GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Subject name and code | Microbiological aspects of ecosystems, PG_00057551 | | | | | | |
| Field of study | Green Technologies | | | | | | |
| Date of commencement of studies | October 2024 | | Academic year of realisation of subject | 2024/2025 | | | |
| 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 | 1 | | Language of instruction | Polish | | | |
| Semester of study | 2 | | ECTS credits | 4.0 | | | |
| 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 hab. inż. Anna Brillowska-Dąbrowska | | | | |
| | Teachers | | | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 30.0 | 0.0 | 30.0 | 0.0 | 0.0 | 60 |
| | 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 | 60 | | 5.0 | 35.0 | | 100 |
| Subject objectives | The aim of the lectures on the subject "Microbiological aspects of ecosystems" is to familiarize students with the role and importance of microorganisms in ecosystems and with scientific methods of research and evaluation of microorganisms in the environment. Lectures are designed to introduce the basic concepts and mechanisms of microbial ecology, as well as the application of this information in practice, such as environmental cleanup, food production, microbiological research and much more. | | | | | | |

| Learning outcomes | Course outcome | Subject outcome | Method of verification |
|---|---|---|---|
| | [K6_W03] has a basic knowledge of soil, air and water pollutants, design and supervision of environmentally friendly technologies and technologies which do not produce waste, knows technology of cleaning and neutralization of industrial waste and wastewater management, has a basic understanding of the theoretical basis of methods and types of apparatus used in chemical analysis of environmental pollutants | The student is able to:<br>understand the basic concepts related to the protection of soil, air and water against pollution,<br>know environmentally friendly technologies and waste-free technologies, technologies for purification and neutralization of industrial waste as well as water and sewage management,<br>know the basic analytical methods used in the study of environmental pollution and the types of apparatus used in the analysis,<br>skillfully supervise and implement environmental protection technologies in practice | [SW1] Assessment of factual knowledge |
| | [K6_W04] is aware of the importance of environmental protection and has a basic knowledge of chemical and biological threats to the environment, with particular emphasis on anthropogenic factors, has a basic knowledge of knowledge of the principles of sustainable development as well as national and European environmental management conditions. | The student understands the meaning of:<br>acquiring basic knowledge in the field of environmental protection and chemical and biological threats to the environment, with particular emphasis on anthropogenic factors,<br>understanding the importance of environmental protection and the need to care for the natural environment | [SW1] Assessment of factual knowledge |
| | [K6_K02] is aware of the social role of a technical college graduate, take the reflections on the ethical, scientific and social aspects of the work performed, understands the need to promote, formulating and providing the public with information and opinions concerning the activities of the profession of engineer. | The student understands:<br>understands the social role of an engineer and is aware of his place in society,<br>reflects on ethical, scientific and social aspects related to the work performed, and is able to take them into account in his activities,<br>is aware of the need to promote and provide the public with information and opinions on engineering activities and their impact on the surrounding environment | [SK4] Assessment of communication skills, including language correctness<br>[SK1] Assessment of group work skills |
| | [K6_U02] is able to operate equipment and perform typical analyzes of studies of environmental pollution, is able to carry out an analysis of typical environmental pollution and simple devices according to specification | The student is able to:<br>operate typical laboratory equipment used in environmental pollution research and perform analyzes in accordance with established procedures,<br>modify existing environmental protection technologies and design new ones tailored to specific needs and requirements | [SU3] Assessment of ability to use knowledge gained from the subject<br>[SU4] Assessment of ability to use methods and tools |
| | [K6_U04] capable of formulating and solving design tasks in the field of environmental technology to recognize their non-technical aspects, including environmental, economic and legal. Is capable of applying the principles of occupational health and safety. Is able to make initial assessment of engineering solutions and actions | The student is able to:<br>identify and take into account non-technical aspects in formulating and solving design problems in the field of environmental protection, such as environmental, economic and legal, | [SU2] Assessment of ability to analyse information<br>[SU3] Assessment of ability to use knowledge gained from the subject |

**Subject contents**

Lectures:

1. Microbiological bases of ecosystems Interactions of microorganisms in the environment
2. Microbial ecology
3. The carbon cycle and microorganisms in the soil
4. Physiology of microorganisms in the environment
5. Metabolism of microorganisms in the environment
6. Bacteria chemically cleaning the environment
7. Water microbiology and its application in purification
8. Ecology of microorganisms in the aquatic environment
9. Soil microbiology and its importance in food production
10. Bioremediation of contaminated soils
11. Microorganisms as bioindicators of environmental quality
12. The influence of microorganisms on human health
13. Air microbiology and its relation to diseases

Laboratory classes:

1. Methods of isolation and cultivation of microorganisms from various environments
2. Microscopy and identification of microorganisms
3. Determination of the activity of microorganisms in the soil
4. Determination of the activity of microorganisms in water
5. Biochemical analysis of microorganisms in the environment
6. Spectroscopic analysis of microorganisms
7. Determination of the influence of pH on the development of microorganisms Antibiotic sensitivity tests of microorganisms
8. Microbiological determination of water quality
9. Analysis of microorganisms in the air
10. Cultivation of microorganisms in controlled environmental conditions
11. Evaluation of the effectiveness of bacteria chemically purifying the environment
12. Study of the influence of microorganisms on plant growth
13. Study of qualitative and quantitative changes of microorganisms in the fermentation process
14. Analysis of the composition of the intestinal microflora.

**Prerequisites and co-requisites**

**Assessment methods and criteria**

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| lecture: test 1 and test 2 | 60.0% | 60.0% |
| lab: average of 6 test entries | 60.0% | 40.0% |

**Recommended reading**

| | |
|---|---|
| Basic literature | Scientific publications indicated by the teacher |
| Supplementary literature | not applicable |
| eResources addresses | Adresy na platformie eNauczanie: |

**Example issues/ example questions/ tasks being completed**

- anthropogenic factors affecting the quality of air, water and soil,
- the role of microorganisms in ecological processes

**Work placement**

Not applicable