



## Subject card

|   |   |  |                                     |            |  |         |     |
|---|---|--|-------------------------------------|------------|--|---------|-----|
| Subject name and code                       | Model Organisms, PG_00058236  |  |                                     |            |  |         |     |
| Field of study                              | Biotechnology   |  |                                     |            |  |         |     |
| Date of commencement of studies             | October 2023  | Academic year of realisation of subject                            |                                     |            | 2023/2024                                      |         |     |
| Education level                             | second-cycle studies  | Subject group  |                                     |            | Obligatory subject group in the field of study |         |     |
| 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                            | general academic profile  | Assessment form  |                                     |            | assessment                                     |         |     |
| Conducting unit                             | Department of Microbiology -> Faculty of Chemistry  |  |                                     |            |  |         |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor  | dr inż. Martyna Mroczyńska-Szeląg                                  |                                     |            |  |         |     |
|   | Teachers  | dr inż. Martyna Mroczyńska-Szeląg<br>dr hab. Beata Zalewska-Piątek |                                     |            |  |         |     |
| Lesson types and methods of instruction     | Lesson type   | Lecture  | Tutorial                            | Laboratory | Project  | Seminar | SUM |
|   | Number of study hours   | 15.0   | 0.0                                 | 15.0       | 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                          | The aim of the course is to gain knowledge by the student about model organisms, their rational use and ethical issues related to their use and the principles of conducting research with their use. In order to test their knowledge in practice, students will solve a research problem, which will consist in the selection of a model organism and its justification for the proposed research, as well as the preparation and description of the proposed experiment. |  |                                     |            |  |         |     |

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| Learning outcomes                                      | Course outcome  | Subject outcome  | Method of verification   |
|  | [K7_K04] is aware of the need to solve problems and perform tasks, independently formulate questions to solve a given problem or task; is able to plan the execution of a larger task by dividing it into partial tasks and draw up an appropriate schedule   | The student is able to pose appropriate theses and questions that will first allow the selection of the appropriate model of the organism for research. He can plan individual tasks and select control groups. The student knows the ethical aspects related to the use of model organisms.   | [SK5] Assessment of ability to solve problems that arise in practice |
|  | [K7_W03] has a structured knowledge of biotechnological applications of model organisms, microorganisms and viruses in the context of conducting bioprocesses and obtaining desired substances  | The student has knowledge of model organisms from various groups of organisms, e.g. bacteria, fungi, invertebrates and vertebrates. The student understands the risks associated with the use of model organisms.  | [SW3] Assessment of knowledge contained in written work and projects |
|  | [K7_U03] can propose applications of model organisms, microorganisms, viruses and biomolecules derived from them to perform bioprocesses and obtain desired substances  | The student is able to determine the advantages and disadvantages of individual model organisms. The student is able to choose the appropriate model organism for research in order to obtain reliable results.  | [SU5] Assessment of ability to present the results of task           |
|  | [K7_U09] is able to design experiments and analyze experimental results, is able to prepare and present papers, reports, documentation of experiments, technological processes using correct scientific and specialist terminology, and to prepare a correct bibliography   | Students can design an experiment using a model organism, carry out measurements, read the results, then analyze the collected data and draw conclusions.  | [SU4] Assessment of ability to use methods and tools                 |
| Subject contents                                       | First research using model organisms. Advantages, disadvantages and problems of using model organisms. How to choose the right model organism. Model bacteria and their applications. Mechanisms of cell infection and pathogenesis using viral models. Model mushrooms and their application. Archaea, protists as model organisms and their application. Invertebrates as new models for studying infections and toxicity of compounds. Vertebrates as model organisms in research on organogenesis, physiology, immunology and biomedical research. Potentially new model organisms, e.g. <i>Stephanopyxis turris</i> , <i>Stentor coeruleus</i> , <i>Naegleria Grubri</i> . |  |  |
| Prerequisites and co-requisites                        | The student must have knowledge about the hazards while working in a microbiological laboratory, and be able to use basic microbiological techniques. Therefore, it is advisable for the student to pass the subject of general microbiology.   |  |  |
| Assessment methods and criteria                        | Subject passing criteria  | Passing threshold  | Percentage of the final grade  |
|  | The percentage share in the final grade is 50% for lectures and laboratories. Lecture components: colloquium + project task; component laboratories: reports  | 60.0%  | 100.0%   |
| Recommended reading                                    | Basic literature  | Brylińska J., Kwiatkowska J. Laboratory animals. Methods of breeding and experiments. UNIVERSITAS, Krakow, 1996<br><br>Ankeny, Rachel A., and Sabina Leonelli. <i>Model organisms</i> . Cambridge University Press, 2020.<br><br>Striedter, Georg. <i>Model Systems in Biology: History, Philosophy, and Practical Concerns</i> . MIT Press, 202 |  |
|  | Supplementary literature  | Greczek-Stachura, Magdalena. Paramecium as a model organism in pharmacological research. Scientific Publishing House of the Pedagogical University, Kraków, 2013.  |  |
|  | eResources addresses  | Adresy na platformie eNauczenie:<br>Organizmy Modelowe 2023/2024 - Moodle ID: 36246<br><a href="https://enauczenie.pg.edu.pl/moodle/course/view.php?id=36246">https://enauczenie.pg.edu.pl/moodle/course/view.php?id=36246</a>   |  |
| Example issues/example questions/tasks being completed | 1. Experiments with which model organisms require approval from the ethics committee? 2. List the advantages of <i>G. mellonella</i> as a model organism. 3. Describe one experiment you know of using an invertebrate model organism.  |  |  |
| Work placement   | Not applicable  |  |  |