COURSE DESCRIPTION

Development activities-applications III

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	**Development activities-applications III**			Course code	**CME6137**
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	II	2.5. Semester	3	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	**6**	of which: 3.2. course		3.3. seminar/ laboratory/ project	**6**
3.4. Total of hours in the curriculum	84	of which: 3.5. course		3.6. seminar/ laboratory	**84**
Time allocation for individual study (IS) and self-taught activities (ST)					**hours**
Learning from textbooks, course materials, bibliography, and notes (IS)					6
Additional research in the library, on subject-specific electronic platforms, and on-site					8
Preparing seminars/ laboratories/ projects, assignments, reports, portfolios, and essays					24
Tutoring (professional guidance)					-
Examinations					3
Other activities					-
3.7. Total hours of individual study (IS) and self-taught activities (ST)				**41**	
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	Not applicable
5.2. seminar/laboratory-related	• The students will attend the program of preparation of the dissertation paper established by the scientific advisor of the dissertation • 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. • The students will attend the laboratory with safety equipment

	(overall, gloves, goggles). • The students will know the goals, means, phases of preparation of the dissertation paper • The papers will be delivered to the scientific advisor or of dissertation paper

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

Professional competencies	
Competency code	**Competency**
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.
PC6	Quality and resource management in process engineering by applying the systemic approach and the principles of longterm development.
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)[2]

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. Applying the thorough knowledge and the specific research methods in the chemical processes engineering.
2. Detailed and pertinent use of the experiment as an assessment method and foundation of the decisions.

[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 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.

3. Designing, executing and capitalizing the results of the scientific research specific to process engineering.
Specific academic skills
1. Use of the specialized knowledge to establish the research strategy and the program of experiments and simulations, explanation and interpretation of results.
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. Seminar/ laboratory	**Teaching and learning methods**	**Remarks**
8.1.1. Preparing the experimental activities/applications (devices, glassware, reactants, computing systems and programs)	Explanation; Conversation; Description; Conceptualization	6
8.1.2. Perforrming the experimental activities / applications specific to undergoing the selected subject.	Explanation; Conversation; Description; Conceptualization	46
8.1.3. Collecting and interpreting the partial experimental data / results of the applications.	Explanation; Conversation; Description; Conceptualization	6
8.1.4. Analysis and systematization of partial experimental data.	Explanation; Conversation; Description; Conceptualization	6
8.1.5. Locating the obtained data in the context of the literature.	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 partial experimental results/used applications	Explanation; Conversation; Description; Conceptualization	8
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 "Babeș-Bolyai" University., and the "Lucian Blaga" Central Library.		

9. Evaluation

Type of activity	9.1 Evaluation criteria[3]	9.2 Evaluation methods[4]	9.3 Percentage in the final grade
9.4. Course	-	-	-
9.5. Seminar/ laboratory	Acquiring the adequate methods, techniques, and instruments for preparing and achieving the objectives of the selected research subject.	Assessment of the selected techniques and instruments for preparing and achieving the objectives of the selected research subject.	10 %
	The manner of realizing the research works, collecting and interpreting partial experimental data/results of the applications	Assessment of the manner of realizing the research works, collecting and interpreting partial experimental data / results of the application	70%

[3] 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.

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

	Correctness, completeness, and argumentation of the analysis and systematization of the partially obtained results	Evaluation of the correctness, completeness, of the analysis and systematization of the partially obtained results	10 %
	Presentation of the papers with partial experimental data/partial results of the applications specific to the selected research subject.	Assessment of the presentation of the papers with partial experimental data/partial results of the applications, specific to the selected research subject	10 %
9.6 Minimum standard for passing			
• The mark 5 (five) for the assessment of each of the assessment criteria. • Knowledge of the main means of documentation for the research in the field of computer assisted chemical process engineering.			

10. SDG labels (Sustainable Development Goals)[5]

	○ Sustainable Development Generic Label							
								
○	○	○	◉	○	○	○	○	○
								No label applies
○	○	○	○	○	○	○	○	○

Date of entry:
23.04.2026

Signature of course coordinator

Scientific supervisor

Signature of seminar coordinator

Scientific supervisor

Date of approval in the department:
29.04.2026

Signature of the head of department

Prof. habil. dr. eng. Graziella L. Turdean

[5] 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."*