UNIVERSITATEA DE ŞTIINŢE AGRICOLE ŞI MEDICINĂ VETERINARĂ CLUJ-NAPOCA
Calea Mănăştur 3-5, 400372, Cluj-Napoca
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SUBJECT OUTLINE

1. Information on the programme

1.1. Higher education institution	University of Agricultural Sciences and Veterinary Medicine, Cluj-Napoca
1.2. Faculty	Food Science and Tecnology
1.3. Department	Food Science
1.4. Field of study	Food Engineering
1.5. Cycle of study[1]	Master
1.6. Specialization / Study programme	Gastronomy, Nutrition and Dietetics
1.7. Form of education	University of Agricultural Sciences and Veterinary Medicine, Cluj-Napoca

2. Information on the discipline

2.1. Name of the discipline	RISC FACTORS, ADVANCED METHODS OF CONTROL AND FOOD SAFETY							
2.2. Course coordinator				Proffesor PhD. Maria Tofana(A) Proffesor PhD. Ancuta M. Rotar (B)				
2.3. Seminar/ laboratory/ project coordinator				Proffesor PhD. Maria Tofana(A) Proffesor PhD. Ancuta M. Rotar (B)				
2.4. Year of study	II	2.5. Semester	**III**	2.6. Type of evaluation	Summative	2.7. Course regime	Content[2]	DS
							Level of compulsory[3]	DO

3. Total estimated time (teaching hours per semester)

3.1. Hours per week – frequency form	3	out of which: 3.2. lecture	1	3.3. seminar / laboratory/ project	2
3.4. Total number of hours in the curricula	42	Out of which: 3.5.1 lecture	14	3.6. seminar /laboratory/project	28
Distribution of time					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					13
3.4.3. Preparing seminars/ laboratories/ projects, subjects, reports, portfolios and essays					20
3.4.4. Tutorials					10
3.4.5. Examinations					10
3.4.6. Other activities					
3.7. Total hours of individual study	83				
3.8. Total hours per semester	125				
3.9. Number of credits[4]	5				

4. Prerequisites (is applicable)

4.1. curriculum-related	Quality control and food safety, Food quality management, Food and related products Legislation, Chemistry and Food Biochemistry, Food microbiology, Toxicology, Food preservation methods, BA
4.2. skills-related	The student should have the knowledge about food biochemistry, food microbiology, food additives, principles and methods of food preservation, food technology

5. Conditions (if applicable)

5.1. for the lecture	Developing the theme proposed in syllabus and interactive discussions based on the materials and bibliography previously announced, coupled with the presented materials on the vidoeprojector
5.2. for the seminar/ laboratory/ project	Students prepare reports, phases of laboratory work, case studies, data interpretation based on the themes set out in laboratory schedule

6. Specific competences acquired

Professional competences	C2.1 Knowledge and deepening of scientific research methods of food quality and safety 2-3 Use of specific research methodologies to increase food quality and safety 2-5 Elaboration of research projects / studies specific to food quality and safety
Transversal competences	CT2. Applying interrelationship techniques within a team; amplifying and refining the empathic capacities of interpersonal communication and of assuming specific attributions in carrying out the group activity in order to treat / solve individual / group conflicts, as well as the optimal time management.

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

7.1. Overall course objective	To acquire knowledge of chemical and biological risks (contaminants); advanced control methods of the chemical and biological risks according to the National and European legislation on food safety
7.2. Specific objectives	Knowing and understanding the language of the discipline Knowing food contaminants and food residues classification, also food safety notions in relation to food contaminants To acquire food contaminants legislation on National and European level To acquire skills in the analysis of chemical and biological contaminants To learn sampling methods for food contaminants analysis

8. Content

8.1. LECTURE	Teaching methods	Notes
Number of hours – 14		
A. Chemical Contaminants: Number of hours - 7		
1. Contamination of food with toxins from molds - Mycotoxins ● Mycotoxins with carcinogen capacity ● Ochratoxine and other grain mycotoxins inactivation ● European legislation regarding the presence and control of food mycotoxins	Developing the theme and interactive discussions; videoprojector	2 hours
2. Food ontamination with dioxins and PCBs ● Milk Dioxin ● PCBs in foodstuffs and animal feed ● PCBs in the North Sea fish ● European legislation regarding the presence of dioxins and PCBs in foodstuffs	Developing the theme and interactive discussions; videoprojector	2 hours
3. Pesticide residues in foodstuff ● Pesticide accumulation risks ● Biopesticides ● National and European regulations regarding the monitorization of the presence of pesticides in foodstuff	Developing the theme and interactive discussions; videoprojector	2 hours

