UNIVERSITATEA DE ŞTIINŢE AGRICOLE ŞI MEDICINĂ VETERINARĂ CLUJ-NAPOCA
Facultatea de Agricultură
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NO._____from _____ Form USAMV 0107030107

SUBJECT OUTLINE

1. Information on the programme

1.1. Higher education institution	University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca
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	Environmental quality monitoring 2							
2.2. Holder of course activities				PhD Associate Professor. Antonia ODAGIU				
2.3. Holder of seminar / laboratory / project activities				PhD Assistent Bianca MOLDOVAN				
2.4. Year of study	III	2.5. Semester	I	2.6. Type of evaluation	Sumative	2.7. Regimul disciplinei	Content[2]	DS
							Obligatory [3]	DI

3. Estimated total time (hours per semester of teaching activities)

3.1. Number of hours per week - frequency form	2	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					orc
3.4.1.Study after manual, course support, bibliography and notes					20
3.4.2. Additional documentation in the library, on specialized electronic platforms and in the field					10
3.4.3. Preparation of seminars / laboratories / projects, topics, reports, portfolios and essays					10
3.4.4. Tutorials					4
3.4.5. Examinations					4
3.4.6. Other activities					
3.7. Total hours of individual study	48				
3.8. Total hours per semester	104				
3.9. . Number of credits[4]	4				

4. Preconditions (where applicable)

4.1. curriculum-related	The chemistry of the environment. Physics of the environment.
4.2. of skills	General notions of mathematics and statistics

5. Conditions (where 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 starting and finishing time of the course.
5.2. for the seminar / laboratory / project	No other activities are tolerated during the lecture, the cell phones being closed.

6. Specific skills acquired

Professional skills	Explaining the mechanisms of processes and effects of anthropic or natural origin that determine and influence the pollution of the environment. Analysis of environmental protection measures and elaboration of technical solutions for the prevention, reduction and elimination of pollution phenomena and for the optimal use of natural resources. Cooperation with institutions that have responsibilities in the field of environmental monitoring and management.
Transversal competences	Identifying and observing the rules of professional ethics and deontology, taking responsibility for the decisions taken and the risks involved. Identify the roles and responsibilities in a multidisciplinary team and apply effective networking and teamwork techniques. Efficient use of information sources and resources for communication and assisted training (Internet portals, specialized software applications, databases, online courses, etc.) both in Romanian and in a language of international circulation.

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

7.1. The general objective of the discipline	Knowledge of the fundamental problems of environmental quality monitoring.
7.2. Specific objectives	Knowledge of classical and instrumental methods of environmental quality investigation.

8. Contents

8.1.Cours **Number of hours - 28**	Teaching methods	Remarks
1.Chapter 1. General considerations regarding the concepts of environment, pollution, public health and environmental quality monitoring.	Lecture	2 hours
1.1.Introduction. The components of the environment. **1.2.Activity monitoring activity. 2. The architecture of the monitoring systems, features and equipment used. The concept of integrated environmental monitoring**	Lecture	6 hours
1.3 Environmental sampling. Types of sampling. Sampling plans. **1.4.Sample collection and preparation of samples for analysis.**	Lecture	4 hours
3.Chapter 2. Monitoring of physical and chemical parameters **2.1 Methodology of monitoring physical parameters - indicators**	Lecture	2 hours
2.2. Methodology of monitoring the chemical parameters indicators	Lecture	6 hours
4. Chapter 3. Monitoring of biological and biochemical parameters **5. Chapter 4. Equipment used in environmental quality monitoring.** **4.1. Equipment used in air quality monitoring** **4.2. Equipment used in water quality monitoring** **4.3. Equipment used in soil quality monitoring**		
6.Chapter 5. Environmental data processing and analysis **5.1.Inventory of environmental data** **5.2 Chemometric interpretation of environmental data**	Lecture	6 hours
5.3.Multivariate analysis of environmental data **7.Chapter 4. Legislative aspects regarding the methods of monitoring the quality of the environment**	Lecture	2 hours

8.2.PRACTICAL WORKS Number of hours - 28		
1. Introduction. Aspects related to labor protection in environmental quality control laboratories. 2.Workers in which the quality monitoring of the environment is practiced Types of equipment used. Presentation and description. 3. Methods of sampling and storage of samples from: air, water, soil. Elaboration of the sampling plan. 4. Preparation of samples for analysis (gaseous, liquid, solid - organic pollutants, inorganic pollutants). 5. Elaboration of methodologies for monitoring physical, chemical and biological parameters using indicators. 6. Inventory of environmental data and chemometric interpretation of environmental data. Calculation example. Multivariate analysis of environmental data. Calculation example. Material balance. 7. Verification of knowledge	Exposure method Experiment method Exposure method Experiment method Exposure method Exposure method Experiment method Exposure method Experiment method Exposure. Problematic Exercise. Verification method	2 hours 4 hours 4 hours 2 hours 6 hours 8 hours 2 hours

Bibliography Required:

1.Odagiu Antonia, 2013, Elemente de monitoring de mediu, Editura Bioflux, Cluj-Napoca
2.Bollag, D.M., şi S.J. Edelstein, 1991, Protein Methods. Wiley-Liss, New York Buleandră, M.,2010, Elemente de standardizare şi legislaţia de mediu. Bucureşti: Editura Universităţii din Bucureşti.
3.Drăghici Camelia, Dana Perniu, 2002, Poluarea şi monitorizarea mediului, Ed. Universităţii Transilvania, Braşov, 2002
4.Oroian I., 2009, Air Pollution, Omrigon GmbH
5.Pietrzyk, D.J., C.W. Frank, 1989, Chimie analitică, Ed. Tehnică, Bucureşti,
6.Ţuţuianu, O.,2006, Evaluarea şi raportarea performanţei de mediu – indicatorii de mediu. Bucureşti: Editura Agir.
7.Ungureanu, I.,2005, Geografia mediului. Iaşi: Editura Universităţii Alexandru Ioan Cuza.

Optional bibliography:

1.Dammann, S. and M. Elle,2006, Environmental indicators: establishing a common language for green building. Building Research & Information, 34, 387-404.
2.Kurtz, J.C., L.E. Jackson & W.S. Fisher, 2001, Strategies for evaluating indicators based on guidelines from 3.Environmental Protection Agency's Office of Research and Development. Ecological Indicators, 1, 49-60.
4.Holtzhauer, M., 2006, Basic Methods for the Biochemical Lab, 1st ed, Spinger, Heidelberg, Germany, p26-65.
5.*** ECA., 2000, Risk Assesment In Relation To Indoor Air Quality.Urban Air
6.*** Environment and Human Exposure. ed. E. I. A. Q. Unit. Bruxelles: European Commission.

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 environmental engineering.
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	-response to the exam - way of presenting the answer -the ability to synthesize	Oral exam	70%

10.5. Seminar / Laboratory	- test results - laboratory presence -Active involvement	Performance evaluation at final verification. Questions for students.	30%

10.6. Minimum standard of performance

COURSE: Requirements for note 5 - The student must know, the basics: CAD, CAM, CAE, definition of CAD systems, classification of programs in the CAD category, data transfer methods, basics on solid modeling. LABORATORY: Obtaining minimum marks 5 for all laboratory applications.

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 - DI (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
Associate Professor PhD Antonia Odagiu

Holder of laboratory works / seminars
Assistent PhD Bianca MOLDOVAN

Date of approval in the department
05.09.2019

Department Director
Professor PhD Ioan Oroian