



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Microbiology [S1IFar2>Mikrobio]

### Course

Field of study

Pharmaceutical Engineering

Year/Semester

1/1

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

### Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

### Number of credit points

2,00

### Coordinators

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### Lecturers

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### Prerequisites

Students entering the course should have well-grounded theoretical and practical knowledge in the field of biology and chemistry at the high school level.

### Course objective

Teaching microbiology aims to equip students with theoretical knowledge and practical skills necessary for the proper performance of the profession, as well as in the pharmaceutical, cosmetics, food, and other industries. Students are acquainted with selected issues in general microbiology, pharmaceutical microbiology, elements of medical microbiology and in the field of techniques for detection, determination and eradication of microorganisms.

## Course-related learning outcomes

### Knowledge:

1. Has knowledge of the physicochemical and biological basis of health sciences in the scope relevant to pharmaceutical engineering, including basic issues in the field of microbiology [K\_W5]
2. Knows pharmacopoeial requirements for assessing the microbiological quality of medicinal substances and products [K\_W25]

### Skills:

1. Has the ability to conduct pharmaceutical tests of pharmaceutically active substances and medicinal products in terms of microbiological purity [K\_U10]
2. Selects and applies analytical methods and techniques in the qualitative and quantitative analysis of the quality of raw materials and products in terms of microbiological purity [K\_U11]
3. In a professional and research environment, is able to plan and organize individual and team work and work both individually and in a team [K\_U25]

### Social competences:

1. Is ready to critically assess knowledge, understands the need for further education, supplementing specialization knowledge, and raising his professional competences in the field of microbiology [K\_K1]

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The form of assessment of Microbiology laboratories is two partial tests. A student can receive 0-20 points from each colloquium. The colloquia will include questions in the form of a test, completion, answer assignment and short open questions. The condition for passing the exercises is to obtain a minimum of 24 points from the partial tests.

If the student receives less than 24 points from the partial tests, the student has the right to take the initial test, which covers all the theoretical material discussed during the classes. Obtaining a result of at least 60% of the points in this colloquium results in receiving 24 points.

The grade for the laboratories will be based on the following points:

- 24 - 27 points - rating 3.0
- 27.5 - 30 points - rating 3.5
- 30.5 - 33 points - rating 4.0
- 33.5 - 36 points - rating 4.5
- 36.5 - 40 points - rating 5.0

The lecture colloquium will include questions in the form of a test, completion and assignment of answers, and open questions on issues discussed during the lectures. The colloquium will be graded on a scale of 0-60 points.

Passing the lecture colloquium takes place when a minimum of 36 points are obtained.

The grade for the lectures will be based on the following points:

- 36 - 40.5 points - rating 3.0
- 41 - 45 points - rating 3.5
- 45.5 - 50 points - rating 4.0
- 50.5 - 54 points - rating 4.5
- 54.5 - 60 points - rating 5.0

## Programme content

The program includes the following topics:

1. Characteristics of selected microorganisms.
2. Classification of microorganisms.
3. Structure and properties of microorganisms. Genetics of microorganisms.
4. Nutritional requirements and metabolism.
5. Genetic engineering based on microbiological models.
6. Microorganisms in biotechnological processes.
7. Methods for assessing the microbiological quality of medicinal products, pharmaceutical raw materials, dietary supplements and cosmetics.
8. Microbiological assessment of the manufacturing environment.

## Course topics

#### Lectures:

1. Characteristics of microorganisms: bacteria, fungi and viruses.
2. Classification of microorganisms.
3. Structure and properties of microorganisms. Genetics of microorganisms.
4. Nutritional requirements and metabolism.
5. Genetic engineering based on microbiological models.
6. Microorganisms in biotechnological processes.

#### Laboratories:

1. The influence of physical and chemical factors on the growth of microorganisms, breeding methods.
2. Assessment of microbial metabolism, basics of microbial identification.
3. Determination of the number of microorganisms.
4. Methods of reducing the number and eradication of microorganisms
5. Pharmacopoeial methods for assessing the microbiological quality of medicinal products and pharmaceutical raw materials.
6. Assessment of the microbiological quality of dietary supplements and cosmetics.
7. Microbiological assessment of the production environment (production hygiene, microbiological control).

#### Teaching methods

1. Lecture: multimedia presentation, illustrated with examples, discussion.
2. Laboratory exercises: demonstration of examples of experiments, analysis of complementary cases, the performance of tasks given by the teacher - practical exercises, and discussion.

#### Bibliography

##### Basic:

1. Hans G. Schlegel Mikrobiologia ogólna , PWN, 2008.
2. Krystyna Kowal, Zdzisława Libudzisz, Zofia Żakowska Mikrobiologia techniczna. Tom 1 i 2 , PWN, 2008.
3. Materiały dydaktyczne opracowane w Katedrze i Zakładzie Genetyki i Mikrobiologii Farmaceutycznej

##### Additional:

1. Urząd Rejestracji Produktów Leczniczych FARMAKOPEA POLSKA XIII , Urząd Rejestracji Produktów Leczniczych, 2023.

#### Breakdown of average student's workload

	Hours	ECTS
Total workload	55	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	25	1,00