SUBJECT DESCRIPTION

1. Information on the study programme

1.1 The institution of higher education	**UNIVERSITY OF ORADEA**
1.2 Faculty	**FACULTY OF ENVIRONMENTAL PROTECTION**
1.3 Department	**FOOD PRODUCT ENGINEERING**
1.4 Field of study	**FOOD PRODUCT ENGINEERING**
1.5 Cycle of study	**BACHELOR**
1.6 Program of study/Qualification	**PROCESSING TECHNOLOGY OF AGRICULTURAL PRODUCTS / ENGINEER**

2. Information on the discipline

2.1 Name of discipline			GENERAL MICROBIOLOGY				
2.2 Course holder			ASSOCIATE PROFESSOR PhD CAMELIA BARA				
2.3 Seminar/Laboratory/Project holder			LECTURER PhD IOANA VLAD				
2.4 Year of study	**1**	2.5 Semester	**II**	2.6 Type of evaluation	**EX**	2.7 Regimen of the subject	**C**

(C) Compulsory; (O) Optional; (E) Elective

3. Total estimate time (hours per semester of didactic activities)

3.1 Number of hours per week	**4**	out of which: 3.2 course	**2**	out of which 3.3 laboratory	**2**
3.4 Total hours from the curriculum	**56**	Of which: 3.5 course	**28**	out of which 3.6 laboratory	**28**

Time allotment	44 hours
Study assisted by manual, course support, bibliography and notes	18
Additional documentation in the library/ on specialised electronic platforms and in the field	4
Preparation of seminars/laboratories/ topics/reports, portfolios and essays	18
Tutorship	2
Examinations	2
Other activities.....	-

3.7 Total hours of individual study	**44**
3.9 Total hours per semester	**100**
3.10 Number of credits	**4**

4. Prerequisites (where appropriate)

4.1 curriculum	Knowledge of Organic Chemistry, Biochemistry, Cell Biology.
4.2 competences	Manipulation of biological samples in safe conditions for the user.

5. Conditions (where appropriate)

5.1. related to course	The course room equipped with video projector; internet connection.
5.2. related to laboratory	Laboratory equipment: optical microscope, sample homogenizer, pH meter, UV lamp, related equipment (autoclave machine, oven, laminar flux), specific utensils (inoculation loops, pipettes).

6. Specific competences acquired

Professional competences	**C3.1** Establishing principles and methods of developing technical specifications based on acquired knowledge at the disciplines related to food equipment, industrial processes, transfer phenomena, operations and equipment. **C5.1** . Identification of specialized terminology on the quality, standards and food hygiene in order to collaborate and cooperate with the authorities responsible for food safety and quality. **C6.1** Identification of elementary concepts, theories, models and methods on the possibility of extending a production activity in the food industry.
Transversal competences	**CT1** Applying strategies of perseverance, rigor, efficiency and accountability in the work, punctuality and accountability for the results of personal activities, creativity, common sense, analytical and critical thinking, problem solving, etc., based on the rules and principles of professional ethics code values in the food sector. **CT2** Applying networking techniques within a team, enhancement and shaping of empathic capacities of interpersonal communication and ownership of some specific tasks in the group activity to treat / solve individual / group conflict, as well as the optimal management of time. **CT3** Efficient use of various ways and learning/ training techniques to acquire the information from electronic and bibliographic databases both in Romanian and in an international language, as well as to evaluate the need and usefulness of extrinsic and intrinsic motivation of continuing education.

7. Objectives of discipline (coming from the specific competences acquired)

7.1 General objective	Acquiring information about the morphology and physiology of the main groups of microorganisms that can contaminate food products, the main relationships between the classes of microorganisms developing in food product, the knowledge of the laboratory techniques regarding the isolation and identification of microorganisms.
7.2 Specific objectives	Deepening knowledge of the presence and role of pathogenic microorganisms in food; the acquisition of techniques necessary for the isolation and identification of pathogenic germs polluting food; deepening knowledge for organizing, endowing and performing microbiological examinations; acquiring legislation on the isolation and identification of pathogens in food products.

8. Contents*

8.1 **Course**	Methods of teaching	No. of hours
The role of microbiology.	Interactive conversation; video presentation; oral exposure.	2
Name and classification of microorganisms.	Interactive conversation; video presentation; oral exposure.	2
Groups of microorganisms widespread in nature.	Interactive conversation; video presentation; oral exposure.	2
Chemical composition of microorganisms.	Interactive conversation; video presentation; oral exposure.	2
Influence of environmental factors on microorganisms.	Interactive conversation; video presentation; oral exposure.	2
Types of relationship between microorganisms.	Interactive conversation; video presentation; oral	2

