



NO. _____ din _____

Form USAMV 0107030102

SUBJECT OUTLINE

1. Information on the programme

1.1. Higher education institution	University of Agricultural Sciences and Veterinary Medicine of Cl
1.2. Faculty	Agriculture
1.3. Department	Environmental and plant protection
1.4. The field of studies	Environmental Engineering
1.5. Cycle of studies ¹⁾	License
1.6. 1.6.Specialization / Study program	Environmental Engineering
1.7. Form of education	ZI

2. Information on the discipline

2.1. Name of the discipline	Analysis and synthesis of technological processes							
2.2. Holder of course activities	LECTURER.PhD. Cristian MALINAS							
2.3. Holder of seminar / laboratory / project activities	Associate Professor. PhD Antonia ODAGIU							
2.4. Year of study	III	2.5. Semester	I	2.6. Type of evaluation	Continue	2.7. The discipline regime	Continut ²	DD
							Obligativitate ³	DI

3. Timpul total estimat (ore pe semestru al activităților didactice)

3.1.Number of hours per week - frequency form	4	of which: 3.2. course	2	3.3.seminar / laboratory / project	2
3.4. Total hours of the educational plan	56	of which: 3.5.course	28	3.6. seminar / laboratory	28
Distribution of the time fund					ore
3.4.1.Study after manual, course support, bibliography and notes					22
3.4.2. Additional documentation in the library, on specialized electronic platforms and in the field					20
3.4.3. Preparation of seminars / laboratories / projects, topics, reports, portfolios and essays					22
3.4.4.Tutorials					4
3.4.5. Examinations					8
3.4.6. Other activities					
3.7. Total hours of individual study	74				
3.8. Total hours per semester	130				
3.9. Number of credits ⁴	5				

4. Preconditions (where applicable)

4.1. curriculum-related	-
4.2. of skills	team communication skills, organization, use of the internet as a resource.

5. Conditions (where applicable)

5.1. for the course	The course is interactive, students can ask questions about the content of the exhibition.
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	Academic discipline is required throughout the duration of the lecture. No other activities are tolerated during the lecture, mobile phones must be switched off. Room with video projector
5.2. for conducting the seminar / laboratory / project	Room with video projector, blackboard. Academic discipline is imposed throughout the duration of the work. Laboratory room with process specificity.

6. Specific skills acquired

Professional skills	<p>1. Knowledge, understanding, explanation and interpretation: The ability to apply general knowledge regarding technological processes; knowledge of the principles and notions specific to the critical analysis of technological processes.</p> <p>2. Instrumental-applicative. Use of chemical processes that underlie the operation of the reactors, depending on the purpose pursued.</p> <p>3. Attitudes: - manifestation of positive and responsible attitudes towards the scientific ruler, based on knowledge of phenomena and practical connections; - cultivation of a scientific environment centered on democratic values and relationships; - the optimal and creative valuation of its own potential in scientific activities; - engaging in the partnership relationship with other people: colleagues, teachers, people from the economic sector, etc .; - participation in their own scientific development</p>
Transversal competences	<p>To understand the connections between the social, cultural and legal economic factors that shape and have an impact on the specific technological processes</p> <p>To develop the skills to work effectively with people with different personalities and backgrounds.</p> <p>To have competences for analyzing the usefulness of different types of programs in different contexts.</p>

7. The objectives of the discipline (based on the grid of specific skills accumulated)

7.1. The general objective of the discipline	Presentation of the essential concepts, principles and notions specific to the analysis and synthesis of technological processes
7.2. Specific objectives	<p>Knowledge and understanding of the different basic concepts, the components of the analysis and synthesis of the technological processes</p> <p>Correlation by the students of the necessity of the analysis and synthesis of the technological processes with the opportunity of their applicability in environmental engineering</p> <p>To develop essential skills in developing technological solutions to improve the quality of the environment</p> <p>To develop the capacity for analysis and synthesis using terms specific to the debated problem.</p> <p>To contribute to the objective evaluation of conditions, needs and risks to generate innovative technological solutions with applicability in environmental engineering</p> <p>To apply the methods of efficient organization in the realization of technological processes</p>

8. Contents

8.1.CURS Number of hours - 28	Teaching methods	Remarks
I. Introduction	Lecture	2 hours
- The purpose, importance, evolution and content of the course		
- General considerations on the involvement of the disciplines		
fundamentals and engineers in the training of specialists in the field of engineering and environmental management as well as industrial systems	Lecture	4 hours
- The role of the engineer specialized in environmental engineering and management issues in industry and in solving environmental problems.		

<p>II. Technological processes in the ceramics industry, consumption and emissions - General considerations; - The sectors of the ceramic industry; - Analysis and synthesis of technological processes for ceramic production - Consumption and emissions in the ceramic industry.</p>	Lecture	4 hours
<p>III. Technological processes in the chemical industry, emissions, the problem of water and waste gases in the chemical industry - General considerations; - Analysis and synthesis of technological processes for wastewater treatment; - Emissions to water and air - Water and gas management systems.</p>	Lecture	4 hours
<p>III. Technological processes involved in ensuring energy efficiency - General considerations; - Analysis and synthesis of technological processes to ensure energy efficiency at the installation level; - Analysis and synthesis of technologies for energy efficiency assurance at the level of activities and processes.</p>	Lecture	4 hours
<p>IV. Technological processes in the fertilizer industry - General considerations; - Analysis and synthesis of the technological processes of production of NPK, CN, urea and UAN; - Analysis and synthesis of the technological processes of production of AN, CAN and superphosphates; - Emissions.</p>	Lecture	4 hours
<p>V. Technological processes in the pulp and paper industry - General considerations; - Analysis and synthesis of the technological processes of cellulose and paper production; - Analysis and synthesis of technological processes for wastewater treatment - Analysis and synthesis of technological processes for paper processing for recycling.</p>	Lecture	6 hours
<p>VI. Technological processes in the oil and natural gas refining industry - General considerations; - Analysis and synthesis of the technological processes involved in the oil and natural gas refining industry; - Consumption and emissions in the oil and natural gas refining industry.</p>		

