



UNIVERSITATEA BABEȘ-BOLYAI  
BABEȘ-BOLYAI TUDOMÁNYEGYETEM  
BABEȘ-BOLYAI UNIVERSITÄT  
BABEȘ-BOLYAI UNIVERSITY  
TRADITIO ET EXCELLENTIA

Tradiție și Excelență prin  
Cultură - Știință - Inovație din 1581



Facultatea de Chimie și Inginerie Chimică

Str. Arany János nr. 11  
Cluj-Napoca, cod poștal 400028  
Tel.: 0264-59.38.33  
Fax: 0264-59.08.18

secretariat.chem@ubbcluj.ro  
www.chem.ubbcluj.ro

## SYLLABUS

Pharmaceutical Products Engineering

University year 2025-2026

### 1. Information regarding the programme

1.1. Higher education institution	Babeș-Bolyai University Cluj-Napoca
1.2. Faculty	Chemistry and Chemical Engineering
1.3. Department	Chemical Engineering
1.4. Field of study	Chemical Engineering
1.5. Study cycle	Master
1.6. Study programme/Qualification	Advanced Chemical Process Engineering)/ Master Chemical Engineer
1.7. Form of education	full-time

### 2. Information regarding the discipline

2.1. Name of the discipline		Pharmaceutical Products Engineering					Discipline code		CME7347				
2.2. Course coordinator					Lect. dr. ing. Lucian Cristian POP								
2.3. Seminar coordinator					Lect. dr. ing. Lucian Cristian POP								
2.4. Year of study		II	2.5. Semester		4	2.6. Type of evaluation		E		2.7. Discipline regime		DS/Op	

### 3. Total estimated time (hours/semester of didactic activities)

3.1. Hours per week	4	of which: 3.2 course	2	3.3 seminar/laboratory	2
3.4. Total hours in the curriculum	56	of which: 3.5 course	28	3.6 seminar/laborator	28
<b>Time allotment for individual study (ID) and self-study activities (SA)</b>					<b>hours</b>
Learning using manual, course support, bibliography, course notes (SA)					20
Additional documentation (in libraries, on electronic platforms, field documentation)					34
Preparation for seminars/labs, homework, papers, portfolios and essays					10
Tutorship					2
Evaluations					3
Other activities:					
<b>3.7. Total individual study hours</b>			69		
<b>3.8. Total hours per semester</b>			125		
<b>3.9. Number of ECTS credits</b>			5		

### 4. Prerequisites (if necessary)

4.1. curriculum	Not necessary
4.2. competencies	Not necessary

### 5. Conditions (if necessary)

5.1. for the course	Not necessary
5.2. for the seminar /lab activities	Not necessary



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## 6. Specific competencies acquired <sup>1</sup>

Professional/essential competencies	<ul style="list-style-type: none"> <li>Use of creative expertise, methods and concepts for analysis and synthesis of new chemical processes.</li> <li>Use of integrated chemical analysis and synthesis for process development and production of innovative products.</li> <li>Application of performance evaluation of new modern facilities to improve the decision making processes for the synthesis.</li> </ul>
Transversal competencies	<ul style="list-style-type: none"> <li>Realization of tasks according to the demands in required terms, with the respect of the ethical professional norms</li> <li>Solving the tasks according to the general objectives established in the work group</li> <li>Permanent information and documentation in the field.</li> </ul>

## 7. Objectives of the discipline (outcome of the acquired competencies)

7.1 General objective of the discipline	<ul style="list-style-type: none"> <li>Pharmaceutical agents based on organic molecules which have been synthesized and modified to provide medicinal products on a large scale</li> </ul>
7.2 Specific objective of the discipline	<ul style="list-style-type: none"> <li>Review of pharmaceutical industry and available drugs, retro-synthetic analyses of active compounds, industrial organic synthesis for pharmaceutical agents.</li> <li>Provide success in research and development laboratories, make contribution to basic understanding of industrial organic synthesis</li> </ul>

