

## Subject card

|                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                          |                                         |                                     |                                                                                                                                                |            |     |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-----------------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----|
| Subject name and code                       | Microbiology, PG_00082050                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                          |                                         |                                     |                                                                                                                                                |            |     |
| Field of study                              | Chemistry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                          |                                         |                                     |                                                                                                                                                |            |     |
| Date of commencement of studies             | October 2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                          | Academic year of realisation of subject |                                     | 2028/2029                                                                                                                                      |            |     |
| Education level                             | Bachelor's studies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                          | Subject group                           |                                     | Obligatory subject group in the field of study<br>Optional subject group<br>Subject group related to scientific research in the field of study |            |     |
| Mode of study                               | full-time studies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                          | Mode of delivery                        |                                     | at the university                                                                                                                              |            |     |
| Year of study                               | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                          | Language of instruction                 |                                     | Polish                                                                                                                                         |            |     |
| Semester of study                           | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                          | ECTS credits                            |                                     | 2.0                                                                                                                                            |            |     |
| Learning profile                            | academic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                          | Assessment form                         |                                     | credit                                                                                                                                         |            |     |
| Conducting unit                             | Laboratory of Bionanotechnology -> Department of Molecular Biotechnology -> Faculty of Chemistry -> Rector                                                                                                                                                                                                                                                                                                                                                                                        |                                                          |                                         |                                     |                                                                                                                                                |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                          | prof. dr hab. Piotr Skowron             |                                     |                                                                                                                                                |            |     |
|                                             | Teachers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                          |                                         |                                     |                                                                                                                                                |            |     |
| Lesson types                                | Lesson type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Lecture                                                  | Tutorial                                | Laboratory                          | Project                                                                                                                                        | Seminar    | SUM |
|                                             | Number of study hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.0                                                      | 0.0                                     | 30.0                                | 0.0                                                                                                                                            | 0.0        | 30  |
|                                             | E-learning hours included: 0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                          |                                         |                                     |                                                                                                                                                |            |     |
| Learning activity and number of study hours | Learning activity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Participation in didactic classes included in study plan |                                         | Participation in consultation hours |                                                                                                                                                | Self-study | SUM |
|                                             | Number of study hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 30                                                       |                                         | 5.0                                 |                                                                                                                                                | 15.0       | 50  |
| Subject objectives                          | Familiarizing students with all the issues mentioned in the syllabus of exercises, introducing students to methods of cultivating microorganisms, familiarizing students with methods of identifying microorganisms, familiarizing students with methods for determining the properties of microorganisms, developing the skills of aseptic work and following procedures for working with microorganisms, developing the ability to independently plan and carry out microbiological experiment. |                                                          |                                         |                                     |                                                                                                                                                |            |     |