● National and European legislation regarding the presence and determination of pesticide residues in food 4. Veterinary drug residues in foodstuff ● Aspects regarding drugs use issues in the food industry and animal husbandry ● National and European legislation regarding the presence and determination of drug residues in foodstuff	Developing the theme and interactive discussions; videoprojector	1 hour
B. Biological Contaminants: Number of hours - 7 1. The concept of biological contaminant. Contamination of foodstuff with toxin-producing bacteria- general terms: ● general mechanism of toxin production ● exotoxin and bacterial endotoxins: Physicochemical particularities and their biological action ● genetic determinism of toxin synthesis	Developing the theme and interactive discussions; videoprojector	2 hours
2 Toxinogenesis. Pathogenicity factors and mechanisms of action: ● Shiga-like toxins (SL) or verotoxinele (V) caused by enterohaemorrhagic Escherichia coli (EHEC), and cytotoxic necrotizing factors: Mechanism of production and historical significance, pathogenesis, adhesion, resistance in food and conditions of multiplication ● Toxins produced by Clostridium botulinum, Clostridium perfringens, Salmonella and Bacillus cereus. Factors affecting their development in food. Clostridium botulinum spores resistance. Toxins resistance to various physical and chemical factors. ● Regulations regarding the presence and detection of bacterial germs.	Developing the theme and interactive discussions; videoprojector	3 hours
3. Main sources of viral contamination, prion and parasitic. ● Taxonomic, characters of culture and resistance, hosts, transmissibility, tissue distribution of prion agents ● Regulations regarding the presence and detection of viral, prion and parasitic germs.	Developing the theme and interactive discussions; videoprojector	2 hours

8.2. PRACTICAL WORK **Number of hours – 14 hours** **PROJECT** **Number of hours – 14 hours**		
A. Evaluation of chemical contaminants in foodstuffs sampling methods and preliminary analysis preparation – 7 1. Mycotoxins determination (aflatoxins ochratoxin, patulin, etc.) from foodstuff (cereals, milk, meat, coffee, wine) by chromatographic methods (HPLC, GC) using different purification systems - Monographic evaluation of mycotoxins;	Practical works; reports; PPT presentation; video; interactive discussions	4 hours
- Evaluation of National and European legislation regarding the presence of mycotoxins in food - Sampling methods and sample preparation for preliminary analysis	Practical works; reports; PPT presentation; video; interactive discussions	3 hours

2. Determination of other contaminants and residues in food (pesticide residues, dioxins, PCBs, veterinary drug residues) using modern methods (HPLC, GC): - Monographic evaluation of mycotoxins; - Evaluation of National and European legislation on the presence of mycotoxins in food; - Sampling and samples preparation for preliminary analysis; **B. Determination of biological contaminants in foodstuffs – 7** 1. Isolation and identification of Escherichia coli O157: H7, Clostridium botulinum, Salmonella and Staphylococcus in foodstuffs - Methods based mainly on biochemical characteristics of bacteria, - Immunoassay and enzyme immunoassay: ECO method VIDAS E. coli O157 E. coli method called Phage Technology (ECPT) technique ELFA (Enzyme Linked Fluorescent Assay-). - ApiKiturile method for the detection of food pathogens: Salmonella, Staphylococcus - Isolation and identification of Cl. botulinum- detection of botulinum toxin 2. Electrophoretic Methods for toxins detection. - Technical SDS-PAGE (sodium dodecyl sulfate polyacrylamide gel electroforesis) - Technical 2D gel electrophoresis - Technical western blooting	Practical works; reports; PPT presentation; video; interactive discussions Practical works; reports; PPT presentation; video; interactive discussions	4 hours 3 hours

Compulsory bibliography:

1. Tofana Maria, 2011 Food Contaminants - analytical performance and legislative regulations, Ed. Mega, Cluj-Napoca.
2. *** SR EN ISO / IEC 17025/2005, General requirements for the competence of testing and calibration laboratories;
3. Stanciuc, N., G. Rapeanu, 2009 Food Safety Management Systems, Ed. Academic, Galati;
4. Banu, C., N. Preda, S. S. Vasu, 1982 Foods and their harmlessness, ed. Technology Bucharest.
5. Ancuţa M. Rotar, Sorin Apostu 2009 - food-borne diseases in humans, Ed Risoprint Cluj-Napoca
6. Zoonoses (2004) - Ed Oxford, Palmer

Optional bibliography:

