

## 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      | CONTROL AND EXPERTISE OF FOOD PRODUCTS/ENGINEER |

### 2. Information on the discipline

|                                       |    |              |                                       |                        |   |                            |   |  |
|---------------------------------------|----|--------------|---------------------------------------|------------------------|---|----------------------------|---|--|
| 2.1 Name of discipline                |    |              | GENERAL MICROBIOLOGY II               |                        |   |                            |   |  |
| 2.2 Course holder                     |    |              | ASSOCIATED PROFESSOR PhD BARA CAMELIA |                        |   |                            |   |  |
| 2.3 Seminar/Laboratory/Project holder |    |              | LECTURER PhD IOANA VLAD               |                        |   |                            |   |  |
| 2.4 Year of study                     | II | 2.5 Semester | III                                   | 2.6 Type of evaluation | E | 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                              |     |                          |    |                             | 10       |
| Additional documentation in the library/ on specialised electronic platforms and in the field |     |                          |    |                             | 10       |
| Preparation of seminars/laboratories/ topics/reports, portfolios and essays                   |     |                          |    |                             | 10       |
| Tutorship   |     |                          |    |                             | 12       |
| 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 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

|                                 |  |
|---------------------------------|--|
| <b>Professional competences</b> | <p>C1.1. Description and use of basic concepts, theories and methods for food engineering on the structure and properties of food components and contaminants, the transformations that they undergo during processing, the devices, equipment and technologies in food industry (knowledge provided by disciplines such as: general, inorganic, organic chemistry, food chemistry, biophysics, biochemistry, physical and colloidal chemistry, devices, equipment and technologies in the food industry)</p> <p>C4.1. Description and use of basic concepts, theories and methods used in quality control of food products, on the chemistry of compounds that determine food quality, the transformations that they undergo during processing, transport and storage, the apparatus and methods for determining and analyzing of these compounds (knowledge provided by the disciplines of general, inorganic, organic chemistry, food chemistry, biochemistry, analytical chemistry, instrumental analysis, microbiology, hygiene, food additives, food quality control)</p> <p>C5.1. Description and use of basic concepts, theories and methods used in food expertise related to chemical compounds that determine the quality and traceability of food products, the transformations that they undergo during processing, transport and storage, the apparatus and methods for determining and analysis of these compounds and the relevant legislation (knowledge provided by the disciplines of general, inorganic, organic chemistry, food chemistry, biochemistry, analytical chemistry, instrumental analysis, microbiology, hygiene, food additives, food quality control).</p> <p>C5.2. Explanation and interpretation of concepts, methods and models used in food expertise, using basic knowledge on chemical compounds that determine the quality and traceability of food products, the transformations that they undergo during their processing, transport and storage, the methods for the determination and analysis of these compounds and relevant legislation.</p> |
| <b>Transversal competences</b>  | <p><b>CT1</b><br/>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.</p> <p><b>CT2</b><br/>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.</p> <p><b>CT3</b><br/>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.</p>  |

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

|                                |   |
|--------------------------------|---|
| <b>7.1 General objective</b>   | Knowledge of microbiological criteria for assessing the quality of a food product and methods of microbiological control of food products. Knowledge of general notions of sources of food contamination with microorganisms.                               |
| <b>7.2 Specific objectives</b> | Characterization of saprophytic microorganisms involved in the processes of microbiological food alteration. Characterization of pathogenic microorganisms with increased biological risk for the generation of food poisoning by eating contaminated food. |

## 8. Contents\*

| 8.1 Course   | Methods of teaching  | No. of hours |
|--|--|--------------|
| The dynamics of the development of microorganisms in a food and its influence on its organoleptic changes. | Interactive conversation; video presentation; oral exposure. | 2            |
| Evolution of microorganisms in a food depending on factors related to the storage environment.             | Interactive conversation; video presentation; oral           | 2            |

