

## Subject card

|                                             |                                                                                                                                                                                                                                                                                                                                                                                            |                                                          |                                         |                                     |         |                                                                                                                      |     |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-----------------------------------------|-------------------------------------|---------|----------------------------------------------------------------------------------------------------------------------|-----|
| Subject name and code                       | General biochemistry, PG_00154399                                                                                                                                                                                                                                                                                                                                                          |                                                          |                                         |                                     |         |                                                                                                                      |     |
| Field of study                              | Biology                                                                                                                                                                                                                                                                                                                                                                                    |                                                          |                                         |                                     |         |                                                                                                                      |     |
| Date of commencement of studies             | October 2024                                                                                                                                                                                                                                                                                                                                                                               |                                                          | Academic year of realisation of subject |                                     |         | 2025/2026                                                                                                            |     |
| Education level                             | undergraduate studies                                                                                                                                                                                                                                                                                                                                                                      |                                                          | Subject group                           |                                     |         | Obligatory subject group in the field of study<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                               | 2                                                                                                                                                                                                                                                                                                                                                                                          |                                                          | Language of instruction                 |                                     |         | Polish                                                                                                               |     |
| Semester of study                           | 3                                                                                                                                                                                                                                                                                                                                                                                          |                                                          | ECTS credits                            |                                     |         | 3.0                                                                                                                  |     |
| Learning profile                            | academic                                                                                                                                                                                                                                                                                                                                                                                   |                                                          | Assessment form                         |                                     |         |                                                                                                                      |     |
| Conducting unit                             | Pracownia Biochemii Mikroorganizmów -> Katedra Biochemii Ogólnej i Medycznej -> Faculty of Biology                                                                                                                                                                                                                                                                                         |                                                          |                                         |                                     |         |                                                                                                                      |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor                                                                                                                                                                                                                                                                                                                                                                         |                                                          | dr inż. Karolina Stojowska-Swędryńska   |                                     |         |                                                                                                                      |     |
|                                             | 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                                                       |                                         | 6.0                                 |         | 39.0                                                                                                                 | 75  |
| Subject objectives                          | The aim of the exercises is to familiarize students with the structure and function of macromolecules (nucleic acids, proteins, sugars, lipids) and with laboratory biochemical techniques used to analyze macromolecules and biochemical processes. An additional goal is for students to acquire the ability to independently perform biochemical experiments and interpret the results. |                                                          |                                         |                                     |         |                                                                                                                      |     |

