

## COURSE DESCRIPTION

### *Development activities-applications I*

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 I</b>			Course code	<b>CME6117</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	1	2.6. Type of assessment	<a href="#">Progress check</a>
2.7. Course status	<a href="#">Compulsory</a>			2.8. Course type	<a href="#">Specialisation subject</a>

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

3.1. Number of hours per week	<b>6</b>	of which: 3.2. course	-	3.3. seminar/ laboratory/ project	<b>6</b>
3.4. Total of hours in the curriculum	84	of which: 3.5. course	-	3.6. seminar/ laboratory	<b>84</b>
<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)					6
Additional research in the library, on subject-specific electronic platforms, and on-site					22
Preparing seminars/ laboratories/ projects, assignments, reports, portfolios, and essays					10
Tutoring (professional guidance)					-
Examinations					3
Other activities					-
<b>3.7. Total hours of individual study (IS) and self-taught activities (ST)</b>				<b>41</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.
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.
PC5	Identifying and defining a research theme in the field of chemical engineering process, elaboration and implementation of a plan for achieving the objectives proposed and valuing the scientific research results obtained.
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
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.

<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.

2. Detailed and pertinent use of the experiment as an assessment method and foundation of the decisions.
<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 specialized knowledge to establish the research strategy and the program of experiments and simulations, explanation and interpretation of results.
3. 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. Initiation for the purpose of documentation in specialized libraries (printed format).	Explanation; Conversation; Description; Conceptualization	12
8. 1.2. Initiation, accessing of electronic international documentation sources (Science Direct, Scopus, SpringerLink, Web of Science, Wiley Journals, ProQuest Journals, etc.).	Explanation; Conversation; Description; Conceptualization	12
8. 1.3. Achievement of documentation in the field of the master program in specialized (selected) libraries, computer assisted chemical process engineering, thoroughness of the physical chemistry knowledge, electro-chemical and material processes; heat integration; intensification of chemical processes; depolluting processes and green chemistry; heat integration; risk and quality management.	Explanation; Conversation; Description; Conceptualization	12
8.1.4. Realization of the documentation in the area of the master program by accessing international (selected) electronic databases: computer assisted chemical engineering process; thoroughness of the physical chemistry knowledge, electro-chemical and material processes; heat integration; intensification of chemical processes; mathematic modeling; acquisition of experimental data; evolved process conducting; depolluting processes and green chemistry; heat integration; risk and quality management.	Explanation; Conversation; Description; Conceptualization	12
8. 1. 5. Systematization of the information accessed in the literature.	Explanation; Conversation; Description; Conceptualization	12
8. 1. 6. Presentation of the papers with the data from the literature.	Explanation; Conversation; Description; Conceptualization	12
8. 1. 7. Presentation of the portfolio of the dissertation subjects and selection of the subject with the scientific advisor.	Explanation; Conversation; Description; Conceptualization	12
<b>Bibliography</b> 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	-	-	-
9.5. Seminar/ laboratory	Presentation of the papers with the data from the literature.	Elaboration and presentation of the papers with the data from the literature	40 %
	Acquiring the documentation method	Assessment of the various methods of documentation.	10%
	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 literature.	30 %
	Integration of the documentation of the literature data collected with the selected dissertation subject	Evaluation of the integration of the documentation of the literature data collected with the selected dissertation subject.	20 %
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>

	<input type="radio"/>	Sustainable Development Generic Label						
								
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

<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.

<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."

<b>10</b> INEQUALITĂȚI REDUSE 	<b>11</b> ORĂȘE ȘI COMUNITĂȚI DURABILE 	<b>12</b> CONSUM ȘI PRODUCȚIE RESPONSABILĂ 	<b>13</b> ACȚIUNE CLIMATICĂ 	<b>14</b> VIAȚĂ ACVATICĂ 	<b>15</b> VIAȚĂ TERESTRĂ 	<b>16</b> PACE, JUSTIȚIE ȘI INSTITUȚII EFICIENTE 	<b>17</b> PARTENERIAȚE 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:  
27.04.2026

Semnătura directorului de departament

Prof. dr. habil. ing. Graziella Liana Turdean