UNIVERSITATEA DE ŞTIINŢE AGRICOLE ŞI MEDICINĂ VETERINARĂ CLUJ-NAPOCA
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Nr._____din _____ **Form code USAMV CN - 0703020101**

COURSE DESCRIPTION

1. General data

1.1. Higher Education Institution	University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca
1.2. Faculty	Faculty of Food Science and Technology
1.3. Department	Food Science
1.4. Study field	Food Engineering
1.5. Study level[1)]	Cycle 1. Bachelor
1.6. Specialization/ Study Program	Food Engineering
1.7. Teaching Form	Regular studies

2. Course Characteristics

2.1. Name of the discipline	**GENERAL MICROBIOLOGY**							
2.2. Course coordinator				Proffesor PhD. Ancuţa M. Rotar				
2.3. Laboratory coordinator				Lecturer PhD. Carmen Rodica Pop				
2.4. Year of study	**II**	2.5. Semester	**III**	2.6. Type of Evaluation	Summative	2.7. Discipline status	Content[2]	DD
							Level of compulsory[3]	DI

3. Total estimated time (hours/semester for the teaching activities)

3.1. Hours/week – Full time programme	4	out of which: 3.2. lecture	2	3.3. laboratory	2
3.4. Total number of hours in the curriculum	56	out of which: 3.5. lecture	28	3.6. laboratory	28
Distribution of the time allotted					Hours
3.4.1. Study based on book, textbook, bibliography and notes					23
3.4.2. Additional documentation in the library, on specialised electronic platforms and field					12
3.4.3. Preparing seminars/ laboratories/ projects, subjects, reports, portfolios and essays					10
3.4.4. Tutorials					4
3.4.5. Examinations					15
3.4.6. Other activities					
3.7. Total hours of individual study	64				
3.8. Total hours per semester	100				
3.9. Number of credits[4]	4				

4. Prerequisites (where is the case)

4.1. curriculum-related	Getting base of: Food Biochemistry, Food Chemistry,
4.2. skills-related	Handling of biological samples under security conditions for the user and the environment

5. Conditions (if applicable)

5.1. of course development	Space and facilities: Classroom equipped with board, projector and computer
5.2. of seminar/laboratory/project development	Laboratory Equipment: Photon microscope; UV lamp; Thermostat; gas connection; related facilities (autoclave, oven, utensils specific)

6. Specific competences acquired

Proffesional competences	C1.1. To describe and use the basic concepts, theories and methods of general microbiology, referring to the main groups of microorganisms involved in the food industry. C1.3. Apply basic principles and methods in microbiology to solve engineering and technological problems, including those related to food safety C.2.3. To apply the principles and methods of microbiological investigation for solving technological problems in the agri-food chain
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	Description taxonomic, morphological characters and behavior the main physiological groups of microorganisms with practical implications. Study of physico-chemical and biological conditions of development micro-organisms and the metabolic behavior according to the physiological peculiarities and growth conditions
7.2. Specific objectives	Knowledge of general concepts related to taxonomy, morphology and physiology and reproductive peculiarities of the main groups of microorganisms with implications in food science and biotechnology. Study extrinsic factors, intrinsic and implicit on the development and physiological activity of the microorganisms. Nutrition of the microorganisms - nutritional sources, types and methods of nutrition. Analysis of the main types of metabolic processes with practical implications.

8. Content

8.1. COURSE **Number of hours – 28**	Teaching methods	Notes
INTRODUCTION The subject and the importance of microbiology. Microbiology relationship with other sciences.	Lecture, heuristic conversation, explanation	1 lecture
Characterization of the main groups of microorganisms important for food microbiology	Lecture, heuristic conversation, Explanation	3 lectures
BACTERIA The morphology of the bacteria. The structure of the bacterial cell. Growth and multiplication of bacteria. Nutrition of bacteria. Bacterial taxonomy. Ecology of bacteria. Factors affecting the number and spreading of the bacteria. Classification and description.	Lecture, heuristic conversation, Explanation	3 lectures
MYCOLOGY General aspects. Morphology. Nutrition of microbial fungi Multiplication of fungi. Taxonomy. Classification and description**.**	Lecture, heuristic conversation, explanation	4 lectures
VIRUSES General characteristics of viruses. Taxonomy. The chemical composition of the viruses. Virus-host relationship. Bacteriophages. Cianofagi. Micro-viruses.	Lecture, heuristic conversation, Explanation	1 lecture
FACTORS INFLUENCING OF MICROORGANISMS IN FOOD Environmental factors.Intrinsic factors. Chemical and structural composition of the food.	Lecture, heuristic	2 lectures