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| Learning outcomes               | Course outcome                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Subject outcome                                                                                                                                                                                                                                                                                                                                                                                                 | Method of verification                                                                                                       |
|                                 | [BIOLL3_U01] The graduate will be able to use basic apparatus and research tools and follow the correct sequence of operations in laboratory and field work                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | The student uses basic research equipment and tools and maintains the correct sequence of activities in laboratory work.                                                                                                                                                                                                                                                                                        | [SU2] presentation/project/paper/report                                                                                      |
|                                 | [BIOLL3_K05] The graduate is prepared to take responsibility for their own and others' safety at work and to recognise risk situations and take appropriate action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | The student is responsible for the safety of his own work and that of others and is able to recognize hazardous situations and take appropriate actions.                                                                                                                                                                                                                                                        | [SK8] observation of student's independent or team work                                                                      |
|                                 | [BIOLL3_W02] The graduate knows the structure and properties of biological macromolecules, the molecular mechanisms of basal metabolic pathways and genetic information flow and the sources of variation in organisms; the rules of inheritance                                                                                                                                                                                                                                                                                                                                                                                                                                           | The student describes the structure, properties and functions of basic types of biological macromolecules and the mechanisms of biochemical methods.                                                                                                                                                                                                                                                            | [SW4] test/exam - oral or written                                                                                            |
|                                 | [BIOLL3_U02] The graduate will be able to make observations individually and in teams, and carry out basic physical, biological and chemical measurements in the field or laboratory                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | The student independently and in a team carries out observations and basic physical, biological and biochemical measurements in the laboratory.                                                                                                                                                                                                                                                                 | [SU2] presentation/project/paper/report                                                                                      |
|                                 | [BIOLL3_K06] The graduate is prepared to take responsibility for the equipment/materials entrusted to them and for their own work and that of others                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | The student is responsible for the provided laboratory equipment, apparatus, materials and reagents. He is responsible for his own work and respects the work of others.                                                                                                                                                                                                                                        | [SK8] observation of student's independent or team work                                                                      |
|                                 | [BIOLL3_U12] The graduates will be able to use Polish and foreign languages specific to biology in a way that is understandable and accessible to both specialists and non-specialists                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | The student is able to use specialized biology language (with particular emphasis on biochemical terms) in a way that is understandable and accessible to both specialists and non-specialists.                                                                                                                                                                                                                 | [SU1] oral statement/conversation/discussion<br>[SU2] presentation/project/paper/report<br>[SU4] test/exam - oral or written |
| Subject contents                | <ul style="list-style-type: none"> <li>Structure, function and properties of basic macromolecules: nucleic acids, proteins, carbohydrates, lipids.</li> <li>Methods of separation and analysis of nucleic acids and proteins (agarose and polyacrylamide electrophoresis).</li> <li>Methods of identification and analysis of biochemical properties of selected macromolecules.- Methods of separating molecules due to differences in molecular weight (molecular filtration).</li> <li>Structure and functions of enzymes, methods of determining enzymatic activity, enzyme inhibition.</li> <li>Chromatographic methods (thin layer chromatography, paper chromatography).</li> </ul> |                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                              |
| Prerequisites and co-requisites | Completion of courses covering general and organic chemistry. Knowledge of the structure of basic inorganic and organic compounds, isomerism, chemical bonds, mechanisms of basic chemical reactions, energetics of chemical reactions, hydrophobic interactions, acids and bases, pH, units of measurement, solution concentration units, ability to calculate solution concentrations.                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                              |
| Assessment methods and criteria | Subject passing criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Passing threshold                                                                                                                                                                                                                                                                                                                                                                                               | Percentage of the final grade                                                                                                |
|                                 | Test with closed and open questions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 50.1%                                                                                                                                                                                                                                                                                                                                                                                                           | 70.0%                                                                                                                        |
|                                 | Written reports of laboratory experiments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 50.1%                                                                                                                                                                                                                                                                                                                                                                                                           | 30.0%                                                                                                                        |
| Recommended reading             | Basic literature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>Instructions for laboratory classes (provided by the laboratory coordinator) (in Polish)</li> </ul>                                                                                                                                                                                                                                                                      |                                                                                                                              |
|                                 | Supplementary literature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | (Textbooks in Polish): <ul style="list-style-type: none"> <li>Berg J. M., Tymoczko J. L., Stryer L. 2017. Biochemia. PWN, Warszawa</li> <li>Berg J. M., Stryer L. , Tymoczko J. L., Biochemia. Krótki kurs. PWN Warszawa 2013</li> <li>Klyszejko-Stefanowicz L. (red.). 2005. Ćwiczenia z biochemii. PWN, Warszawa</li> <li>Hames B. D., Hooper N.M. 2007. Krótkie wykłady: Biochemia. PWN, Warszawa</li> </ul> |                                                                                                                              |

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|                                                                | eResources addresses                                                                                                                                                                                                                                                                                                                                             | Adresy na platformie eNauczenie: |
| Example issues/<br>example questions/<br>tasks being completed | Differences in the structure of RNA and DNA, characteristic features of plasmid DNA, amino acid structure, what is the isoelectric point, what is molecular filtration, what is the active center of the enzyme, list the differences between competitive and non-competitive inhibition, What is the Biuret reaction used for, what is an amphiphilic molecule. |                                  |
| Work placement                                                 | Not applicable                                                                                                                                                                                                                                                                                                                                                   |                                  |

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