UNIVERSITATEA DE ŞTIINŢE AGRICOLE ŞI MEDICINĂ VETERINARĂ CLUJ-NAPOCA
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No._____ of _____ **USAMV form 0704010107**

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	Faculty of Food Science and Technology
1.3. Department	Food Sciences
1.4. Field of study	Food Engineering
1.5. Education level	Postgraduate
1.6. Specialization/ Study programme	Food Quality Management
1.7. Form of education	Full time

2. Information on the discipline

2.1. Name of the discipline	**Chemical hazard assessment and control in food quality management**							
2.2. Course coordinator				Prof. dr.Edward Ioan Muntean				
2.3. Seminar/ laboratory coordinator				Prof. dr.Edward Ioan Muntean				
2.4. Year of study	1	2.5. Semester	2	2.6. Type of evaluation	Summative	2.7. Discipline status	Content[2]	DS
							Compulsoriness[3]	CD

3. Total estimated time (teaching hours per semester)

3.1. Hours per week – full time programme	3	Out of which: 3.2. lecture	1	3.3. seminar/ laboratory	2
3.4. Total number of hours in the curriculum	42	Out of which: 3.5. lecture	14	3.6. seminar/laboratory	28
Distribution of the time allotted					hours
3.4.1. Study based on book, textbook, bibliography and notes					30
3.4.2. Additional documentation in the library, specialized electronic platforms and field					28
3.4.3. Preparing seminars/ laboratories/ subjects, reports, portfolios and essays					20
3.4.4. Tutorials					10
3.4.5. Examinations					10
3.4.6. Other activities					10
3.7. Total hours of individual study	108				
3.8. Total hours per semester	150				
3.9. Number of credits[4]	6				

4. Prerequisites

4.1. curriculum-related	Inorganic Chemistry and Analytical Chemistry 1, Inorganic Chemistry and Analytical Chemistry 2, Organic Chemistry, Food Biochemistry, Food Chemistry
4.2. skills-related	The student must have basic knowledge of inorganic qualitative analysis, oral and written communication in English, as well as of using information technology for typing, data processing (spreadsheets and graphics) and documentation using the Internet

5. Conditions

5.1. for the lecture	● The course is interactive; students can ask questions regarding the content of the lecture. ● Academic discipline requires compliance with the start and end of the course. Other activities during the lecture are not allowed; mobile phones will be closed down. ● The classroom should be equipped with a whiteboard, a computer, a video projector and a projection screen; a good wireless internet connection is a must.
5.2. for the seminar/ laboratory	● Participation in seminars and laboratories is compulsory. ● Punctuality, compliance with academic discipline. ● During practical works, each student will develop an individual activity with laboratory materials (made available in the sheets that describe the laboratory work). ● The seminar room must be equipped with a whiteboard, a projector, a laptop and a projection screen; a good wireless internet connection is a must. ● The laboratory in which practical activities are performed will be equipped with a UV-VIS spectrophotometer, an HPLC system, a solid-phase extraction system, a rotary evaporator, common glassware and reagents.

6. Specific competencies acquired

Professional competences	▪ C1.1. To describe and use basic concepts, theories and methods in inorganic chemistry and analytical chemistry, related to the structure, properties and transformations of food components and contaminants. ▪ C1.2. To explain and interpret concepts, processes, models and methods in inorganic chemistry and analytical chemistry, using basic knowledge on the composition, structure, properties and transformations of food components. ▪ C1.3. To identify the specialized terminology regarding the quality of food products to collaborate and cooperate with the responsible institutions in the field of food quality and safety. ▪ C1.4. To evaluate the qualitative and quantitative characteristics, the performances and the limitations of the analytical processes applied in the agri-food chain. ▪ C1.5. To perform a critical analysis, evaluation of the characteristics, performances and limits of some analytical processes and some laboratory equipment in the field of the agri-food industry.
Transversal comp	▪ CT1. Efficient use of various ways and techniques of learning-training for the acquisition of information from bibliographic and electronic databases, both in Romanian and in English. ▪ CT2. Applying interrelationship techniques within a team, amplifying and refining the empathic capacities of interpersonal communication and assuming specific tasks in carrying out group activity to resolve individual / group conflicts, as well as optimal time management.

