



## Subject card

|                                             |                                                                                                                                                                                                            |                                                          |                                                                                                                                                                                                              |                                     |                                                                                                                      |            |     |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------|------------|-----|
| Subject name and code                       | Biochemistry, PG_00037491                                                                                                                                                                                  |                                                          |                                                                                                                                                                                                              |                                     |                                                                                                                      |            |     |
| Field of study                              | Biotechnology                                                                                                                                                                                              |                                                          |                                                                                                                                                                                                              |                                     |                                                                                                                      |            |     |
| Date of commencement of studies             | October 2024                                                                                                                                                                                               |                                                          | Academic year of realisation of subject                                                                                                                                                                      |                                     | 2026/2027                                                                                                            |            |     |
| Education level                             | first-cycle 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                               | 3                                                                                                                                                                                                          |                                                          | Language of instruction                                                                                                                                                                                      |                                     | Polish                                                                                                               |            |     |
| Semester of study                           | 5                                                                                                                                                                                                          |                                                          | ECTS credits                                                                                                                                                                                                 |                                     | 6.0                                                                                                                  |            |     |
| Learning profile                            | general academic profile                                                                                                                                                                                   |                                                          | Assessment form                                                                                                                                                                                              |                                     | exam                                                                                                                 |            |     |
| Conducting unit                             | Department of Pharmaceutical Technology and Biochemistry -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology                                                                           |                                                          |                                                                                                                                                                                                              |                                     |                                                                                                                      |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor                                                                                                                                                                                         |                                                          | dr hab. inż. Iwona Gabriel                                                                                                                                                                                   |                                     |                                                                                                                      |            |     |
|                                             | Teachers                                                                                                                                                                                                   |                                                          | dr hab. inż. Iwona Gabriel<br>dr hab. inż. Agnieszka Potęga                                                                                                                                                  |                                     |                                                                                                                      |            |     |
| Lesson types                                | Lesson type                                                                                                                                                                                                | Lecture                                                  | Tutorial                                                                                                                                                                                                     | Laboratory                          | Project                                                                                                              | Seminar    | SUM |
|                                             | Number of study hours                                                                                                                                                                                      | 60.0                                                     | 15.0                                                                                                                                                                                                         | 0.0                                 | 0.0                                                                                                                  | 0.0        | 75  |
|                                             | E-learning hours included: 0.0                                                                                                                                                                             |                                                          |                                                                                                                                                                                                              |                                     |                                                                                                                      |            |     |
|                                             | eNauczanie source addresses:<br>Moodle ID: 7537 BIOCHEMIA_V_26/27<br><a href="https://enauczanie.pg.edu.pl/2025/course/view.php?id=7537">https://enauczanie.pg.edu.pl/2025/course/view.php?id=7537</a>     |                                                          |                                                                                                                                                                                                              |                                     |                                                                                                                      |            |     |
| 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                                                                                                                                                                                      | 75                                                       |                                                                                                                                                                                                              | 10.0                                |                                                                                                                      | 65.0       | 150 |
| Subject objectives                          | To know the background knowledge about the function of living organisms in the field of biochemical data, means in the field of chemical structures, physicochemical interactions and biological processes |                                                          |                                                                                                                                                                                                              |                                     |                                                                                                                      |            |     |
| Learning outcomes                           | Course outcome                                                                                                                                                                                             |                                                          | Subject outcome                                                                                                                                                                                              |                                     | Method of verification                                                                                               |            |     |
|                                             | K6_W05                                                                                                                                                                                                     |                                                          | Know the background about the function of living organisms on the level of biochemical processes, The student is familiar with the physical and biochemical principles of biocatalysis.                      |                                     | [SW1] Assessment of factual knowledge<br>[SW2] Assessment of knowledge contained in presentation                     |            |     |
|                                             | K6_W06                                                                                                                                                                                                     |                                                          | The student is familiar with the major metabolic pathways and is able to assess the consequences of metabolic disorders. The student understands the basic principles of the structure of biomacromolecules. |                                     | [SW2] Assessment of knowledge contained in presentation<br>[SW1] Assessment of factual knowledge                     |            |     |

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| Subject contents                                               | Course content – lecture<br>1. Introduction<br><br>2. Proteins, the structures and functions.<br><br>4. Enzymes, the catalytic and and regulatory strategy,<br><br>5. Carbohydrates, structures, physiological function, binding with the membrane proteins.<br><br>6. Lipids in the function of biological membranes,<br><br>7. Metabolic transformations in the cell, ATP in the role of the universal energy transporter,<br><br>8. Glicolysis pathway and gluconeogenesis,<br><br>9. Cytric acid cycle, Synthesis of acetylcoenzymeA, the stechiometry and control mechanisms,<br><br>10. Lipid acids metabolism, degradation and biosynthesis. CoA activation, carnityne function. Biodegradation versus biosynthesis pathways.<br><br>11. The metabolism of nitrogen. The level regulations of proteins and aminoacids<br><br>12.The integration of metabolic processesin the living organism<br><br>Course content – exercises<br><b>Biochemistry exercises</b> : The aim is to learn students the effective methods of biochemical process calculations. There is crucial for the preparation of the solutions with proper concentration for biochemical experiments as the rate of biochemical transformations or the molecular mechanisms of biochemical processes |                                                                                                                                                       |                               |
| Prerequisites and co-requisites                                | The background knowledge in the field of biology, chemistry and physics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                       |                               |
| Assessment methods and criteria                                | Subject passing criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Passing threshold                                                                                                                                     | Percentage of the final grade |
|                                                                | calculation exercises -tests                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 60.0%                                                                                                                                                 | 20.0%                         |
|                                                                | Writting exam                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 60.0%                                                                                                                                                 | 80.0%                         |
| Recommended reading                                            | Basic literature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | J.M.Berg, J.L.Tymoczko, L.Stryer, Biochemistry, English version<br><br>J.L.Tymoczko, J.M.Berg, L.Stryer, Biochemistry, short edition, English version |                               |
|                                                                | Supplementary literature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                       |                               |
|                                                                | eResources addresses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                       |                               |
| Example issues/<br>example questions/<br>tasks being completed | 1. Which tricarbon molecules are formed by the degradation of fructoso-1,6-bisfosforan?<br><br>2. Fosfogliceromutase is responsible for the reaction .....What is it role in the glycolysis<br><br>3. Present the role of electron transfer from the cytric acid cycle by oxidative phosphorylation to ATP synthesis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                       |                               |
| Practical activites within the subject                         | Not applicable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                       |                               |

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