University of Gdańsk

Subject card

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| Subject name and code | Biotechnology in medicine - Therapies and medical technologies Fundaments (M05_B3), PG_00196945 | | |
| Field of study | Biotechnology | | |
| 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>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 | 4.0 |
| Learning profile | academic | Assessment form | exam |
| Conducting unit | Intercollegiate Faculty of Biotechnology UG-MUG -> Rector | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr Grzegorz Stasiłojć | |
| | Teachers | | |

| Lesson types | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|---|
| | Number of study hours | 48.0 | 0.0 | 0.0 | 0.0 | 0.0 | 48 |
| | 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 | 48 | 5.0 | 47.0 | 100 |

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| Subject objectives | Block 3's primary goal is to get students ready to comprehend the fundamentals of medical biotechnology, with a focus on the function of medications and the use of contemporary research methods. Additionally, it seeks to provide students with the information they need to evaluate the moral implications of the advancement and use of biotechnology in medicine. |

Learning outcomes

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [BIOTECHL3_W09] The graduate possesses structured and advanced knowledge of the terminology and concepts used in biological and medical sciences and related disciplines. | The student is comfortable with the terminology of molecular biology, pharmaceutics, genetics and statistics, accurately describing phenomena and processes related to drug action, stem cells, gene therapy and other biomedical issues.<br>He has extensive terminological knowledge of biotechnology, covering concepts related to bioavailability, pharmacokinetics, proteomics, molecular diagnostics and the ethics of biomedical research. | [SW4] test/exam - oral or written<br>[SW2] presentation/project/paper/ report |
| [BIOTECHL3_K03] The graduate is willing to understand risks and dilemmas, including ethical dilemmas related to conducting scientific research and introducing advanced technologies using the achievements of biotechnology; understand and appreciate the importance of intellectual property; behave ethically. | The student identifies important moral dilemmas pertaining to the advancement and use of biotechnology, such as:<br>The risks associated with organism genetic modification<br>Concerns about using animals in laboratories<br>Problems relating to gene and cell therapy<br>Intellectual property and patent issues pertaining to biotechnological discoveries<br>The development of biotechnology in social and economic aspects<br>Student examine how biotechnology research and applications may affect society, ethics, and the environment.<br>The student assess different ethical viewpoints on contentious biotechnology issues. | [SK1] oral statement/conversation/ discussion<br>[SK3] text preparation/written work<br>[SK4] test/exam - oral or written |
| [BIOTECHL3_W07] The graduate has advanced knowledge of the rules of operation and the possibilities of using research techniques and tools used in biotechnology. | The student possesses advanced knowledge of medical biotechnology, including familiarity with modern research techniques, bioinformatics tools, and principles of experimental design. They can appropriately apply this knowledge to analyze research problems and evaluate research results published in the scientific literature. | [SW4] test/exam - oral or written<br>[SW2] presentation/project/paper/ report |
| [BIOTECHL3_W01] The graduate possesses structured and advanced knowledge of biological phenomena at the molecular level and understands their importance for biotechnology. | The student understands advanced biological processes occurring at the molecular and cellular levels and their relevance to medical biotechnology. | [SW4] test/exam - oral or written<br>[SW2] presentation/project/paper/ report |
| [BIOTECHL3_W06] The graduate possesses structured and advanced knowledge of exact and natural sciences necessary to understand biological phenomena and processes, in particular cellular processes at the molecular level. | With particular reference to novel drug development, gene therapies, and tissue engineering, the student demonstrates the ability to apply his understanding of science and the life sciences to the analysis and interpretation of biological effects at the molecular level. Student is qualified to discuss how drugs work, how stem cells aid in tissue repair, and how molecular diagnostic methods are used in medicine. | [SW4] test/exam - oral or written<br>[SW2] presentation/project/paper/ report |

<table>
<tr><td>Subject contents</td><td>
• F1. Drug knowledge<br>
1. Drugs and their forms<br>
2. Bioavailability and pharmacokinetics of the drug substance<br>
3. Generic drugs, bioequivalence<br>
• F2. Methods and processes used in medical biotechnology<br>
1. Medical concepts.<br>
2. Regulation of stem cell function. Stem cells in medical biotechnology.<br>
3. Tissue engineering.<br>
4. Pharmacogenetics and pharmacogenomics.<br>
5. Molecular diagnostics and pharmacodiagnostics.<br>
6. Proteomics. Identification of new therapeutic targets.<br>
7. Search for new molecular targets - clinical trials.<br>
8. Recombinant vaccines.<br>
9. Antibodies in biotechnology and immunotherapy.<br>
10. Genetic modifications of cells and organisms.<br>
11. Concepts related to the use of laboratory animals in biotechnology and medicine.<br>
12. Gene therapy.<br>
13. Law regulations regarding CGT. Ethical controversies surrounding medical biotechnology.<br>
• F3. Application of selected methods of statistical analysis in biotechnology.<br>
1. Stages of statistical investigation. Descriptive statistics.<br>
2. Formulation and verification of statistical hypotheses.<br>
3. Selected issues of statistical inference<br>
4. Parametric and nonparametric tests<br>
5. Tests used to compare two samples and their non-parametric counterparts<br>
6. One-way analysis of variance (ANOVA) and its nonparametric counterparts<br>
7. Introduction to qualitative data analysis and interdependence of phenomena
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<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Comprehensive integrating exam</td><td>50.0%</td><td>40.0%</td></tr>
<tr><td>F1-F3</td><td>51.0%</td><td>60.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>• Materials provided by the lecturer<br>• Literature sources provided in the lecture materials<br>• Małgorzata Sznitowska, Roman Kaliszan, Biopharmaceutics, Publisher: Edra Urban & Partner, 2013</td></tr>
<tr><td>Supplementary literature</td><td>• European Pharmacopoeia<br>• International Conference on Harmonization (ICH) http://www.ich.org/<br>• Food & Drug Administration (FDA) - Generic Drugs http://www.fda.gov<br>• Andrzej Balicki, Wieslaw Makać, Methods of statistical inference, UG Publishing House, Gdansk 2004<br>• Self-researched and selected materials on classes using library resources and electronic sources of information</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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