SYLLABUS

1. Information regarding the programme

1.1 Higher education institution	Babeş-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

2. Information regarding the discipline

2.1 Name of the discipline	Pharmaceutical Products Engineering- CME7347						
2.2 Course coordinator	Conf. dr. ing. Vasile Miclaus						
2.3 Seminar coordinator	Conf. dr. ing. Vasile Miclaus						
2.4. Year of study	II	2.5 Semester	4	2.6. Type of evaluation	E	2.7 Type of discipline	Opt

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

3.1 Hours per week	4	Of which: 3.2 course	2	3.3 laboratory	2
3.4 Total hours in the curriculum	56	Of which: 3.5 course	28	3.6 laboratory	28
Time allotment:					hours
Learning using manual, course support, bibliography, course notes					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:					-

3.7 Total individual study hours	69
3.8 Total hours per semester	125
3.9 Number of ECTS credits	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

6. Specific competencies acquired

Professional competencies	• Use of creative expertise, methods and concepts for analysis and synthesis of new chemical processes. • Use of integrated chemical analysis and synthesis for process development and production of innovative products. • Application of performance evaluation of new modern facilities to improve the decision making processes for the synthesis.
Transversal competencies	• Realization of tasks according to the demands in required terms, with the respect of the ethical professional norms • Solving the tasks according to the general objectives established in the work group • Permanent information and documentation in the field.

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

7.1 General objective of the discipline	Pharmaceutical agents based on organic molecules which have been synthesised and modified to provide medicinal products on a large scale
7.2 Specific objective of the discipline	Review of pharmaceutical industry and available drugs, retro-synthetic analyse of active compounds, industrial organic synthesis for pharmaceutical agents. Provide success in research and development laboratories, make contribution to basic understanding of industrial organic synthesis

8. Content

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

Bibliography

1. D. Lednicer, L.A. Mitscher, Organic chemistry of drug synthesis, Wiley New York 1980.
2. J. L. McGuire, Pharmaceuticals, Wiley- VCH Weinheim, 2000
3. H. Auterhoff, J. Knabe, H.-D.Holtje, Lehrbuch der Pharmazeutischen Chemie, Wissenschaftliche Verlagesellschaft mbH Stuttgart, 1999
4. C. Daescu: Chimia şi tehnologia medicamentelor. Ed. Did. Ped., Bucuresti 1994,
5. C. Oniscu: Chimia şi tehnologia medicamentelor. Ed. Tehnica , Bucuresti 1988,
6. E. Cioranescu: Medicamente de sinteza, Ed. Tehnica Bucuresti,1966,

8.2 Laboratory	Teaching methods	Observaţii
8.2.1. Labor protection in the laboratory. Pharmaceutical industry. Equipment. Operations. Drawings	Labor protection in the lab. Discussion of technological issues. Drawings	The number of laboratory hours is

8.2.2. Preparation of antiseptic solutions. Synthesis of iodoform.	Discussion of technological issues. Experiment.	grouped in 7 sessions
8.2.3. Nutritional supplements. Evaluation of antioxidant activity.	Discussion of technological issues. Experiment.	
8.2.4. Neuropharmacological agents. Polymorphism. Crystallization.	Discussion of technological issues. Experiment.	
8.2.5. Anti-inflammatory drugs. Synthesis of indomethacin (one phase). Drawing up an installation scheme after the technology.	Discussion of technological issues. Experiment.	
8.2.6. Benzodiazepines. Synthesizing a phase. Drawing up an installation scheme after the technology.	Discussion of technological issues. Experiment.	
8.2.7. Related technologies. Pharmaceutical dosage forms. Disaggregation of the capsules. Colloquy	Discussion of technological issues. Experiment.	

Bibliography

1. D. Lednicer, L.A. Mitscher, Organic chemistry of drug synthesis, Wiley New York 1980.
2. J. L. McGuire, Pharmaceuticals, Wiley- VCH Weinheim, 2000
3. H. Auterhoff, J. Knabe, H.-D.Holtje, Lehrbuch der Pharmazeutischen Chemie, Wissenschaftliche Verlagesellschaft mbH Stuttgart, 1999
4. C. Daescu: Chimia şi tehnologia medicamentelor. Ed. Did. Ped., Bucuresti 1994,
5. C. Oniscu: Chimia şi tehnologia medicamentelor. Ed. Tehnica , Bucuresti 1988,

E. Cioranescu: Medicamente de sinteza, Ed. Tehnica Bucuresti,1966,

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

- To the establishing of formative content of the course and laboratory work have been participated teaching personal from chemistry and chemical engineering departments from our faculty and from other universities.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the 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	60
10.5 Seminar/lab activities	Capacity to analyze the models in real applications.	Colloquy	40
	The activity during the lab work and the quality of reports.		
10.6 Minimum performance standards			
➢ 6 (six) in lab and examination according to the standard.			

Date	Signature of course coordinator	Signature of seminar coordinator
25 February 2018		

Date of approval	Signature of the head of department
26 February 2018