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7. Course objectives (based on the list of competencies acquired)

7.1. Overall course objective	• To acquaint the future specialist with the main features of Food Quality Management in the modern context of the competitive economy by describing, explaining and give interpretations of concepts, models and methods used.
7.2. Specific objectives	• To train and to develop the capacity of exploration, observation and critical analysis through a project approach on hazard assessment of certain chemical substances. • To create suitable conditions for fostering teamwork. • To build an ethical attitude on the impact of information dissemination. • To develop the specific scientific curiosity, analytical rigour and scientific prerequisites of a researcher. • To empower and involve students in addressing the current and future scientific problems by involving them in research activities.

8. Content

8.1. LECTURE **Number of hours – 14**	Teaching methods Lecture	Note: 1 lecture = 2 hours
1. Introduction; the concept of hazard, hazard categories, food scandals related to chemical hazards.		1 hour
2. Chemical hazards, toxicology basics, mutagenic and carcinogenic substances.		1 hour
3. Chemical hazards: contaminants, residues, foodborne toxins		1 hour
4. Food additives. Process contaminants	Lecture	
5. Food contaminants: pesticides, heavy metals, drug residues, polycyclic aromatic hydrocarbons.	Explanation Heuristic conversation	1 hour 1 hour
6. Toxic substances of natural origin: mycotoxins, marine toxins. Toxic plants.	Case study	1 hour
7. Monitoring and control techniques: UV-VIS spectrophotometry, atomic absorption spectrophotometry, high performance liquid chromatography, gas chromatography,		6 hours
8. Chemical hazard management.		2 hours

8.2. SEMINARS AND PRACTICAL WORK **Number of hours – 28**	Theoretical presentation of practical works	Note: 1 lab work = 2 hours
Recent EU food scandals caused by food contamination with hazardous chemical substances	Heuristic conversation Case studies Explanation	2 hours
Mutagenic and carcinogenic substances: case studies.		2 hours
Chemical risk factors: contaminants, residues, foodborne toxins, additives: case studies		2 hours
Food contaminants: case studies on pesticides, heavy metals, drug residues, polycyclic aromatic hydrocarbons, nitrites.		2 hours
Process contaminants		2 hours
Toxic substances of natural origin.		2 hours
Chemical hazard management: tutorial activity for writing an essay focused on a specific chemical hazard in food products		2 hours
Spectrophotometric determination of Al^{3+} in food products	Demonstration	2 hours
Spectrophotometric determination of Cr^{6+} in drinking water		2 hours
Spectrophotometric determination of nitrates in food products		2 hours

HI special needs		
Ion chromatographic determination of ammonium in natural juices		4 hours
Colloquium		2 hours

Compulsory bibliography:

1. Banu C., Barascu E., Stoica A., Nicolau A. 2007, Suveranitate, securitate si siguranta alimentara. Editura ASAB, Bucuresti.
2. Luning P.A., Marcelis W.J., Jongen W.M.F., 2002, Food quality management, a techno-managerial approach, Wageningen Pres.
3. Luning P.A., Marcelis W.J., Jongen W.M.F., 2008, Managementul calităţii alimentelor (trad O.N. Pentelescu), Casa Cărţii de Ştiinţă, Cluj-Napoca.
4. Mencinicopschi G., Raba D. N. 2005, Siguranţa alimentară autenticitate şi trasabilitate. Editura Mirton.
5. Nollet L.M.L., Ed, 1996, Handbook of Food Analysis, Vol. 2, Residues and Other Food Components Analysis, Marcel Dekker, Inc.

