



ENVIRONMENTAL AND FOOD CHEMISTRY

Information about the program

1.1.	UNIVERSITY: "GRIGORE T. POPA" UNIVERSITY OF MEDICINE AND PHARMACY OF IAȘI
1.2.	FACULTY: PHARMACY SCHOOL / DEPARTMENT: PHARMACEUTICAL SCIENCES I
1.3.	SUBJECT: ENVIRONMENTAL AND FOOD CHEMISTRY
1.4.	STUDY FIELD: HEALTH
1.5.	STUDY CYCLE: UNDERGRADUATE
1.6.	STUDY PROGRAMME: PHARMACY

1. Subject data

2.1.	SUBJECT: ENVIRONMENTAL AND FOOD CHEMISTRY						
2.2.	Module leader: Assoc. Prof. Morariu Ionela-Daniela, PhD						
2.3.	Seminar leader: Assoc. Prof. Morariu Ionela-Daniela, PhD, Assist. Șlencu Bogdan Gabriel, PhD Assist. Avasilcăi Liliana, PhD						
2.4. Year of study	IV	2.5. Semester in which is taught	I/II	2.6. Evaluation type	C1/E2	2.7. Subject status	Compulsory

2. Duration of the course (hours per semester)

2.1. Number of hours / week	4 (1 st sem) 5 (2 nd sem)	2.2. Number of hours / week	1 (1 st sem) 2 (2 nd sem)	3.3.Seminar / lab	3 (1 st sem) 3 (2 nd sem)
3.4.Total number of learning hours	56 (1 st sem) 70 (2 nd sem)	3.5.Total number of learning hours	14 (1 st sem.) 28 (2 nd sem)	3.6. seminar / lab	42 (1 st sem) 42 (2 nd sem)
Distribution of activities in the course (1 st sem/2 nd sem)					hours
Study based on the manual, printed course, bibliography and notes					17/20
Additional research in the library, on specialized e-platforms and field study					9/10
Preparation for seminars, practical courses, portfolios and essays					10/10
Tutoring					-
Assessment					8/15
Other activities					-
3.8. Number of hours of individual study					36/40
3.9. Number of hours per semester					100/125
3.10. Number of ECTS					4/5



4. Previous Knowledge (if applicable)

4.1. course related	Analytical Chemistry, Organic Chemistry, Biochemistry , Physiology, Physiopathology.
4.2. skill related	The ability to conduct and interpret laboratory analyses ; The ability to know the structure of chemical compounds (normal components and pollutants) from environmental elements (water, air, soil); The ability to know the nutrients from foods and their role in the human body. The ability to know the place and role of dietary supplements within a balanced diet.

5. Requirements (if applicable)

5.1. course conditions	Videoprojector.
5.2. seminar / laboratory conditions	Equipment specific for Chemistry laboratories: laboratory glassware, spectrophotometers, burettes, balances, electric furnace, water bath, sand bath, thermobalance, laboratory reagents, chromatographic plates, obscure camera with UV lamp, centrifuge, vessels for collecting residues, samples (water, air, soil, foods and dietary supplements).

6. Specific Skills Acquired

Professional skills displayed by knowledge and skills	<ul style="list-style-type: none">• Analysis and control of sample of water, air, soil , food and food supplements, analysis in food and environmental hygiene laboratories.
Transversal skills (role skills, professional and personal skills)	<ul style="list-style-type: none">• Using the theoretical and practical knowledge in resolving some problems specific to the professional qualification.• Ability to work in a team.• The ability to establish the quality of a sample which was analyzed (water, air, soil, foods and dietary supplements) individually.• Oral and written communication skills specific to the profession.

7. Course Objectives (confirmed by the grid of specific skills acquired)

7.1. General Objective	Acquisition of knowledge regarding chemical composition and quality of water, air and soil as environmental elements, foodstuffs and the diet, alteration and preservation of foodstuffs.
7.2. Specific Objectives	Acquisition of knowledge regarding: <ul style="list-style-type: none">• sources of drinkable water;• ways to impurify the water;• standards for water potability ; European legislation in the field of water and air quality;• global approach for the analysis of a sample of water;• chemical and infectious water related pathology;• physical-chemical analysis of a sample of water in order to establish its potability;• estimation of the quality of air based on a certificate of analysis;• dietary sources of nutrients;• quality indicators for foodstuffs;• pollution of foodstuffs: classes of pollutants;

	<ul style="list-style-type: none"> • legislation in the field of food security and food safety, chemical-sanitary control of a food product; • physical-chemical analysis of a sample of foodstuff or food supplement; • food additives and the risks for the consumer's health; • estimation of the quality of a foodstuff based on a certificate of analysis.
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8. Contents

