



Subject card

|   |   |  |   |                                     |  |            |     |
|---|---|--|---|-------------------------------------|--|------------|-----|
| Subject name and code                       | Basic Pharmacology, PG_00037514   |  |   |                                     |  |            |     |
| Field of study                              | Biotechnology   |  |   |                                     |  |            |     |
| Date of commencement of studies             | October 2021  | Academic year of realisation of subject                  |   |                                     | 2023/2024  |            |     |
| Education level                             | first-cycle studies   | Subject group  |   |                                     | 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                           | 6   | ECTS credits   |   |                                     | 2.0  |            |     |
| Learning profile                            | general academic profile  | Assessment form  |   |                                     | assessment   |            |     |
| Conducting unit                             | Department of Pharmaceutical Technology and Biochemistry -> Faculty of Chemistry  |  |   |                                     |  |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor  | dr inż. Agnieszka Potęga                                 |   |                                     |  |            |     |
|   | Teachers  | dr inż. Agnieszka Potęga                                 |   |                                     |  |            |     |
| Lesson types and methods of instruction     | Lesson type   | Lecture  | Tutorial  | Laboratory                          | Project  | Seminar    | SUM |
|   | Number of study hours   | 30.0   | 0.0   | 0.0                                 | 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   |   | 2.0                                 |  | 18.0       | 50  |
| Subject objectives                          | Extending the knowledge of pharmaceutical substances in the field of pharmacology, with particular emphasis on pharmacokinetics and pharmacodynamics. Understanding the fate of the drug in the body and the relationship between the dose and the pharmacological effect of the drug. Getting to know the form of the drug and methods of creating the form of the drug. |  |   |                                     |  |            |     |
| Learning outcomes                           | Course outcome  |  | Subject outcome   |                                     | Method of verification   |            |     |
|   | K6_W05  |  | The student acquires knowledge in the field of pharmacokinetics, pharmacodynamics and side effects of medicinal substances, can present the basic mechanisms of action of drugs, describes the stages of drug research, characterizes various types of drugs and methods of obtaining them. |                                     | [SW1] Assessment of factual knowledge<br>[SW2] Assessment of knowledge contained in presentation                           |            |     |
|   | K6_U02  |  | The student can use his knowledge of basic subjects to predict the behavior of medicinal substances in biological systems.  |                                     | [SU3] Assessment of ability to use knowledge gained from the subject<br>[SU2] Assessment of ability to analyse information |            |     |

