



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Microbiology

Course

Field of study

Pharmaceutical Engineering

Area of study (specialization)

-

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

1/1

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

Number of hours

Lecture

15

Tutorials

Laboratory classes

15

Projects/seminars

Other (e.g. online)

0

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

prof. dr hab. n. med. Marzena Gajęcka

Responsible for the course/lecturer:

dr n. med. Dorota Nowak-Malczewska

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 ordered, theoretically founded general knowledge in the field of microbiology, enabling understanding, description, and investigation of phenomena caused by microorganisms. K_W4
2. Has knowledge of the microbiological basis of health sciences to the extent appropriate for pharmaceutical engineering. K_W5
3. Has knowledge of basic techniques, research methods used in microbiological analysis of substances for pharmaceutical purposes. K_W7
4. Has knowledge of the basic conceptual categories and terminology used in microbiology. K_W9
5. Knows the basics of pharmaceutical law and has a basic knowledge of quality management and principles of Good Manufacturing Practice in the microbiological aspect. K_W23
6. Knows pharmacopoeial requirements in the field of microbiological quality assessment of pharmaceutical raw materials and medicinal products. K_W25

Skills

1. Understands literature in the field of microbiology in Polish, is able to obtain information from literature and other sources related to pharmaceutical engineering, integrate it, interpret it, and draw conclusions and form opinions. K_U1
2. Based on general knowledge, explains the basic phenomena associated with microorganisms can characterize various microorganisms using the methods used to identify them. K_U2
3. Uses chemical and pharmaceutical terminology and nomenclature of chemical compounds with antimicrobial properties correctly. K_U3
4. Uses basic technics, equipment, and research equipment useful in microbiological analysis. K_U8
5. Has the ability to conduct microbiological tests of pharmaceutically active substances and medicinal products. K_U10
6. Selects and applies appropriate methods and techniques in assessing the microbiological quality of products and raw materials. K_U11
7. Can plan and carry out simple experiments in the field of microbiological analysis, interpret their results, and draw conclusions. K_U12
8. Adheres to the safety rules related to the performed work and is able to assess the risks arising from working with microorganisms. K_U22

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:



Two partial colloquia are a form of assessment of laboratories in Microbiology. A student may receive 0-20 points from each colloquium, which will include questions in the form of a test, supplementing, and assigning answers. The condition of passing the exercises is to obtain a sum of a minimum of 26 points from partial colloquia.

In the case of receiving below 26 points from partial colloquia, the student has the right to proceed to the colloquium, covering all the theoretical material discussed in the classes. The 65% of positive answers on this colloquium results in 26 points.

The grade from the laboratory will be based on the following score:

26 – 28.5 points - rating 3,0

29 - 31 points - rating 3,5

31.5 - 34 points - rating 4,0

34.5 – 37 points - rating 4,5

37.5 – 40 points - rating 5,0

Colloquium from lectures will include questions in the form of a test, supplementation, assigning answers, and open questions from the issues discussed in the lectures. The colloquium will be assessed on a scale of 0-60 points.

Completion of the lecture test takes place when a minimum of 39 points is obtained.

Lecture grade will be issued based on the following score:

39 - 42.5 points - rating 3.0

43 - 47 points - grade 3.5

47.5 - 51 points - rating 4.0

51.5 – 55.5 points - rating 4.5

56 - 60 points - rating 5.0

Programme content

Lectures:

1. Characteristics of microorganisms: bacteria, fungi, viruses.
2. Classification of microorganisms
3. Construction and properties.
4. Nutritional requirements and metabolism.
5. Microorganisms in biotechnological processes.
6. Hygiene of production (Good Manufacturing Practice - GMP, Hazard Analysis based on Critical Points Control - HACCP)
7. Drug safety (production hygiene, microbiological control).

Laboratories:

1. Impact of physical and chemical factors on the growth of microorganisms, breeding methods.
2. Evaluation of microbial metabolism, basics of microbial diagnostics.
3. Determination of the number of microorganisms.
4. Methods for reducing the number and eradication of microorganisms
5. Pharmacopoeial methods for assessing the microbiological quality of medicinal products and



pharmaceutical raw materials.

6. Microbiological quality assessment of dietary supplements and cosmetics.

7. Microbiological assessment of the production environment.

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 Libudysz, Zofia Żakowska **Mikrobiologia techniczna. Tom 1 i 2** , PWN, 2008.

Additional

1. Urząd Rejestracji Produktów Leczniczych **FARMAKOPEA POLSKA XI** , Urząd Rejestracji Produktów Leczniczych, 2017.

2. Włodzimierz Kędzia **Mikrobiologia dla farmaceutów** , UM Poznań, 1994.

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2
Classes requiring direct contact with the teacher	30	1
Student's own work (literature studies, preparation for laboratory classes, preparation for tests) ¹	30	1

¹ delete or add other activities as appropriate