8.1. Course	Teaching methods	Observations
Water in nature; importance of water for human activity; distribution of water on the globe; Properties of water; Chemical composition of water; Water pollution; Processing of water for potability purposes; Correction of physical-chemical properties of water; Standards for water potability; Water related pathology; Wastewater;	Power Point presentation; Discussions based on the questions posed by students;	10 hours
Chemical composition of air; Pollution of atmospheric air; Factors which condition the pollution and self-purification of atmospheric air	Power Point presentation; Discussions based on the questions posed by students;	2 hours
Structure of soil; Physical properties of soil; Chemical composition of soil; Pollution of soil	Power Point presentation; Discussions based on the questions posed by students;	2 hours
Inadequate intake of nutrients: undernutrition and overnutrition; Coefficient of digestibility; Retention coefficient; Proteins, lipids, sugars, . mineral substances and vitamins - their role in the diet ; Dietary fiber ; Maturation and Alteration of foodstuffs; Preservation of foods; Toxic substances naturally present in food products; Pollution of foodstuffs ; Food additives; Food quality and food security	Power Point presentation; Discussions based on the questions posed by students;	28 hours
Bibliography <ol style="list-style-type: none"> 1. Benjamin M. <i>Water Chemistry</i>. New York: Mc Graw-Hil Edition, 2002. 2. *** <i>Directive Europeenne 98/83/CE</i> (Decret 2001/1220/20.12.2001 et code de la sante publique, relatifs eaux destinees a al consommation humaine. 3. *** <i>Air Quqlity Guidlines for Europe</i>. WHO, Second Edition, Regional publications, 1997. 4. *** <i>Water Treatment Handbook</i>. Degremont, vol I-II, Sixth Edition, Lavoisier Publisher, 1991. 5. Alpert DH, Stenson WF, Bier DM. <i>Manual of Nutritional Therapeutics</i>. Fourth Edition, Lippincott Williams & Wilkins, 2001. 6. Basdevant A, Laville M, Lerebours E. <i>Traite de nutrition clinique de l' adulte</i>. Medecine- Science Edition, Flammarion, 2002. 7. Kathleen L, Mahan MS. <i>Krause's Food Nutrition and Diet Therapy</i>. Philadelphia Edition, Saunders, 2004. 8. *** <i>Food Chemicals Codex</i> . 4th edition - Committee on Food Chemicals Codex, National Academy press, Washington DC, 1996. 		
8.2. Seminar / Practical lessons	Teaching Methods	Observations
Labor safety. Water analysis. Water sampling; Determination of parameters from water: organic substances, ammonia, nitrites, nitrates, chlorides, residual chlorine, hardness, dissolved oxygen Integrated practical work at Chirița water	Seminar regarding the theoretical aspects of the practical works. Presentation of the methodology for conducting the current practical work.	27hours 3 hours

treatment plant		3 hours
Determination of NO _x from air		
Soil analysis - preparation of soil aqueous extract ; determinations of organic substances, ammonia, nitrites and nitrates from soil aqueous extract		6 hours
Sanitary expertise of a sample of drinkable water		3 hours
Determination from food products: macroelements, microelements, vitamin C, vitamin B ₁ , index of acidity, quality indicators for dietary fats, indicators of freshness		18 hours
Determination of food additives: sulfur dioxide, sorbic acid, nitrites, flavoring agents, toxic metals, pesticides, mycotoxins		21 hours
Sanitary expertise of a food product		3 hours

Bibliography

1. Benjamin M. *Water Chemistry*. New York: Mc Graw-Hil Edition, 2002.
2. *** *Directive Europeenne 98/83/CE* (Decret 2001/1220/20.12.2001 et code de la sante publique, relatifs eaux destinees a al consommation humaine.
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5. Alpert DH, Stenson WF, Bier DM. *Manual of Nutritional Therapeutics*. Fourth Edition, Lippincott Williams & Wilkins, 2001.
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8. *** *Food Chemicals Codex* . 4th edition - Committee on Food Chemicals Codex, National Academy press, Washington DC, 1996.

9. The agreement between the course contents and the expectations of the representatives of the epistemic communities, professional associations and employers in the field related to the program

The content of the practical works and of the theoretical course supports the formation of the student from a professional point of view and allows the student to expand his employment opportunities by orienting him towards chemical analysis laboratories for various environmental elements, for food products and dietary supplements. Based on the acquired knowledge, the graduate students contribute to improving the quality of the medical act by counseling the patient in regard to the adequate dietary habits.

10. Assessment

Activity	10.1. Assessment criteria	10.2. Assessment methods	10.3. Percentage of the final grade
10.4. Course	General specialized knowledge.	Semester written/oral evaluation	50%
	Interest towards new information.		

10.5. Seminar / Practical lessons	Theoretical knowledge and practical abilities.	Final written evaluation for the practical works	40%
	The quality of practical results.	Continuous testing during the semester	10%
Minimal standard of proficiency: 5 is the lowest passing grade.			