achieve the proposed objectives, and capitalization of the results of the scientific research.
2. Applying the thorough knowledge and the specific research methods in the chemical processes engineering.
3. Detailed and pertinent use of the experiment as an assessment method and foundation of the decisions.
4. Designing, executing and capitalizing the results of the scientific research specific to process engineering.
<b>Specific academic skills</b>
1. Selection and realization of an extended research of the data in the literature corresponding to the research subject, organization and synthesis of the data by acquiring the domain-specific terminology; knowledge of the general and specific research methods.
2. Use of the conceptual and methodological research apparatus to develop new/original theoretical approaches and products/technology with practical applications.
3. Proper selection and use of the assessment methods for the pertinent interpretation of the research results by drawing conclusions and arguing the proposed solutions.
4. Use of fundamental and applicative concepts in the development of the research projects.

## 8. Contents

8.2. Laboratory	Teaching and learning methods	Remarks
8.1.1. Documentation in the subject of the proposed dissertation in specialized libraries (printed format)	Explanation; Conversation; Description; Conceptualization	10
8. 1.2. Documentation in the subject of the dissertation by accessing of electronic international documentation sources (Science Direct, Scopus, SpringerLink, Web of Science, Wiley Journals, Proquest Journals, etc.)	Explanation; Conversation; Description; Conceptualization	10
8. 1.3. Selection of the adequate methods, techniques, and instruments for observation, measuring, experimenting, control, optimization and modeling.	Explanation; Conversation; Description; Conceptualization	10
8.1.4. Preliminary tests of the selected methods, techniques, and instruments.	Explanation; Conversation; Description; Conceptualization	46
8. 1. 5. Elaboration of the preliminary research plan to realize the dissertation.	Explanation; Conversation; Description; Conceptualization	6
8. 1. 6. Hearing scientific defenses (conferences, symposiums, public defenses of doctoral theses).	Explanation; Conversation; Description; Conceptualization	6
8. 1. 7. Presentation of the results of the experimental tests/preliminary applications, and analysis of the future research directions.	Explanation; Conversation; Description; Conceptualization	10
Bibliography 1. Bibliographical sources mentioned in the course syllabus of the curriculum for the ICAP program. 2. Electronic databases (Science Direct, Scopus, SpringerLink, Web of Science, Wiley Journals, Proquest Journals, etc.) 3. The bibliographical sources indicated by the scientific advisor of the dissertation.  Note: The bibliographical elements can be consulted at the Library of the Department of Chemical Engineering, at the Library of the Faculty of Chemistry and Chemical Engineering – extension of the “Lucian Blaga” Central Library of the “Babeş-Bolyai” University, and the “Lucian Blaga” Central Library.		

## 9. Evaluation





















Type of activity	9.1 Evaluation criteria <sup>3</sup>	9.2 Evaluation methods <sup>4</sup>	9.3 Percentage in the final grade
9.4. Course	-	-	-

<sup>3</sup> 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.

<sup>4</sup> Both final evaluation methods and ongoing evaluation strategies should be established.

9.5. Seminar/ laboratory	Presentation of the papers with the data from the literature specific to the selected subject.	Assessment of the papers presented with the data from the literature.	20 %
	Acquiring the adequate methods, techniques, and instruments for observation, measurement, experimenting, control, optimization and modelling, selected for the selected research subject	Assessment of the (selected) techniques and instruments for observation, measuring, experimenting, control, optimization and modeling	20%
	Correctness, completeness, and argumentation of the systematization of the information collected from the specialized literature	Evaluation of the correctness, completeness, and argumentation of the systematization of the information collected from the specialized literature.	10 %
	Presentation of the preliminary research plan and the results of the experimental tests/preliminary applications.	Assessment of the integration of the documentation of the data collected from the literature with the selected dissertation subject and assessment of the results of the experimental tests/preliminary applications.	50 %
9.6 Minimum standard for passing			
<ul style="list-style-type: none"> <li>• The mark 5 (five) for the assessment of each of the assessment criteria.</li> <li>• Knowledge of the main means of documentation for the research in the field of computer assisted chemical process engineering.</li> </ul>			

## 10. SDG labels (Sustainable Development Goals)<sup>5</sup>

		Sustainable Development Generic Label						
								
								

<sup>5</sup> 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."

 10 INEQUALITĂȚI REDUSE	 11 ORĂȘE ȘI COMUNITĂȚI DURABILE	 12 CONSUM ȘI PRODUCȚIE RESPONSABILĂ	 13 ACȚIUNE CLIMATICĂ	 14 VIAȚĂ ACVATICĂ	 15 VIAȚĂ TERESTRĂ	 16 PACE, JUSTIȚIE ȘI INSTITUȚII EFICIENTE	 17 PARTENERIATE PENTRU REALIZAREA OBIECTIVELOR	No label applies
								

Date of entry:  
23.04.2026

Signature of course coordinator

Signature of seminar coordinator

Scientific supervisor

Scientific supervisor

Date of approval in the department:  
27.04.2024

Signature of the head of department

Prof. Habil. Dr. Eng. Graziella Liana Turdean.