| Subject contents   | <ul style="list-style-type: none"> <li>• <b>Introductory information</b> - definitions (active substance, drug, poison, potency, efficacy, pharmacology), drug action (pharmaceutical phase, pharmacokinetic phase, pharmacodynamic phase), methods and places of drug administration.</li> <li>• <b>Drug absorption and transport across membranes</b> - barriers to be crossed during absorption, absorption and transport mechanisms (passive diffusion, facilitated diffusion, active transport, pinocytosis, phagocytosis, persorption), transport proteins (for medicinal substances).</li> <li>• <b>Distribution of the drug in the body</b> - compartments, protein binding, distribution factors.</li> <li>• <b>Biotransformation</b> - phase I reactions (oxidation, reduction, hydrolysis, decarboxylation), phase II reactions (conjugation with endogenous substrates), induction of drug transporting and metabolizing proteins, first pass effect, inhibition of enzymatic activity, bioinactivation and bioactivation, factors influencing biotransformation.</li> <li>• <b>Excretion.</b></li> <li>• <b>Pharmacokinetics</b> - pharmacokinetic parameters (bioavailability, bioequivalence, elimination half-life, minimal therapeutic concentration and minimal toxic concentration) and pharmacokinetic models (one-compartment model, two- or multi-compartment model, changes in plasma concentration after intravenous and oral administration, pharmacokinetics in special situations - pathological conditions, the elderly).</li> <li>• Pharmacodynamics - mechanisms of drug action, pharmacological action through receptors (the concept of a receptor, types and subtypes of receptors, receptor reserve, agonists and antagonists, ion channels).</li> <li>• <b>Dosage and drug action dependence on dose or concentration</b> - dependence curves, indices and pharmacological values.</li> <li>• <b>Adverse drug reactions</b> - drug allergic reactions, side effects, drug dependence, drug interactions.</li> <li>• <b>Gene and antisense therapy.</b></li> <li>• <b>Searching for and testing new drugs</b> - preclinical and clinical trials, placebo action, types of drug testing.</li> <li>• <b>Applied pharmacy</b> - drug forms and methods of preparation (powders, granules, tablets, capsules, liposomes, microspheres, medicinal aerosols, syrups, ointments, creams, parenteral drugs), drug administration routes, injection drug form technology (ampoules, vials).</li> </ul> |  |  |                          |                   |                               |  |       |       |  |       |       |
|--|---|--|--|--------------------------|-------------------|-------------------------------|--|-------|-------|--|-------|-------|
| Prerequisites and co-requisites                                | Basic knowledge of biochemistry and enzymology.   |  |  |                          |                   |                               |  |       |       |  |       |       |
| Assessment methods and criteria                                | <table border="1"> <thead> <tr> <th>Subject passing criteria</th> <th>Passing threshold</th> <th>Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>Written test, part 2 - lecture material 6 - 9.</td> <td>60.0%</td> <td>50.0%</td> </tr> <tr> <td>Written test, part 1 - lecture material 1 - 5.</td> <td>60.0%</td> <td>50.0%</td> </tr> </tbody> </table>  |  |  | Subject passing criteria | Passing threshold | Percentage of the final grade | Written test, part 2 - lecture material 6 - 9. | 60.0% | 50.0% | Written test, part 1 - lecture material 1 - 5. | 60.0% | 50.0% |
| Subject passing criteria                                       | Passing threshold   | Percentage of the final grade  |  |                          |                   |                               |  |       |       |  |       |       |
| Written test, part 2 - lecture material 6 - 9.                 | 60.0%   | 50.0%  |  |                          |                   |                               |  |       |       |  |       |       |
| Written test, part 1 - lecture material 1 - 5.                 | 60.0%   | 50.0%  |  |                          |                   |                               |  |       |       |  |       |       |
| Recommended reading  | Basic literature  | <ol style="list-style-type: none"> <li>1. E. Mutschler, G. Geisslinger, H.J. Kroemer, P. Ruth, M. Schäfer-Korting. Farmakologia i toksykologia. Podręcznik. Wydanie III polskie poprawione i uzupełnione. Redakcja naukowa W. Buczko. MedPharm Polska 2013.</li> <li>2. S. Janicki, A. Fiebiga, M. Sznitowska. Farmacja stosowana. Podręcznik dla studentów farmacji. Wydawnictwo Lekarskie PZWL. Warszawa 2012, wydanie 4.</li> </ol> |  |                          |                   |                               |  |       |       |  |       |       |
|  | Supplementary literature  | Review papers in scientific journals provided by the lecturer.   |  |                          |                   |                               |  |       |       |  |       |       |
|  | eResources addresses  | Adresy na platformie eNauczanie:<br>Elementy farmakologii - wykład, Biotechnologia sem. VI, 2023/2024 - Moodle ID: 19545<br><a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=19545">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=19545</a>  |  |                          |                   |                               |  |       |       |  |       |       |
| Example issues/<br>example questions/<br>tasks being completed | Sample questions:<br><br><ol style="list-style-type: none"> <li>1. Define the terms: AUC and drug bioavailability - show how these kinetic parameters can be determined.</li> <li>2. List the mechanisms of transport and absorption through biological membranes. Characterize active transport.</li> <li>3. List the main enzymes of phase I and II metabolism. Characterize the physiological function of one family of isoenzymes from each group, also giving examples of catalyzed reactions.</li> </ol>  |  |  |                          |                   |                               |  |       |       |  |       |       |
| Work placement   | Not applicable  |  |  |                          |                   |                               |  |       |       |  |       |       |