



No. _____ of _____

USAMV form 0107030104 (discipline code)

SUBJECT OUTLINE

1. Information on the programme

1.1 Higher education institution	University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca
1.2. Faculty	Agriculture
1.3. Department	Technical and Soil Science
1.4. Field of study	Agronomy
1.5. Cycle studies ¹⁾	Bachelor
1.6.Specialization/ Study program	ENVIRONMENTAL ENGINEERING
1.7. Form of education	Full time

2. Information on the discipline

2.1. Discipline name	AUTOMATION OF TECHNOLOGICAL PROCESSES							
2.2. Course coordinator	Assoc. prof. eng. PhD. Ovidiu RANTA							
2.3. Seminar/laboratory/project leader	Assoc. prof. eng. PhD. Ovidiu RANTA							
2.4. Year of study	III	2.5. Semester	1	2.6. Form of evaluation	Summative	2.7. Discipline status	Content ²	D
							Compulsoriness ³	DI

3. Total estimated time (teaching hours per semester)

3.1. Hours per week – full time programme	4	out of which: 3.2. course	2	3.3. seminar/ laboratory/ project	1
3.4.Total number of hours in the curriculum	42	out of which: 3.5.course	28	3.6. seminar/laboratory	14
Distribution of the time allotted					
3.4.1. Study after manual, course support, bibliography and notes					Hours
3.4.2. Additional documentation in the library, on specialized electronic platforms and on the ground					28
3.4.3. Preparing seminars/ laboratories/ projects, subjects, reports, portfolios and essays					20
3.4.4. Tutorials					18
3.4.5. Examinations					4
3.4.6. Other activities					8
3.4.1. Study after manual, course support, bibliography and notes					
3.7. Total hours of individual study	78				
3.8. Total hours per semester	120				
3.9. Number of credits ⁴	4				

4. Prerequisites (if applicable)

4.1. Curriculum related	Mathematics, mechanics, physics
4.2. Skills related	The student must have knowledge of mathematics, mechanics, physics

5. Conditions (if applicable)

5.1. for the course	The course is interactive, students can ask questions about the content of the exhibition. The university discipline requires the observance of the start and end time of the course.No other activities are tolerated during the lecture, mobile phones should be closed.
5.2. for the seminar/laboratory/project	In the practical works it is compulsory to consult the reports for the practical works, each student will carry out an individual activity with the laboratory materials made available and described in the existing reports. The academic discipline is required throughout the duration of the works. It is also necessary to respect the labor protection and PSI norms

6. Comulated specific competences

Professional competences	Defining the basic technical and technological concepts necessary for the application of scientific theories and methodology Choosing the principles and establishing the basic methods suitable for designing and adopting technological solutions. Knowing the main processes in the environment and identifying the possibilities for their automation. Writing a specialized study to determine the interactions between natural factors, human activities and the quality of the environment.
Transversal competences	Identifying and observing the rules of professional ethics and deontology, taking responsibility for the decisions taken and the risks involved Carrying out a work / project, carrying out responsibilities specific to the role in a multidisciplinary team

7. Discipline objectives (based on the cumulated specific competences)

7.1 . General objective	Formation of the engineering technical horizon of the future specialists upon their acquaintance with the engineering models of approaching and solving the problems related to the automation of processes, methods of depollution and environmental conservation
7.2. Specific objectives	Creation of skills for the correct choice of the technological stages, the proper setting of the dimensions and type of installations to reduce the specific consumption and for a greater reliability, at high technical parameters. Identification of the types of systems and their adaptability to various possibilities of automation

8. Content

8.1. COURSE Number of hours – 28	Teaching methods	Observation
1. The objectives of automation	Lecture	1 Hours
2. General concepts of automatic	Lecture	
3. Automatic systems. Definition of systems, mathematical modeling of processes. Standard mathematical models, transfer functions	Lecture	1 Hours 2 Hours
4. Regulation and management of processes in environmental engineering	Lecture	3 Hours
5. 5. Sensors, transducers, actuators	Lecture	2 Hours
6. Automation of retention processes on grills and sites; Automatizare proceselor de decantare a poluantilor	Lecture	2 Hours
7. Separation of pollutants by sedimentation. Theoretical principles, Utilaje pentru sedimentare;	Lecture	2 Hours
8. Automation of the processes of separation of pollutants by coagulation-flocculation and flotation;	Lecture	2 Hours
Theoretical principles, destabilization of colloidal systems, flocculatory coagulation agents, influencing factors, coagulation flocculation equipment;	Lecture	2 Hours
9. Automation of filtering processes. Basic principles, filtering techniques, filtering equipment;	Lecture	2 Hours
10. Automation of advanced water treatment processes; Microfiltration, ultrafiltration, reverse osmosis, nanofiltration, electro dialysis;	Lecture	2 Hours
11. Automation of water disinfection processes; chlorine disinfection, ozone disinfection, UV disinfection;	Lecture	1 Hours
12. Automation of systems for regulating temperature and air quality in protected spaces	Lecture	1 Hours
13. Automation of fertilizer distribution processes;	Lecture	2 Hours
14. Automation of distribution processes of plant protection substances	Lecture	2 Hours
15. Software for process modeling and simulation;		3 Hours

