

SYLLABUS

1. Information regarding the programme

1.1 Higher education institution	Babes-Bolyai University
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	ICAP/ Master

2. Information regarding the discipline

2.1 Name of the discipline	Green Chemistry-Theoretical and Technological Aspects						
2.2 Course coordinator	Assoc prof. . Dr. CRISTEA CASTELIA						
2.3 Seminar coordinator	Assoc prof. Dr. CRISTEA CASTELIA						
2.4. Year of study	II	2.5 Semester	III	2.6. Type of evaluation	C	2.7 Type of discipline	Optional

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

3.1 Hours per week	3	Of which: 3.2 course	2	3.3 seminar	1
3.4 Total hours in the curriculum	42	Of which: 3.5 course	28	3.6 seminar	14
Time allotment:	hours				
Learning using manual, course support, bibliography, course notes	20				
Additional documentation (in libraries, on electronic platforms, field documentation)	32				
Preparation for seminars/labs, homework, papers, portfolios and essays	50				
Tutorship	3				
Evaluations	3				
Other activities:					
3.7 Total individual study hours	108				
3.8 Total hours per semester	150				
3.9 Number of ECTS credits	6				

4. Prerequisites (if necessary)

4.1. curriculum	• No
4.2. competencies	• No

5. Conditions (if necessary)

5.1. for the course	• The mobile telephones must be switched off during course and seminar
5.2. for the seminar	• Not necessary

6. Specific competencies acquired

Professional competencies	<p>Mastering the principles of “Green Chemistry” as methodology for achieving sustainability in the chemical industry.</p> <p>Using chemical knowledge for environmentally friendly chemistry.</p> <p>Formulate, develop and apply creative solutions for strategic problems by promoting innovative chemical technologies that reduce or eliminate the use or generation of hazardous substances in the design, manufacture and use of chemical products</p>
Transversal competencies	<ul style="list-style-type: none"> • Team working and professional task • Documentation in foreign languages using the new information and communication technologies.

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

7.1 General objective of the discipline	<ul style="list-style-type: none"> • To familiarize the students with the green chemistry concept, with the theoretical and technological aspects of sustainable chemical processes.
7.2 Specific objective of the discipline	<ul style="list-style-type: none"> • To understand the principles of Green Chemistry concept • Life Cycle Assessment of chemical products • To develop abilities in planning strategies of sustainable development

8. Content

8.1 Course	Teaching methods	Remarks
1. The 12 principles of Green Chemistry, definition and specific concepts	Lecture	1
2. Prevention of waste formation in chemical industry	Lecture	1
3. Life cycle assessment	Lecture	1
4. Catalysis in chemical synthesis	Lecture	2
5. Non polluting solvents in chemical processes	Lecture	2
6. Renewable resources for the chemical industry	Lecture	2
7. Alternative energy sources for chemical processes	Lecture	2
8. Designing nonpolluting processes	Lecture	1
9. Case studies	Demonstrating	2
Bibliography 1. P. T. Anastas, J. C. Warner “ <i>Green Chemistry Theory and Practice</i> ” Oxford Univ. Press, 1998. 2. M. Lancaster “ <i>Green Chemistry an introductory text</i> ” Pub. The Royal Society of Chemistry, 2002 3. P. Tundo, A. Perosa, F. Zechinni, <i>Methods and Reagents for Green Chemistry</i> ” J. Wiley and Sons, 2007. 4. W. M. Nelson, <i>Green solvents for chemistry: perspectives and practice</i> , Oxford Univ. Press, 2003. 5. M. Doble, A. K. Kruthiventi <i>Green Chemistry & Engineering</i> , Elsevier Sci & Technol. Books, 2007.		
8.2 Seminar	Teaching methods	Remarks
1. The 12 principles of Green Chemistry, definition and specific concepts	Collaborative discussions	1
2. Life Cycle Assessment of sulphuric acid	Collaborative discussions	1
3. Life Cycle Assessment of phenol	Collaborative discussions	1
4. Life Cycle Assessment of anilin	Collaborative discussions	1

5. Life Cycle Assessment of synthetic fibers	Collaborative discussions	1
6. Life Cycle Assessment of plastic materials	Collaborative discussions	2

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"> The content of this discipline is based on a modern/critical approach of chemical processes employed in the fabrication of synthetic materials useful for chemical engineers in both production and marketing areas, as well as for the professional development towards a scientific carrier (research, doctoral studies).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Course	Knowledge of the concepts of green chemistry Abilities to use the concepts of green chemistry in the analysis of industrial processes	Written report <i>in extenso</i> of a case study	50%
		Oral presentation with ppt support of the same case study	20%
		Answer to questions formulated by the examiner	20%
10.5 Seminar	Understanding of the concepts presented during the teaching activities	Home work	10%
	Adequate use of concepts	Answer to questions formulated by the examiner	
10.6 Minimum performance standards			
Enumeration of the green chemistry principles			

Date

5.11.2013

Signature of course coordinator

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Signature of seminar coordinator

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Date of approval

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Signature of the head of department