Natural antimicrobial constituents. A_w value. Acidity and pH. Processing factors. Extrinsic factors. Microclimate storage areas. The effects of the combined action of environmental factors	conversation, explanation	

8.2. PRACTICAL WORK **Number of hours – 28**	Teaching Methods	Practical work
The protection norms work in microbiology laboratories. Apparatus, instruments, glassware used in the microbiology laboratory	Exposition, explanation, demonstration, case study	1 Practical work
Sterilization by physical agents. Sterilization by heat moist / dry. UV sterilization. Chemical sterilization. Filtration	Exposition, explanation, demonstration, case study	1 Practical work
Technical examination of morphological characters and tinctorial of microorganisms. Technical execution wet preparations. Technical execution the smears. Methods for staining. Usual methods. Special methods.	Exposition, explanation, demonstration, case study	2 Practical works
Techniques of growing the micro-organisms. The culture media. PH adjustment. Classification culture media. Technical preparation of culture media.	Exposition, explanation, demonstration, case study	2 Practical works
Technical examination of cultural characters of microorganisms grown on culture media. Characters microorganisms in dense culture media. The characters of microorganisms in liquid culture media.	Exposition, explanation, demonstration, case study	1 Practical work
The dimensioning technique and counting of microorganisms. Dimensioning in horizontally plan of cells. Decimal dilution technique. Direct methods of counting with counting- cameras Indirect methods (Koch method). The titre method.	Exposition, explanation, demonstration, case study	1 Practical work
Techniques for isolation, cultivation and preservation of pure cultures of microorganisms. Isolation in pure culture. Mechanical methods. Physical methods. Chemistry methods. Growing. Static methods. Agitation methods. Methods submersed. Conservation.	Exposition, explanation, demonstration, case study	2 Practical works
Metabolic activity study of the microorganisms and to determine the products Alcoholic fermentation. Lactic fermentation. Butyric fermentation. Acetic fermentation.	Exposition, explanation, demonstration, case study	2 Practical works
Technical examination of metabolic and biochemical characters, highlighting the properties. Zaharolitice. Proteolytic. Reducing.	Exposition, explanation, demonstration, case study	1 Practical work
Oral Examination	-	1 Practical work
Compulsory bibliography: Apostu S. – "Microbiologia produselor alimentare", vol. 1, Ed. Risoprint, 2012, Cluj-Napoca Apostu Sorin, Mihaela-Ancuţa Rotar, Carmen R. Pop – "Microbiologia produselor alimentare", vol.3, Ed. Risoprint, 2012, Cluj-Napoca		
Optional bibliography: Bărzoi D., Meica S., Negrut M. – "Toxiinfecţiile alimentare", Ed. Diacon Coresi, 1999, Bucureşti Dan Valentina – "Microbiologia produselor alimentare", vol. 1 şi 2, Ed. Alma, 1999		

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

Knowledge of the the impact of the presence of microorganisms in food. Knowledge of biological risks induced on consumers by certain groups of microorganisms contaminating the food.

Food microbiological quality control for biochemical stability and food security. Practical skills in microbiology laboratory

10. Assessment

Type of activity	10.1. Assessment criteria	10.2. Assessment methods	10.3. Percent of the final grade
10.4. Lecture	Evaluation the knowledge acquired,	Written examination	50%
10.5. Seminar/Laboratory	Evaluation the knowledge acquired, evaluation the practical knowledge, degree of involvement and individual study	**Oral final colloquium** (Practical assessment of professional competence gained)	50%
10.6. Minimal performance standard: Description of a specific microbiological process, including reasoning methods, techniques, processes and tools used. Develop a solution for the elimination of risk factors in a microbiological process			

[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