Optional bibliography:

1. Eaton D. L., Groopman J. D. (Eds.). 2013. The toxicology of aflatoxins: human health, veterinary, and agricultural significance. Elsevier.
2. Froman B., Văleanu M., 1998, Manualul calitatii: instrument strategic al abordarii calitatii. Editura Tehnica.
3. Van Leeuwmen F.X.R, 2000. Setting toxicological standards for food safety. In Food Safety and Toxicity, edited by J. de Vries, CRC Press Taylor&Francis Group, Boca Raton.
4. Harrison N. 2000, Inorganic contaminants in food. In Food Chemical safety, volume 1. Contaminants, edited by Watson D.H., CRC Press, Boca Raton.
5. Muntean, E., Muntean, N., Michalshy, R., & Duda M, M. 2017. Chemical risk due to the contamination of medicinal plants with polycyclic aromatic hydrocarbons. Hop and Medicinal Plants, 25(1/2), 131-138.
6. Muntean, N., Muntean, E., Creta, C., Duda, M. 2013, Heavy metals in some commercial herbal teas. ProEnvironment Promediu, 6(16), 591-594.
7. Socaciu C., Stanila A., 2007, Nitrates In Food, Health And The Environment in: Case studies in food safety and Environmental health (Ed. P. Ho, M.M.C.Vieira), ISEKI Publ. Ed. Kristberg Kristbergsson, Springer, NY. 16-25.

9. Corroborating the course content with the expectations of the epistemic community representatives, of the professional associations and the relevant stakeholders in the corresponding field

This course provides knowledge and abilities with which the students can justify and control some aspects of food safety. The course, together with the corresponding seminars and laboratory practice, are correlated and complementary in information, leading to abilities to work independently and to accomplish a personalized essay. The students' activities are intended to develop their capacity of individual involvement as well as teamwork, of results' analysis and interpretation, their ability to provide solutions to practical problems.

By working on the theoretical and methodological concepts included in this course, students can acquire an adequate knowledge base, according to the skills required for possible occupations listed in RNCIS. The competencies and abilities can be valorized in different future positions such as managers within food control agencies, health and hygiene departments in universities or public departments, as well in the food industry.

10. Assessment

Type of activity	10.1. Assessment criteria	10.2. Assessment methods	10.3. Percentage of the final grade
10.4. Lecture	• The level of knowledge assimilation related to the classification and description of main categories of chemical hazards. • The fairness of answers, logical coherence.	Exam	50%
10.5. Seminar/ Laboratory	• Submission of a specific essay on chemical risk analysis for a given food product.	Oral assessment	50%

10.6. Minimum performance standards

- Proper documentation on chemical hazards in food products
- Structuring the data gathered during the documentation stage in tables, graphs, charts

[1] Education levels- choose one of the three options: Bachelor/ * Master/Ph.D.

[2]Discipline status (content) - for the undergraduate level, choose one of the options: - **FD** (fundamental discipline), **BD** (basic discipline), **CS** (specific disciplines-clinical sciences), **AP** (specific disciplines-animal production), **FH** (specific disciplines-food hygiene), **UO** (disciplines based on the university's options).

[3/] Discipline status (compulsoriness) - choose one of the options – **CD** (compulsory discipline) **OD** (optional discipline) **ED** (elective discipline).

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

[5/ *] Disciplines: AK- Advanced knowledge, CT- Complementary Training, S- Synthesis

Filled in on
08.09.2021

Course coordinator
Prof.Edward Ioan Muntean, PhD

Laboratory work/seminar coordinator
Prof.Edward Ioan Muntean, PhD

Subject coordinator
Prof.Edward Ioan Muntean, PhD

Head of the Department
Prof.Ramona Suharoschi, PhD

Approved by the
Department on
22.09.2021

Dean
Prof.Elena Mudura, PhD

Approved by the Faculty
Council on
28.09.2021