

Subject card

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|--|---|---|---|--|----------------|-----------------------------------|------------|
| Subject name and code | Biomolecules - biological functions Foundation (M02_B2), PG_00153662 | | | | | | |
| Field of study | Biotechnology | | | | | | |
| Date of commencement of studies | October 2024 | Academic year of realisation of subject | | | | 2024/2025 | |
| Education level | undergraduate studies | Subject group | | | | | |
| Mode of study | full-time studies | Mode of delivery | | | | at the university | |
| Year of study | 1 | Language of instruction | | | | Polish | |
| Semester of study | 2 | ECTS credits | | | | 2.0 | |
| Learning profile | academic | Assessment form | | | | | |
| Conducting unit | | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | dr hab. Katarzyna Węgrzyn | | | | |
| | Teachers | | | | | | |
| Lesson types | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 20.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20 |
| | 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 | 20 | | 0.0 | | 18.0 | 38 |
| Subject objectives | The program block 02 in Module 02 aims to provide detailed knowledge about the functions of biomolecules (such as proteins, nucleic acids, sugars, and lipids) forming more complex biological systems, cellular compartments. By completing the program block, the student will acquire detailed knowledge about the network of interactions between biomolecules and their transport. The student will also gain knowledge related to the analysis of enzyme reaction kinetics, determination of kinetic constants, and statistical processing of measurement data. | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | | Method of verification | |
| | [BIOTECHL3_W06] The graduate knows and understands basic knowledge in science and natural sciences necessary for understanding the phenomena and biological processes, particular cellular processes at the molecular level | | Student has the knowledge about the functions of biomolecules (such as proteins, nucleic acids, sugars, and lipids) forming more complex biological systems, cellular compartments. Student knows about the network of interactions between biomolecules and their transport. The student has also knowledge related to the analysis of enzyme reaction kinetics, determination of kinetic constants, and statistical processing of measurement data. | | | [SW4] test/exam - oral or written | |

| Subject contents | <p>F1. Structural Proteins of the ECM and Cytoskeleton (models collagen, myosin, actomyosin)</p> <p>F2. Monomeric and Oligomeric Proteins (models myoglobin and hemoglobin)</p> <p>F3. Enzymes</p> <ul style="list-style-type: none"> • kinetics • catalytic strategies • regulatory strategies <p>F4. Cell Membranes</p> <ul style="list-style-type: none"> • description of thermodynamic equilibria/non-equilibria, simple diffusion, Fick's law, • membrane permeability, simple diffusion through membranes, facilitated diffusion, osmosis, diffusion of charged particles (electrochemical potential), Donnan equilibrium, membrane potential, • active transport, ion transport and its connection to membrane potential and the use of energy stored in the ion gradient for selected cellular processes (nerve impulse transmission, colorless vision process, ATP synthesis, etc.) • membrane channels and pumps <p>F5. Basics of Structure and Function of Cellular Receptors and Signal Transducers</p> <ul style="list-style-type: none"> • ligands, receptors, activation, and inhibition of proteins • main types of signaling pathways, biological effects of signaling | | | | | | | | | | | |
|--|---|--|--|--------------------------|-------------------|-------------------------------|-------|-------|-------|------------------|------|-------|
| Prerequisites and co-requisites | | | | | | | | | | | | |
| Assessment methods and criteria | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Subject passing criteria</th> <th style="width: 30%;">Passing threshold</th> <th style="width: 30%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>F1-F5</td> <td>40.0%</td> <td>60.0%</td> </tr> <tr> <td>Integration exam</td> <td>0.0%</td> <td>40.0%</td> </tr> </tbody> </table> | | | Subject passing criteria | Passing threshold | Percentage of the final grade | F1-F5 | 40.0% | 60.0% | Integration exam | 0.0% | 40.0% |
| Subject passing criteria | Passing threshold | Percentage of the final grade | | | | | | | | | | |
| F1-F5 | 40.0% | 60.0% | | | | | | | | | | |
| Integration exam | 0.0% | 40.0% | | | | | | | | | | |
| Recommended reading | Basic literature | <ul style="list-style-type: none"> • Basics of Biophysics. A Textbook for Medical Students, edited by Andrzej Pilawski, PZWŁ • Biophysics for Biologists. Edited by M. Bryszewska, W. Leyko, PWN • Molecular Biology of the Cell, Fifth Edition (or newer - we currently have the fifth edition), by Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, and Peter Walter, Garland Science Publishing, 2008. • Molecular Cell Biology, Fifth Edition (or newer), by Harvey Lodish, Arnold Berk, Paul Matsudaira, Chris A. Kaiser, Monty Krieger, Matthew P. Scott, Freeman W. H. & Company Publishing, 2003. | | | | | | | | | | |
| | Supplementary literature | Materials independently searched for and selected by students for the classes using library resources and electronic information sources | | | | | | | | | | |
| | eResources addresses | Adresy na platformie eNauczanie: | | | | | | | | | | |
| Example issues/ example questions/ tasks being completed | | | | | | | | | | | | |
| Work placement | Not applicable | | | | | | | | | | | |

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