8.2. PRACTICAL WORKS Number of hours – 14		
1. Labor protection measures and rules. Units of measure 2. Automation of temperature regulation in protected spaces 3. Automation of fluid flow regulation 4. Automation of fluid pressure regulation 5. Automation of the drying process 6. The study of the filtration operation; Elements of filter design and sizing 7. Calculation and dimensioning elements for de-sanding installations	Practical works Practical works Practical works Practical works Practical works Applications and problems	1 lab work 1 lab work 1 lab work 1 lab work 1 lab work 1 lab work
8. Calculation and dimensioning element for installations decanting; 9. Calculation and dimensioning elements for coagulation-flocculation systems; 10. Automation of water supply processes; Calculation elements for water supply installations; 11. Automation of the distribution processes of the fertilizers 12. Automation of distribution processes of plant protection substances 13. Automation of grinding processes 14. Automation of evacuation and transport processes a manure	Applications and problems Applications and problems Applications and problems Practical works Practical works Practical works Practical works	1 lab work 1 lab work 1 lab work 1 lab work 1 lab work 1 lab work 1 lab work
<p><i>Compulsory bibliography:</i></p> <ol style="list-style-type: none"> 1. Ranta O. Curs predat 2. Baci Dorina, Tehnici, utilaje și tehnologii de depoluare a apelor reziduale, Editura Risoprint, Cluj-Napoca, 2001 3. Robescu Diana și colab., Modelarea și simularea proceselor de epurare, Editura Tehnică, București, 2004 4. Teodosiu Carmen, Tehnologia apei potabile și industriale, Editura Matrixrom, București, 2001 5. Petre Miu, Introducere in mecatronica, Editura Didactica si Pedagogica, Bucuresti 1999 		
<p><i>Optional bibliography:</i></p> <ol style="list-style-type: none"> 1. Ianculescu, Ov., și colab, Epurarea apelor uzate, Editura Matrixrom, București, 2001 2. Vida Simiti, I, Violeta Popescu, Metode de separare a poluanților, Editura UT Pres, Cluj-Napoca, 2003 		

9. Corroborating the discipline contents with the expectations of the epistemic community representatives, of the professional association and of the relevant employers in the corresponding field

In order to identify ways of modernizing and continuously improving the teaching and the content of the courses, with the most current topics and practical problems, the teachers participate in the meetings and symposiums where they meet with teachers from other universities and with representatives from the economic activity. Also the teachers participate in exhibitions and forums organized at these events.

10. E valuation

Type of activity	10.1. Evaluation criteria	10.2. Evaluation type	10.3. Percentage of the final grade
10.4. Course	The ability to analyze the technological systems and identify the specific automation variants. Knowledge of pollution sources, types of pollutants, pathways into the environment; Knowledge of the types of pollutants and their physical and chemical properties; Knowledge of the methods of classical separation of pollutants from polluted environments and the automation of the technological flow Know the methods of advanced separation of pollutants from polluted environments (microfiltration, ultrafiltration, reverse osmosis, nanofiltration, electrodialysis).	Continuous assessment	80%
10.5. Seminar/Laboratory	The ability to identify and apply automation systems Recognition and identification of the main types of installation systems Decontamination Carrying out dimensioning, verification and execution calculations for depollution installations	Continuous assessment	20%
10.6. Minimum performance standard			
Mastery of scientific information transmitted through lectures and practical papers at an acceptable level.			

¹ Cycle of studies - choose one of the three options: Bachelor/Master/Ph.D.

² according to the educational plan

³ Discipline status (compulsoriness) - choose one of the options – **DI** (compulsory discipline) **DO** (optional discipline) **DFac** (facultative discipline).

⁴ One credit is equivalent to 25-30 hours of study (teaching activities and individual study).

Filled in on
04.09.2019

Course coordinator
Assoc. prof. eng. PhD. Ovidiu RANTA

Laboratory works/ seminars coordinator
Lect. eng. PhD. Ovidiu MARIAN

Approved by the
department on
05.09.2019

Head of the Department
Assoc. prof. eng. PhD. Ovidiu RANTA