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 chemical analysis, proficiency in both oral and written communication in English to engage effectively in course discussions and assignments, as well as competence in using information technology tools, including word processing, spreadsheet software, graphic representation software and internet-based documentation.

5. Conditions

5.1. for the lecture	Teaching manuals: Brimer, L. (2011). Chemical food safety. CABI. Lecture notes: Chemical hazard assessment and control in food quality management Course presentation in pptx format: course holder: Edward Muntean Logistic support: video projector, interactive whiteboard and PowerPoint presentations. • Participation in a minimum of 50% of courses is a condition for participation in the exam.

5.2. for the seminar/ laboratory	• Teaching manuals: Brimer, L. (2011). Chemical food safety. CABI. • Laboratory/ seminar notes: Chemical hazard assessment and control in food quality management • Place of seminar/ laboratory: seminar room/ laboratory of chemistry and biochemistry, the Auditorium's building • Seminar room equipment: blackboard, a projector, a laptop and a projection screen; a good wireless internet connection is a must. • Laboratory equipment: a blackboard, analytical reagents, laboratory utensils, glassware, specialized equipment and apparatuses (an UV-VIS spectrophotometer, an HPLC system, a solid-phase extraction system, a rotary evaporator, an analytical balance, a technical balance, a vacuum filtration system, common glassware and reagents). • Specialized software used: Microsoft Office package, HPLC and UV-VIS software • Adherence to safety protocols: students must prioritize punctuality, wear the prescribed protective equipment, and strictly adhere to academic discipline, technical norms, safety regulations, and fire prevention measures at all times during practical work sessions. • Participation in 100% laboratory/seminar work is a condition for the exam participation.

6. Specific competencies acquired

Professional competences	1. Conduct scientific research - engages in the conception or creation of new knowledge by formulating research-related questions, conducting research, improving or developing concepts, theories, models, techniques, tools, software or operational methods and by using scientific methods and techniques 2. Apply good manufacturing practices (GMP) - applies regulations concerning food manufacturing and compliance with food safety, uses food safety procedures based on GMP 3. Evaluate the quality standards - evaluates in detail the production, quality, or packaging of goods to ensure compliance with the manufacturer's quality standards.

7. Course objectives

7.1. Overall course objective	• Developing an expertise in a specialized field that use advanced knowledge that allows the development of user-oriented products. • Together with the other disciplines in the curriculum, to ensure the implementation and formation of complex concepts on Food Quality Management within the contemporary competitive economy.
7.2. Specific objectives	• Obtaining learning outcomes that aim the formation of skills and abilities based on the correlation of the information received with those acquired in other disciplines such as understanding the specific design of the food products.

8. Content

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

8.2. SEMINARS AND PRACTICAL WORK **Number of hours – 28**	Theoretical presentation of practical works	Note: 1 lab work = 2 hours
Relevant food scandals caused by food contamination with hazardous		2 hours

chemical substances	Heuristic conversation Case studies Explanation	
Chemical hazards: antibiotic residues, food additives - case studies.		4 hours
Food contaminants: case studies on pesticides, heavy metals, polycyclic aromatic hydrocarbons, nitrites.		2 hours
Process contaminants: case studies		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
HPLC determination of carbohydrates in foods for people with special needs		3 hours
Ion chromatographic determination of ammonium in natural juices		3 hours
Colloquium		2 hours

Compulsory bibliography:

1. Brimer, L. (2011). Chemical food safety. CABI.

Optional bibliography:

1. Banu C., Barascu E., Stoica A., Nicolau A. 2007, Suveranitate, securitate si siguranta alimentara. Editura ASAB, Bucuresti.
2. Eaton D. L., Groopman J. D. (Eds.). 2013. The toxicology of aflatoxins: human health, veterinary, and agricultural significance. Elsevier.
3. Harrison N. 2000, Inorganic contaminants in food. In Food Chemical safety, volume 1. Contaminants, edited by Watson D.H., CRC Press, Boca Raton.
4. Luning P.A., Marcelis W.J., Jongen W.M.F., 2002, Food quality management, a techno-managerial approach, Wageningen Pres.
5. Luning P.A., Marcelis W.J., Jongen W.M.F., 2008, Managementul calităţii alimentelor (trad O.N. Pentelescu), Casa Cărţii de Ştiinţă, Cluj-Napoca.
6. Muntean E., 2022. Food Analysis Using Ion Chromatography. Walter de Gruyter GmbH & Co KG.
7. 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.
8. Muntean, N., Muntean, E., Creta, C., Duda, M. 2013, Heavy metals in some commercial herbal teas. ProEnvironment Promediu, 6(16), 591-594.
9. 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.

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

The course content is carefully aligned with the standards of leading European university programs while taking into account the diverse preparedness levels of students. This alignment has been corroborated by representatives of the epistemic community, professional associations, and relevant stakeholders in the field. By integrating their expectations and insights, the course ensures that students are equipped with the critical skills and knowledge required to excel as specialists in their future careers, meeting both academic and professional standards in the field.

10. Assessment

Type of activity	10.1. Assessment criteria	10.2. Assessment methods	10.3. Percentage of the final grade
10.4. Lecture	• Proper knowledge of chemical hazards: assessing the depth of understanding regarding the classification and description of the chemical hazards. • Response accuracy and logical consistency: evaluating the accuracy of responses and the logical coherence demonstrated in explanations and reasoning.	Exam	50%
10.5. Seminar/ Laboratory	• Quality and relevance of a chemical hazard analysis case study: assessing the quality and relevance of the presented case study pertaining to chemical risk analysis for a specific food product or a specific chemical hazard.	Oral assessment	50%

	• Quality of work conducted: evaluating the overall quality of the activities performed, including research, data collection, and analysis. • Proficiency in analyzing and interpreting results: assessing the ability to effectively analyze and interpret collected data and results, demonstrating sound analytical skills and logical interpretation.		

10.6. Minimum performance standards

- Knowledge of 50% of the information contained in the course.
  - Hazard identification: students should be able to identify and categorize potential chemical hazards present in food products, considering factors such as contaminants, additives, and naturally occurring substances.
  - Regulatory compliance: students should understand and adhere to relevant food safety regulations, standards, and guidelines, ensuring their hazard analysis align with legal requirements.
  - Mitigation strategies: students should be able to propose and evaluate risk mitigation strategies to minimize or eliminate identified chemical hazards in food products, including process modifications, quality control measures, and regulatory compliance.
- Knowledge of 50% of the information provided at practical work / seminar.
  - Laboratory proficiency: students should be skilled in the identification of stages in experimental and laboratory activities, demonstrating a basic procedural knowledge.
  - Equipment competence: students must demonstrate the correct and safe use of laboratory apparatus and equipment during chemical hazard analysis, adhering to established safety protocols.
  - Documentation: students must be capable of collecting relevant data, and accurately interpreting the results to assess chemical hazards effectively.
  - Effective reporting and communication: students should communicate their findings and recommendations clearly and effectively, both in written reports and oral presentations, ensuring that stakeholders can understand and act upon the results of the chemical hazard analysis.
- 100% attendance at practical work / seminars is mandatory.
- Attendance at 50% courses is a condition for entering the exam.

[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
06.09.2024

Course coordinator
Prof.Edward Ioan Muntean, PhD

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

Subject coordinator
Prof.Edward Ioan Muntean, PhD

Approved by the Department on
12.09.2024

Head of the Department
Prof.Ramona Suharoschi, PhD

Approved by the Faculty Council on
27.09.2024

Dean
Prof.Elena Mudura, PhD