| Learning outcomes               | Course outcome                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Subject outcome                                                                                                                                                                                                                  | Method of verification                                                                                                                                                                        |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 | [CHEML3_U02] Performs analyses using experimental methods and draws conclusions based on them.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Performs experiments specified in the laboratory manual and speaks about microbiological issues in understandable professional language.                                                                                         | [SU1] oral statement/conversation/discussion<br>[SU2] presentation/project/paper/report<br>[SU6] demonstration of practical skills<br>[SU8] observation of student's independent or team work |
|                                 | [CHEML3_W12] Characterises the basic principles of health and safety at work in a chemical laboratory; knows and describes the hazards associated with working with hazardous substances, ways to counteract these hazards and rules of conduct during an accident.                                                                                                                                                                                                                                                                                                                                                                                                       | Knows sterilization methods, types of microbiological media and breeding methods microorganisms in laboratory conditions.                                                                                                        | [SW4] test/exam - oral or written<br>[SW1] oral statement/conversation/discussion                                                                                                             |
|                                 | [CHEML3_W01] Enumerates basic laws and theories in chemistry, physics, mathematics and biology.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Demonstrates knowledge of the structure of the cell, methods of its observation and knows selected groups of microorganisms.                                                                                                     | [SW4] test/exam - oral or written<br>[SW2] presentation/project/paper/report                                                                                                                  |
|                                 | [CHEML3_K05] Observes established procedures in laboratory work and is responsible for the safety of her/his and others' work.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Is able to prepare a workstation, work aseptically, follows established research procedures and procedures for working with microorganisms, is careful when dealing with chemical substances and materials of biological origin. | [SK6] demonstration of practical skills<br>[SK8] observation of student's independent or team work                                                                                            |
|                                 | [CHEML3_K03] Establishes priorities in the right way for the implementation of tasks specified by herself/himself and/or by others.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Independently plans the course of microbiological experiments.                                                                                                                                                                   | [SK2] presentation/project/paper/report<br>[SK6] demonstration of practical skills<br>[SK8] observation of student's independent or team work                                                 |
|                                 | [CHEML3_U07] Prepares documented elaboration on a specific problem in the field of selected chemical and physical issues.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Prepares a report on the results obtained in the laboratory.                                                                                                                                                                     | [SU2] presentation/project/paper/report<br>[SU3] text preparation/written work                                                                                                                |
|                                 | [CHEML3_K02] Works individually demonstrating initiative and independence of activity and cooperates in a team fulfilling various roles in it.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Works in the microbiology laboratory independently and in groups.                                                                                                                                                                | [SK6] demonstration of practical skills<br>[SK8] observation of student's independent or team work                                                                                            |
|                                 | [CHEML3_W02] Describes the properties of elements and the most important chemical compounds, enumerates the methods of their preparation and methods of analysis.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Demonstrates knowledge of biochemical processes occurring in a living cell.                                                                                                                                                      | [SW4] test/exam - oral or written<br>[SW2] presentation/project/paper/report                                                                                                                  |
| Subject contents                | Learning basic techniques of working in a microbiological laboratory (sterilization methods, methods performing cultures and microorganisms), the influence of physical factors (temperature, osmotic pressure, UV radiation) and chemicals on microorganisms, morphology of microorganisms - preparation of stained microscopic preparations and their observation, flora human physiological and pathogenicity, chemotherapeutics and drug sensitivity determination, physiology and metabolism of microorganisms, collection and testing environmental samples for the presence of microorganisms, the use of microorganisms in industry and environmental protection. |                                                                                                                                                                                                                                  |                                                                                                                                                                                               |
| Prerequisites and co-requisites |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                  |                                                                                                                                                                                               |
| Assessment methods and criteria | Subject passing criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Passing threshold                                                                                                                                                                                                                | Percentage of the final grade                                                                                                                                                                 |
|                                 | lab report/book                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 30.0%                                                                                                                                                                                                                            | 20.0%                                                                                                                                                                                         |
|                                 | test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 51.0%                                                                                                                                                                                                                            | 80.0%                                                                                                                                                                                         |

|                                                                |                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Recommended reading                                            | Basic literature                                                                                                                                                                    | <p>Salyers, A.A., Whitt, D.D.: Mikrobiologia. Różnorodność, chorobotwórczość i środowisko. Wydawnictwo Naukowe PWN, Warszawa 2003</p> <p>Kunicki-Goldfinger, W.J.H. Życie bakterii. Wydawnictwo Naukowe PWN, Warszawa 2005</p> <p>Schlegel, H.G. Mikrobiologia ogólna. Wydawnictwo Naukowe PWN, Warszawa 2000</p> <p>Libudzisz, Z., Kowal, K., Żakowska, Z. (red.) Mikrobiologia techniczna. Mikroorganizmy i środowiska ich występowania. Wydawnictwo Naukowe PWN, Warszawa 2007</p> <p>Libudzisz, Z., Kowal, K., Żakowska, Z. (red.) Mikrobiologia techniczna. Mikroorganizmy w biotechnologii, ochronie środowiska i produkcji żywności. Wydawnictwo Naukowe PWN, Warszawa 2008</p> <p>Kur, J.: Ćwiczenia z mikrobiologii ogólnej. Wydawnictwo Politechniki Gdańskiej, Gdańsk 1993</p> <p>Tortora, G.J., Funke, B.R., Case, C.L. Microbiology. An introduction. Pearson International Edition, San Francisco 2007</p> |
|                                                                | Supplementary literature                                                                                                                                                            | <p>E. M. Szewczyk Diagnostyka bakteriologiczna. Wydawnictwo Naukowe PWN, Warszawa 2005</p> <p>Brown T. A. [red. wyd. pol. Piotr Węglński] Genomy, Wydawnictwo Naukowe PWN, Warszawa, latest ed.</p> <p>Stryer L. Biochemia. Wydawnictwo Naukowe PWN, Warszawa, latest ed.</p> <p>J. Baj, Z. Markiewicz Biologia molekularna bakterii. Warszawa 2006</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                                | eResources addresses                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Example issues/<br>example questions/<br>tasks being completed | sterilization techniques, types of media, growth curves of bacterial cultures, determination of the number of microorganisms including CFU, microscopy, detection of microorganisms |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Work placement                                                 | Not applicable                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

Document generated electronically. Does not require a seal or signature.