|   |   |              |
|---|---|--------------|
|   | exposure.   |              |
| Saprophytic bacteria used in the manufacture of food.   | Interactive conversation;<br>video presentation; oral<br>exposure.              | 2            |
| Saprophytic molds used in the manufacture of food.  | Interactive conversation;<br>video presentation; oral<br>exposure.              | 2            |
| Saprophytic yeasts used in the manufacture of food.   | Interactive conversation;<br>video presentation; oral<br>exposure.              | 2            |
| Contaminating food with pathogenic bacteria.  | Interactive conversation;<br>video presentation; oral<br>exposure.              | 2            |
| Contaminating food with viruses.  | Interactive conversation;<br>video presentation; oral<br>exposure.              | 2            |
| Contaminating food with pathogenic molds.   | Interactive conversation;<br>video presentation; oral<br>exposure.              | 2            |
| Contaminating food with pathogenic yeasts.  | Interactive conversation;<br>video presentation; oral<br>exposure.              | 2            |
| Contaminating food with parasites.  | Interactive conversation;<br>video presentation; oral<br>exposure.              | 2            |
| Contaminating food with toxins produced by pathogenic microorganisms.   | Interactive conversation;<br>video presentation; oral<br>exposure.              | 2            |
| Microbiological contamination of food preserves.  | Interactive conversation;<br>video presentation; oral<br>exposure.              | 2            |
| Microbiological contamination of cereals.   | Interactive conversation;<br>video presentation; oral<br>exposure.              | 2            |
| Diseases of bread and bakery products caused by microorganisms.   | Interactive conversation;<br>video presentation; oral<br>exposure.              | 2            |
| <b>Bibliography</b><br>Bara Camelia, <i>Food Microbiology</i> , Oradea, Oradea University Press, 2005.<br>Bara Camelia, <i>Principles of appreciating the quality of some foods</i> , Oradea, Oradea University Press, 2008.<br>Bara Camelia, <i>Microbiology and quality of food of animal origin</i> , Oradea, Oradea University Press, 2008.<br>Apostu Sorin, <i>Food Microbiology, vol. II</i> , Cluj-Napoca, Risoprint Publishing House, 2006. |   |              |
| 8.2 Seminary  | -   | -            |
| 8.3 Laboratory  | Methods of teaching   | No. of hours |
| Nutritional needs of microorganisms that develop in food.   | Presentation, description,<br>observation, demonstration,<br>directed learning. | 2            |
| Culture media used in microbiology for isolating and identifying microorganisms in food.  | Presentation, description,<br>observation, demonstration,<br>directed learning. | 2            |
| Microbiological techniques for evaluation of microorganisms in food.  | Presentation, description,<br>observation, demonstration,                       | 2            |

|   |   |   |
|---|---|---|
|   | directed learning.  |   |
| Harvesting, labeling and transporting food samples for the microbiological examination.   | Presentation, description, observation, demonstration, directed learning. | 2 |
| The preparation of microbiological smear from liquid and solid food samples.  | Presentation, description, observation, demonstration, directed learning. | 2 |
| Sanitary microbiological indicators of food.  | Presentation, description, observation, demonstration, directed learning. | 2 |
| Microbiological sanitary water indicators.  | Presentation, description, observation, demonstration, directed learning. | 2 |
| Microbiological examination of working surfaces, machinery and food processing equipment in food industry.  | Presentation, description, observation, demonstration, directed learning. | 2 |
| Microbiological examination of pipelines in food industry.  | Presentation, description, observation, demonstration, directed learning. | 2 |
| Microbiological examination of packaging materials used in food industry.   | Presentation, description, observation, demonstration, directed learning. | 2 |
| Microbiological examination of the air in the workspaces and food storage spaces.   | Presentation, description, observation, demonstration, directed learning. | 2 |
| Microbiological contamination of the hand of food handlers as indicator of hand washing efficacy in food industry.  | Presentation, description, observation, demonstration, directed learning. | 2 |
| Laboratory diagnosis of microbial food poisoning.   | Presentation, description, observation, demonstration, directed learning. | 2 |
| Determination of Aerobic Mesophilic Bacteria in food.   | Presentation, description, observation, demonstration, directed learning. | 2 |
| <b>Bibliography</b><br>Bara Camelia, <i>Practical work of microbiology</i> , Oradea, Oradea University Press, 2009.<br>Bara, V., Chipurici, M., Zabik, A., Bara C., Nechita Derevenco, R., Paul, G., Bonta, M., <i>General methods of practical microbiology</i> , Oradea, Oradea University Press, 2000.<br>Bara Vasile, Bara Camelia, Pop Constantin, <i>Applied microbiology techniques</i> , 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

Identification of consumer-induced risks by microorganisms developed in food. Control of the microbiological quality of foodstuffs, within traceability, with the aim of ensuring the biochemical stability of food products and food safety and security.

## 10. Evaluation

| Type of activity | 10.1 Evaluation criteria             | 10.2 Evaluation methods                  | 10.3 Share in the final grade |
|------------------|--------------------------------------|--|-------------------------------|
| 10.4 Course      | - interactive activity at the course | - continuous evaluation (percentage 20%) | 80%                           |

|  |   |  |     |
|--|---|--|-----|
|  | - by written/oral exams.  | - <i>cumulative evaluation</i><br>(percentage 80%)   |     |
| 10.5 Seminary  |   |  |     |
| 10.6 Laboratory  | - evaluation by oral methods, written tests and home works (paper on a subject at choice from the thematic of the subject);<br>- evaluation by practical tests. | - <i>continuous evaluation</i><br>(percentage 40%)<br><br>- <i>cumulative evaluation</i><br>(percentage 60%) | 20% |
| 10.7 Project   |   |  |     |
| 10.8 Minimum standard of performance   |   |  |     |
| 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.<br>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. |   |  |     |

Date of completion      Signature of course holder\*\*

Signature of seminar  
laboratory/project holder \*\*

01.10.2023      Assoc.prof. PhD Camelia Bara  
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Date of approval in the department

Signature of the Head of Department

01.10.2023

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

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