Nr._____din _____ **UASMV –CN - 0706010106**

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	Food Safety and Consumer Protection
1.7. Form of education	IF

2. Information on the discipline

2.1. Name of the discipline	**Biological contaminants and food safety**							
2.2. Course coordinator	**Proffesor PhD. Ancuta M. Rotar**							
2.3. Seminar/ laboratory/ project coordinator	**Lecturer PhD. Carmen R. Pop**							
2.4. Year of study	I	2.5. Semester	II	2.6. Type of evaluation	Summative	2.7. Course regime	Content[2]	DD
							Level of compulsory[3]	DI

3. Total estimated time (teaching hours per semester)

3.1. Hours per week – frequency form	4	Out of which: 3.2. lecture	2	3.3. seminar/ laboratory/ project	2
3.4. Total number of hours in the curricula	56	Out of which: 3.5. lecture	28	3.6. seminar/laboratory	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					34
3.4.3. Preparing seminars/ laboratories/ projects, subjects, reports, portfolios and essays					30
3.4.4. Tutorials					10
3.4.5. Examinations					15
3.4.6. Other activities					0
3.7. Total hours of individual study	119				
3.8. Total hours per semester	175				
3.9. Number of credits[4]	7				

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 video-projector
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 **Number of hours – 28**	Teaching methods	Notes
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 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	Developing the theme and interactive discussions; videoprojector	3 lectures (6 hours)

• 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. 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. 4. The main sources of viral, prion and parasitic contamination Taxonomy, cultural and resistance traits, hosts, Transmissibility, Distribution of prion agents in tissues Legislative regulations regarding the presence and detection of viral, prion and parasitic germs	Developing the theme and interactive discussions; videoprojector Developing the theme and interactive discussions; videoprojector Developing the theme and interactive discussions; videoprojector	4 lectures (8 hours) 4 lectures (8 hours) 3 lectures (6 hours)

8.2. PRACTICAL WORK **Number of hours – 28** **Determination of biological contaminants in foodstuffs** 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. Isolation and identification of *Salmonella* and staphylococcus from food - Methods based mainly on the biochemical characteristics of the bacterium - immunological and enzyme-linked immunosorbent assays: the VIDAS ECO *E. coli* O157 method also called the *E. coli* Phage Technology (ECPT) thnica ELFA (Enzyme-Linked Fluorescent Assay) method. - ApiKits method for the detection of pathogens in food: Salmonella, staphylococcus	Practical works; reports; PPT presentation; video; interactive discussions Practical works; reports; PPT presentation; video; interactive discussions Practical works; reports; PPT presentation; video; interactive discussions	4 Practical works (8 hours) 4 Practical works (8 hours) 4 Practical works (8 hours)

- Isolation and identification of *Cl. botulinum* - detection of botulinum toxin 3. 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	2 Practical works (4 hours)
Compulsory bibliography: 1. Banu, C., N. Preda, S. S. Vasu, 1982, Foods and their harmlessness, ed. Technology Bucharest. 2. Ancuţa M. Rotar, Sorin Apostu, 2009, Food-borne diseases in humans, Ed Risoprint Cluj-Napoca 3. Zoonoses (2004) - Ed Oxford, Palmer		
Optional bibliography: 1. James B. Kaper, Alison D. O'Brien ASM Press Escherichia Coli 0157:H7 and Other Shiga Toxin-producing E. Coli Strains 2. 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, 3. SR ISO 4. Dana Philpott, Frank Ebel (2003) *E. coli***:** Shiga Toxin Methods and Protocols 5. 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 and meetings of professional associations 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	Knowledge of sampling methods and analysis of chemical and biological food contaminants	Report	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
08.09.2021

Course coordinator
Proffesor PhD. Ancuţa M. Rotar

Laboratory work/seminar coordinator
Lecturer PhD. Carmen Rodica Pop

Subject coordinator
Proffesor PhD. Ancuţa M. Rotar

Approved by the
Department on
22.09.2021

Head of the Department
Proffesor PhD. Ramona Suharoschi

Approved by the Faculty
Council on
28.09.2021

Dean
Proffesor PhD. Elena Mudura