**SYLLABUS**

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

1. Basic Course/Module Information

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| --- | --- |
| Course/Module title | *General Microbiology* |
| Course/Module code \* |  |
| Faculty (name of the unit offering the field of study) | *College of natural Sciences, Institute of Biotechnology* |
| Name of the unit running the course | *Institute of Biotechnology* |
| Field of study | Biology, Biotechnology |
| Qualification level | I grade |
| Profile | *general academic strand* |
| Study mode | *stationary* |
| Year and semester of studies |  |
| Course type |  |
| Language of instruction | English |
| Coordinator | Justyna Ruchala, PhD |
| Course instructor | *Justyna Ruchala, PhD* |

\* - 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** |
| Winter |  |  |  | 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)

credit with grade, exam

2. Prerequisites

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| Knowledge in the fields of organic biochemistry,, biochemistry, and cell biology. |

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

3.1. Course/Module objectives

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| --- | --- |
| O1 | *Expanding theoretical knowledge of the structure of the microbial cell, physiology, biochemistry and genetics of microorganisms and impact of microorganisms; types, methods and directions of microbial biotechnology; microorganisms as members of the physiology and agents of pathogenesis of plants, animals and humans* |
| O2 | *Ability to use techniques, methods and tools to conduct basic biotechnological processes.* |
| O3 | *Prepare students to use microscopic techniques necessary to work in a microbiology laboratory.* |

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 | The student knows the most important groups of microorganisms and their structure | O\_K\_04 |
| LO\_02 | The student knows the principles of microbial metabolism and energy transformations and the possibilities of their practical use | O\_K\_01 |
| LO\_03 | The student understands the risks associated with working with microorganisms and adheres to the principles of safe work with biological material | O\_K\_01 |
| LO\_04 | The student is able to use the equipment in compliance with the principles of occupational health and safety and good laboratory practice | O\_K\_05 |
| LO\_05 | The student uses biochemical, microbiological and molecular techniques | O\_S\_02 |
| LO\_06 | The student prepares microscopic preparations using various staining techniques, is able to inoculate microorganisms, cultivate, isolate pure cultures, examine the properties of microorganisms | O\_S\_11 |
| LO\_07 | The student is able to select and apply appropriate methods, techniques and research tools useful in microbiological work and analyze them based on basic and current statistical methods | O\_S\_11 |

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

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

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| Content outline |
| Practical requirements for microbiology research, good laboratory practice |
| Sterilization and disinfection |
| Microscopy. The morphology of microorganisms |
| Bacterial cytology. Staining techniques used in microbiology. |
| Methods of microbial cultivation. Method of isolating pure cultures. |
| Microbiological media |
| Methods for determining the number and size of microorganisms |
| The influence of physical and chemical factors on bacteria |
| Identification of microorganisms. Selected biochemical properties |

3.4. Methods of Instruction

e.g.

*Lecture: a problem-solving lecture/a lecture supported by a multimedia presentation/ distance learning*

*Classes: text analysis and discussion/project work (research project, implementation project, practical project)/ group work (problem solving, case study, discussion)/didactic games/ distance learning*

*Laboratory classes: designing and conducting experiments*

Laboratory exercises - work in the laboratory, work in groups, processing the results, performing experiments

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-o3 – Lo-07 | test, activity, observation during classes | Le |

4.2 Course assessment criteria

|  |
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| For passing the course is the achievement of all assumed learning outcomes.  Lab classes:   * conducting laboratory experiments, * colloquium   Obtaining a positive grade from the lab classes is required for taking part in the exam. |

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.) | 85 |
| Total number of hours | 125 |
| 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

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| Compulsory literature:  Microbiology Lab Manual: Principles and Applications by S.A. Norrrell & K.E. Messley, Prentice Hall – 1999  Microbiology: Laboratory Manual by J.G. Cappuccino & N. Sharman, Pearson – 2011  Laboratory Experiments in Microbiology by T.R. Johnson & C.L. Case, Benjamin/Cummings Pub. Co - 12th Edition – 2019 |
| Complementary literature:  General Microbiology by Hans G. Schlegel - 1999 |

Approved by the Head of the Department or an authorised person