1. Dunne C, M. M., Smyth M (1993). "Multimycotoxin Detection and Clean-up for Aflatoxins, Ochratoxin and Zearalenone in Animal Feed Ingredients using High Performance Liquid chromatography and Gel permeation Chromatography." Journal of Chromatography 629: 229-235.
2. Melotte, L. (2004). "Survey on the Analysis of Mycotoxins." J. Inst. Brew. 110(3): 235-239.
3. *** EFSA (2004). "Opinion of the Scientific Panel on Contaminants in the Food Chain related to Aflatoxin B1 as undesirable substance in animal feed." The EFSA Journal 39: 1-27.
4. *** EFSA (2004). "Oppinion of the Scientific Panel on Contaminants in Food Chain on a request from the Commission related to ochratoxin A (OTA) as undesirable substance in animal feed." The EFSA Journal 101: 1-36.
5. Community Strategy for Dioxins, Furans and Polychlorinated Biphenyls.
6. *** Quality and Accreditation Standards and Guides in Analytical Laboratories: Overview. **2004**.
7. *** Europeennes, C. (2003). "Directive 2003/78/CE de la Commission du 11 aout 2003 portant fixation de prelevement d'echantillons et des methodes d'analyse pour le controle officiel des teneurs en patuline des denrees alimentaires." Journal officiel des Communautes europeennes : L 203/40 - L 203/44.
8. James B. Kaper, Alison D. O'Brien ASM Press Escherichia Coli 0157:H7 and Other Shiga Toxin-producing E. Coli Strains
9. Michael Hügler, Karin Böckle, Ingrid Eberhagen, Karin Thelen, Claudia Beimfohr and Beate Hambsch **2012** Detection and Quantification of E. coli and Coliform Bacteria in Water Samples with a New Method Based on Fluorescence In Situ Hybridisation,
10. SR ISO

11. Dana Philpott, Frank Ebel (2003) E. coli**:** Shiga Toxin Methods and Protocols
12. SR ISO 16649-2 / 2007 Food and animal feeding stuffs microbiology. Horizontal method for the enumeration of Escherichia coli β-glucuronidase positive to. Part 2: Colony count technique at 440C using 5-bromo-4-chloro-3-β-D-glucuronide Indolyl

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

In order to identify ways of modernization and continuous improvement of teaching and course content with the current issues and practical problems, teachers participate in various workshops (with guests from the economic environment), exhibition fairs of agriculture and food industry (eg. Agraria), food festivals (ex. "The festival food" - exhibition of products made by students in their final years in order to support the diploma project) and meetings of professional associations (eg. Association of Food Industry Specialists Romania - ASIAR) where they meet with teachers from different universities, engineers and managers in the economic environment, as discussed current and future aspects of food production in Romania and Europe.

10. Evaluation

Type of activity	10.1. Evaluation criteria	10.2. Evaluation methods	10.3. Percentage of the final grade
10.4. Lecture	Knowledge of chemical and biological contaminants classes Knowledge of food safety legislation regarding chemical and biological contaminants	Summative	70%
10.5. Seminar/Laboratory/ Project	Knowledge of sampling methods and analysis of chemical and biological food contaminants	Report/Project	30%
10.6. Minimal standard of performance			
Mastering scientific information transmitted through lectures and seminars at an acceptable level; Obtaining the pass mark at knowledge verification to the end of the practical work is the condition of graduation; Frequency of seminar activities (minimum 80%).			

1 Level of study- to be chosen one of the following - Bachelor/Post graduate/Doctoral
2 Course regime (content) – for bachelor level it will be chosen one of the following - **DF** (fundamental subject), **DD** (subject in the domain), **DS** (specific subject), **DC** (complementary subject).
3 Course regime (compulsory level) - to be chosen one of the following - **DI** (compulsory subject), **DO** (optional subject), **DFac** (facultative subject)
4 One ECTS is equivalent with 25-30 de hours of study (didactical and individual study).

Filled in on
08.09.2020

Course coordinator
Proffesor PhD. Maria Tofana(A)
Proffesor PhD. Ancuta M. Rotar (B)

Laboratory work/seminar coordinator
Proffesor PhD. Maria Tofana(A)
Proffesor PhD. Ancuta M. Rotar (B)

Subject coordinator
Proffesor PhD. Maria Tofana(A)
Proffesor PhD. Ancuta M. Rotar (B)

Approved by the
Department on
22.09.2021

Head of the Department

Proffesor PhD. Ramona Suharoschi

Dean

Approved by the Faculty
Council on
28.09.2021

Proffesor PhD. Elena Mudura