**SYLLABUS**

**regarding the qualification cycle FROM 2024 To 2025**

1. Basic Course/Module Information

|  |  |
| --- | --- |
| Course/Module title | *Microbiology* |
| Course/Module code \* |  |
| Faculty (name of the unit offering the field of study) | *Institute of Food Technology and Nutrition* |
| Name of the unit running the course | *Department of Bioenergetics, Food Analysis and Microbiology* |
| Field of study | *Environmental protection* |
| Qualification level | *first level* |
| Profile | *academic* |
| Study mode | *stationary* |
| Year and semester of studies | *I year 1 semester* |
| Course type | *basic* |
| Language of instruction | *english* |
| Coordinator | *dr Dorota Grabek-Lejko* |
| Course instructor | *dr Dorota Grabek-Lejko* |

\* - as agreed at the faculty

1.1.Learning format – number of hours and ECTS credits

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Semester  (n0.) | Lectures | Classes | Colloquia | Lab classes | Seminars | Practical classes | Internships | others | **ECTS credits** |
| 1 |  |  |  | 30 |  |  |  |  | 5 |

1.2. Course delivery methods

- conducted in a traditional way

- involving distance education methods and techniques

1.3. Course/Module assessment (exam, pass with a grade, pass without a grade)

pass with a grade

2. Prerequisites

|  |
| --- |
| Basic knowledge of general biology |

3. Objectives, Learning Outcomes, Course Content, and Instructional Methods

3.1. Course/Module objectives

|  |  |
| --- | --- |
| O1 | Provide basic knowledge in the field of microbiology and the possibilities of practical use of microorganisms in scientific research, medicine, agriculture, industry, and environmental protection. |
| O2 | During laboratory classes, the student acquires the ability to deal with the microbiological material from the moment of sampling and testing to full identification of bacteria. Acquisition of work skills with microbial material (work in sterile conditions with basic laboratory techniques (microscopy,staining, identification of bacteria, counting microbial cells, microbial cultures, growth characteristics, influence of physical and chemical factors on bacteria,interactions between bacteria). |

3.2. Course/Module Learning Outcomes (to be completed by the coordinator)

|  |  |  |
| --- | --- | --- |
| Learning Outcome | The description of the learning outcome  defined for the course/module | Relation to the degree programme outcomes |
| LO\_01 | knows and understands the concepts of classification, evolution and development  microorganisms | *(K\_W01)* |
| LO\_02 | knows the structure and physiology of microorganisms (structure and shape, life activities, living environment, microorganisms, the influence of microorganisms on the environment  and other organisms) | *(K\_W01)* |
| LO\_03 | knows the professional terminology for the description of microorganisms (prokaryotic and eukaryotic) and processes occurring in their cells | *(K\_W01)* |
| LO\_o4 | is able to select research methods, plans and carries out basic diagnostic tests | *(K\_U03)* |
| LO\_o5 | can recognize, evaluate and demonstrate awareness of possible microbiological hazards in the laboratory, environment, food, etc. | *(K\_U03)* |
| LO\_o6 | Is able to cooperate in group during laboratory analysis and also work independently | *(K\_K02)* |
| LO\_o7 | Is responsible for the equipment,  is ready to take care of work safety in the laboratory,  he respects his own work and the work of others, and is also ready to critical assessment of knowledge regarding ethics, economic and environmental priorities in his own or other activities. | (K\_K01) |

**3.3. Course content (to be completed by the coordinator)**

1. Classes, tutorials/seminars, colloquia, laboratories, practical classes

Classes

1. Principles of safe work in a laboratory of microbiology.
2. Equipment and working conditions in a microbiological laboratory.
3. Sterilization and disinfection.
4. Microscopy - types of microscopes and their application. Bacterial morphology. Bacterial staining.
5. Microbiological media: types, characteristics, application.
6. Methods of obtaining pure cultures. Culture techniques.
7. Microbial growth.
8. Principles of microbiological diagnostics.
9. Techniques of microbiological work. Direct and indirect methods of determining the number of microorganisms.
10. The influence of physical and chemical factors on bacterial cells.
11. Biochemical properties of microorganisms.

3.4. Methods of Instruction

*Classes: conducting experiments, group work (problem solving, case study, discussion, text analysis, project work practical project)*

4. Assessment techniques and criteria

4.1 Methods of evaluating learning outcomes

|  |  |  |
| --- | --- | --- |
| Learning outcome | Methods of assessment of learning outcomes (e.g. test, oral exam, written exam, project, report, observation during classes) | Learning format (lectures, classes,…) |
| *LO-01* | *report, oral presentation* | *classes* |
| *LO-o2* | *report, oral presentation* | *classes* |
| *LO-o3* | *report, oral presentation* | *classes* |
| *LO-o4* | *report, observation during classes, oral presentation* | *classes* |
| *LO-o5* | *observation during classes, oral presentation* | *classes* |
| *LO-o6* | *observation during classes* | *classes* |
| *LO-o7* | *observation during classes* | *classes* |

4.2 Course assessment criteria

|  |
| --- |
| *final degree is based on laboratory reports and multimedia presentation* |

5. Total student workload needed to achieve the intended learning outcomes

– number of hours and ECTS credits

|  |  |
| --- | --- |
| Activity | Number of hours |
| Scheduled course contact hours | 30 |
| Other contact hours involving the teacher (consultation hours, examinations) | 10 |
| Non-contact hours - student's own work (preparation for classes or examinations, projects, etc.) | 90 |
| Total number of hours | 130 |
| Total number of ECTS credits | 5 |

\* One ECTS point corresponds to 25-30 hours of total student workload

6. Internships related to the course/module

|  |  |
| --- | --- |
| Number of hours | *-* |
| Internship regulations and procedures | *-* |

7. Instructional materials

|  |
| --- |
| Compulsory literature:  1.Linda Bruslind, General Microbiology, Oregon State University, 2017  2.Allied Health Microbiology, Oregon State University, 2017  3.Nina Parker, Mark Schneegurt, Anh-Hue Thi Tu, Brian M. Forster, Philip Lister, Microbiology, ASM Press, 2021  4.Gianfranco Donelli, Advances in Microbiology, Infectious diseases and public health, Springer, 2018 |
| Complementary literature:  1. Sanjai Saxena, Applied Microbiology, Springer, 2015  2. Grabek-Lejko, D.; Hyrchel, T. The Antibacterial Properties of Polish Honey against *Streptococcus mutans*—A Causative Agent of Dental Caries. Antibiotics 2023, 12, 1640. |

Approved by the Head of the Department or an authorised person