	exposure.	
Pathogenicity of microorganisms.	Interactive conversation; video presentation; oral exposure.	2
Nutrition of microorganisms.	Interactive conversation; video presentation; oral exposure.	2
Culture media for microorganisms.	Interactive conversation; video presentation; oral exposure.	2
Growth and multiplication of microorganisms in a culture medium.	Interactive conversation; video presentation; oral exposure.	2
Soil microorganisms.	Interactive conversation; video presentation; oral exposure.	2
Microorganisms in the air.	Interactive conversation; video presentation; oral exposure.	2
Microorganisms in the human body.	Interactive conversation; video presentation; oral exposure.	2
Microorganisms in water and food.	Interactive conversation; video presentation; oral exposure.	2
Bibliography Apostu Sorin, *Food Microbiology, vol. I*, Cluj-Napoca, Risoprint Publishing House, 2006. Apostu Sorin, *Food Microbiology, vol. II*, Cluj-Napoca, Risoprint Publishing House, 2006. Bara Camelia,*General Microbiology*, Oradea, Oradea University Press, 2009. Bara Camelia, *General microbiology of agrifood units*, Oradea, Oradea University Press, 2010.		
8.2 Seminary	-	-
8.3 **Laboratory**	Methods of teaching	No. of hours
Presentation of the Microbiology Laboratory. Labor Safety Standards in the Microbiology Laboratory. Laboratory equipment and supplies. Disinfection techniques of specific instruments. Objects and biological material.	Presentation, description, observation, demonstration, directed learning.	2
Presentation of dry heat sterilization methods - practical examples. Presentation of wet sterilization methods - practical application.	Presentation, description, observation, demonstration, directed learning.	2
Presentation of optical microscope operation. Practical use of the optical microscope.	Presentation, description, observation, demonstration, directed learning.	2
Examination of morphological and structural characters of microorganisms. Presentation of the microbial smear technique. Steps of microbial smear preparation. Staining techniques. Gram staining smear examination.	Presentation, description, observation, demonstration, directed learning.	2
Types of culture media used in the Microbiology Laboratory. Common ingredients of culture media. Culture media preparation steps. Culture media storage protocol and conditions. Culture handling procedure.	Presentation, description, observation, demonstration, directed learning.	2
Presentation of sampling technique from a biological material. Steps in sampling process. The technique used to make serial dilutions.	Presentation, description, observation, demonstration, directed learning.	2

Methods of culturing microorganisms in liquid medium.	Presentation, description, observation, demonstration, directed learning.	2
Interpreting the appearance of bacterial cultures on liquid culture media.	Presentation, description, observation, demonstration, directed learning.	2
Techniques for sowing microorganisms on solid culture media.	Presentation, description, observation, demonstration, directed learning.	2
Interpretation of the appearance of bacterial cultures on solid culture media.	Presentation, description, observation, demonstration, directed learning.	2
Identification of bacteria based on biochemical tests.	Presentation, description, observation, demonstration, directed learning.	2
Calculating bacterial growth. Determination of aerobic plate.	Presentation, description, observation, demonstration, directed learning.	2
Mold identification methods. Mold cell counting by using microscopy.	Presentation, description, observation, demonstration, directed learning.	2
Yeast identification methods.Yeast cell counting.	Presentation, description, observation, demonstration, directed learning.	2

Bibliography

Bara Camelia, *Practical work of microbiology*, Oradea, Oradea University Press, 2009.
Bara, V., Chipurici, M., Zabik, A., Bara C., Nechita Derevenco, R., Paul, G., Bonta, M.,*General methods of practical microbiology*, Oradea, Oradea University Press, 2000.
Bara Vasile, Bara Camelia, Pop Constantin, *Applied microbiology techniques*, Oradea, Oradea University Press, 1998.

* The content, respectively the number of hours allocated to each course / seminar / laboratory / project will be detailed during the 14 weeks of each semester of the academic year.

9. Corroboration of discipline content with the expectations of the epistemic community, professional associations and representative employers from the field corresponding to the study programme

Accomplishment of analyzes and food quality control using the basics of compound chemistry that determine food quality and transformations that they undergo during their processing, transport and storage as well as concepts, theories, methods and basic apparatus in the field.
Accomplishment of food surveying, using the basics of compound chemistry that determine the food quality and traceability, the transformations that they undergo during their processing, transport and storage, and analysis and determination methods of these compounds, the concepts, theories and legislation in the field.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the final grade
10.4 Course	- for grade 5 - 50% knowledge of the subject for grade 6 - 60% knowledge of the subject for grade 7 - 70% knowledge of the Summative assessment - exam - written or oral test 70% subject for grade 8 - 80% knowledge of the subject for grade 9 - 90% knowledge of the subject		

	for grade 10 - knowledge of the subject in proportion of 100% (the student proves the consultation of the presented bibliographic		
10.5 Seminary			
10.6 Laboratory	for grade 5 - the student answers 50% of the questions correctly for grade 6 - the student answers 60% of the questions correctly for grade 7 - the student answers 70% of the questions correctly for grade 8 - the student answers 80% of the questions correctly for grade 9 - the student answers 90% of the questions correctly for grade 10 - the student answers 100% of the questions correctly	Practical evaluation	30%
10.7 Project			
10.8 Minimum standard of performance			
Execution of specific operations in the sphere of production according to the job description by complying with the rules of professional ethics and values. Making a portfolio by identifying and describing professional roles within a subordinate team. Accomplishing a bibliographic study on the food theme.			

Date of completion Signature of course holder** Signature of seminar laboratory/project holder **

01.10.2023 Assoc.prof. PhD Camelia Bara cameliabara@yahoo.com Lecturer PhD Ioana Vlad andraioanavlad@co.uk

Date of approval in the department Signature of the Head of Department

01.10.2023 Lecturer eng.PhD AdrianTimar atimar@uoradea.ro

Dean signature

Assoc.prof. PhD Cristina Maerescu

** - Name, first name, academic degree and contact details (e-mail, web page, etc)will be specified.

.....