## 8. Content

8.1 Course	Teaching methods	Remarks
1. The features of pharmaceutical industry	Interactive lecture	
2. Pharmaceutical agents and therapeutically area		
3. Chemiotherapics		
4. Antiinfectives I		
5. Antiinfectives II		
6. Neuropharmaceuticals I		
7. Neuropharmaceuticals II		
8. Cardiovascular drugs		
9. Antiinflammatory-Antireumatic drugs		
10. Gastrointestinal drugs		
11. Endocrine and metabolic drugs		
12. Related technologies		

<sup>1</sup> One can choose either competences or learning outcomes, or both. If only one option is chosen, the row related to the other option will be deleted, and the kept one will be numbered 6.



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13. Pharmaceutical dosage forms		
14. Drug testing		
Bibliography 1. D. J. am Ende, M. T. am Ende, Chemical engineering in the pharmaceutical industry - drug product design, development and modeling, John Wiley & Sons, 2019 2. J. Roy, An introduction to pharmaceutical sciences - Production, chemistry, techniques and technology, Woodhead Publishing, 2011 3. G. L. Patrick, An Introduction to Medicinal Chemistry, Oxford University Press, 2023 4. J. J. Li, Current Drug Synthesis, Wiley, 2022		
8.2 Seminar / laboratory	Teaching methods	Remarks
8.2.1. Labor protection in the laboratory. Pharmaceutical industry. Equipment. Operations. Drawings	Discussion of technological issues. Drawings	
8.2.2. Preparation of antiseptic solutions. Synthesis of iodoform.		
8.2.3. Nutritional supplements. Evaluation of antioxidant activity.		
8.2.4. Neuropharmacological agents. Polymorphism. Crystallization.		
8.2.5. Anti-inflammatory drugs. Synthesis of indomethacin (one phase). Drawing up an installation scheme after the technology.		
8.2.6. Benzodiazepines. Synthesizing a phase. Drawing up an installation scheme after the technology.		
8.2.7. Related technologies. Pharmaceutical dosage forms. Disaggregation of the capsules.		
Bibliography 1. D. J. am Ende, M. T. am Ende, Chemical engineering in the pharmaceutical industry - drug product design, development and modeling, John Wiley & Sons, 2019 2. J. Roy, An introduction to pharmaceutical sciences - Production, chemistry, techniques and technology, Woodhead Publishing, 2011 3. G. L. Patrick, An Introduction to Medicinal Chemistry, Oxford University Press, 2023 4. J. J. Li, Current Drug Synthesis, Wiley, 2022 5. Specialized scientific articles, patents		

**9. Corroborating the content of the discipline with the expectations of the epistemic community, professional associations and representative employers within the field of the program**

<ul style="list-style-type: none"> <li>By acquiring the theoretical and applied skills included in the content of the discipline "Pharmaceutical Products Engineering" the students are acquiring consistent knowledge, corresponding to the competences specified in the Diploma Supplement and the potential jobs from ANC.</li> </ul>
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**10. Evaluation**

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of final grade
10.4 Course	The ability to establish and to choose the models proper to the studied properties of materials, applying the correct research methods.	Exam, ppt presentation	80%
10.5 Seminar/laboratory	Capacity to analyse the models in real applications.	Colloquy	20%
	The activity during the lab work and the quality of reports.		



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10.6 Minimum standard of performance
<ul style="list-style-type: none"><li>▪ 5 (five) in lab and examination according to the standard.</li><li>▪ each student will have to make a ppt presentation on a chosen topic related to the technological process of obtaining a drug</li></ul>

## 11. Labels ODD (Sustainable Development Goals)<sup>2</sup>



Date:  
26/03/2025

Signature of course coordinator

Signature of seminar coordinator

Date of approval:  
...14.04.2025

Signature of the head of department

<sup>2</sup> Keep only the labels that, according to the [Procedure for applying ODD labels in the academic process](#), suit the discipline and delete the others, including the general one for *Sustainable Development* – if not applicable. If no label describes the discipline, delete them all and write „Not applicable.”.