<p>8.2. PRACTICAL WORK Number of hours - 28 1. Working instructions and norms of the labor safety technique in the profile laboratories. Work organization, fire prevention and extinction rules and first aid measures in case of accidents. 2. The ceramics industry and the environment. Good practices on reducing consumption and emissions in the ceramic industry. 3. Chemical industry and environment. Good practices regarding wastewater and gas treatment technologies. 4. Energy efficiency and the environment. Case study: Benchmarking and energy efficiency. 5. Fertilizer industry and environment. Good practices regarding emission reduction technologies.</p>	<p>Teaching methods</p> <p>Presentation of the laboratory work. Conducting experiments laboratory in groups of 3 to 5 students. Processing of results and analysis by each group of students</p>	<p>2 hours 2 hours 4 hours 2 hours 4 hours</p>
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6. The pulp and paper industry and the environment. Good practices regarding emission reduction technologies.	Verification method	4 hours
7. Oil and natural gas refining industry. Good practices regarding emission reduction technologies.		4 hours
8. Material balance		4 hours
9. Verification of knowledge		2 hours
<i>Bibliography Required:</i>		
1. Odagiu Antonia, 2014, <i>Analiza si sinteza proceselor tehnologice</i> , Note de curs.		
2. Părăușanu V., 1982, <i>Tehnologii chimice</i> , Editura Științifică și Enciclopedică, București.		
3. Răducanu C., R. Pătrașcu 2006, <i>Evaluarea eficienței energetice</i> , Editura AGIR, București.		
4. Rusu M., M. Mărghitaș, I. Oroian, T. Mihăiescu, A. Dumitraș, 2005, <i>Tratat de agrochimie</i> , Editura Ceres, București.		
5. Măluțan T., 2005, <i>Analiza, modelarea și sinteza proceselor</i> , http://omicron.ch.tuiasi.ro/~thmalu/asmp.htm		
6. Măluțan T., 2008, <i>Chimia celulozei</i> , Editura Politehniun, Iași.		
7. Ivanus G., 2010, <i>Tratat de petrochimie. Vol. 1. Produse petrochimice de bază</i> , Editura AGIR, București.		
Optional bibliography:		
1. Cuculeanu G., <i>Tehnologii industriale și de construcții</i> , http://www.biblioteca-digitala.asc.ro/biblioteca/carte2.asp?id=342&idb= .		
2. ***, <i>Reference documents under the IPPC Directive and the IED</i> , http://eippcb.jrc.ec.europa.eu/reference/		

9. Corroborating the contents of the discipline with the expectations of representatives of epistemic communities, professional associations and representative employers in the field related to the program

The content of the discipline is in accordance with what is studied in other university centers in the country and abroad. The content and structure of the course are aspects adapted to the needs of the students and the demands of the employers in the field of analysis and synthesis of technological processes. The graduates of this course can use their knowledge gained in the job market offers, in institutions with a technological profile in general and in those with an environmental engineering profile in particular, including in companies and or non-governmental organizations that provide consultancy in the field. At the same time, the specific knowledge of the course constitutes a starting point towards the higher level of preparation, represented by the doctoral programs, in the field of environmental protection.

10. Evaluation

Activity type	10.1.Evaluation criterias	10.2. Methods of evaluation	10.3. Weight in the final grade
10.4. COURS	Minimum requirements for note 5 (or as note 5 is granted) Note 5 is awarded following the individual evaluation of each subject, which must obtain note 5 individually; The final average will be a simple arithmetic resulting from the final note at periodic verification Requirements for note 10 Note 10 is awarded following the individual evaluation of each subject, at the higher level of mastery of the subject. The student's ability to make logical connections between concepts is pursued, as well as his overall view on the subject.	E (sumative)	70%
10.5. Seminar / Laboratory	The mode of public presentation of the reports. The correctness of the answers to the questions.	Performance evaluation at final verification. Questions for students.	30%
10.6. Minimum standard of performance			
60% knowledge of the information taught at the course.			
60% knowledge of the information obtained from the laboratory hours.			

- ¹ The cycle of studies - one of the variants is chosen - Bachelor / Master / Doctorate
- ² The regime of the discipline (content) - for the license level one of the variants is chosen - DF (fundamental discipline), DD (discipline in the field), DS (specialized discipline), DC (complementary discipline).
- ³ The regime of the discipline (compulsory) - one of the variants is chosen - D1 (compulsory discipline) DO (optional discipline) DFac (optional discipline).
- ⁴ A credit is equivalent to 25-30 hours of study (teaching activities and individual study).

Date completed

04.09.2019

Course holder

Lecturer PhD. Cristian MĂLINAȘ

Holder of laboratory works / seminar

Associate Professor. PhD

Antonia ODAGIU

**Date of approval in the
department**

05.09.2019

Department director

Professor PhD. Ioan OROIAN