

Course Syllabus

Course from study programme for the cycle: 2022/2023

- **General Information**

Course name	General microbiology
Programme	BSc
Level of studies (BA, BSc, MA, MSc, long-cycle MA)	part-time
Form of studies (full-time, part-time)	Biological sciences
Discipline	English
Language of instruction	BSc

Course coordinator	Dr Marta Kłos
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Type of class (<i>use only the types mentioned below</i>)	Number of teaching hours	Semester	ECTS Points
lecture	30	III	6
tutorial			
classes	30	III	
laboratory classes			
workshops			
seminar			
introductory seminar			
foreign language classes			
practical placement			
field work			
diploma laboratory			
translation classes			
study visit			

Course pre-requisites	knowledge in biology at the high school level
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- **Course Objectives**

A brief history of microbiology.
Sterilization, disinfection, antisepsis.
Microorganisms (bacteria, fungi, viruses, protists): identification, taxonomy, diversity, structure, growth, metabolism, types of nutrients, genetics, culture media, diagnostics, most important disease.
Principles of working with microbiological material, microscopy techniques, dyeing, growing and biochemical differentiation.
Industrial microbiology.

- **Course learning outcomes with reference to programme learning outcomes**

Symbol	Description of course learning outcome	Reference to programme learning outcome
KNOWLEDGE		
W_01	Student presents terminology used in microbiology, defines phenomena and biophysical, physiological and biochemical processes occurring in living microorganisms	K_W01
W_02	describes the issues in physics, mathematics and chemistry necessary to understand and interpret basic phenomena and processes involving microorganisms	K_W02
W_03	Student presents knowledge in the field of laboratory techniques and research tools used in microbiology	K_W05
W_04	Student presents issues related microbiology required for practical use in biotechnological processes which are applied in food and pharmaceutical industry as well as in agriculture	K_W08
SKILLS		
U_01	Student applies techniques and research tools in the field of microbiology	K_U01
U_02	Student carries out observations and performs physical, chemical and biological measurements of microorganisms and their environment	K_U02
U_03	Student is able to use light microscope, independently prepares microscopic preparations; is able to carry out and documents microscopic observations of microorganisms	K_U03
U_04	Student conducts the microbial cell cultures	K_U04
U_05	Student designs and performs research tasks or expertise in the field of microbiology	K_U15
U_06	Student learns independently in a targeted manner in the field of microbiology, updates his knowledge and skills, applies new research techniques and plans his professional development	K_U17
SOCIAL COMPETENCIES		
K_01	Student demonstrates appropriate habits necessary to work in a microbiological laboratory, in particular in aseptic conditions, behaves in accordance with the principles of occupational health and safety	K_K04

- **Course Content**

A brief history of microbiology, major events and discoveries. The structure of the prokaryotic cell and eukaryotic, the differences between them. Principles of disinfection, sterilization and antiseptics, the differences between them, their methods. Systematic (by classification artificial) overview of the main groups of microorganisms (viruses, bacteria and fungi). Discussion of their morphology, structure, metabolism (specific metabolic pathways) and the environment they live in. Types of microbial growth. Discussion between Gram- and Gram + bacteria. Prokaryotic DNA and RNA metabolism - replication, transcription, translation. Mitosis, meiosis. Molecular basis of taxonomy and microbiological diagnostics. A brief overview of the most important microbial diseases. The influence of the environment on the bacteria. Participation in the formation of microbial biosphere - participation in the circulation of carbon, oxygen, hydrogen, sulfur, nitrogen and other elements of nature. The biotechnological application of microorganisms in industry and medicine. The microscopes - construction and types of microscopes, the morphology of bacterial cells and their characteristic grouping. Fundamentals of staining microorganisms. The composition and classification of microbiological culture media. Cultures of microorganisms. The pure bacterial cultures and the overall strategy of microbiological diagnostics. The impact of physical and chemical factors on microorganisms - including the theoretical basis of antibiotic resistance.

- **Didactic methods used and forms of assessment of learning outcomes**

Symbol	Didactic methods <i>(choose from the list)</i>	Forms of assessment <i>(choose from the list)</i>	Documentation type <i>(choose from the list)</i>
KNOWLEDGE			
W_01	Conventional lecture Laboratory analysis	Report Written exam	Evaluated test/written exam, report file
W_02	Conventional lecture Laboratory analysis	Report Written exam	Evaluated test/written exam, report file
W_03	Laboratory analysis	Report Written exam	Evaluated test/written exam, report file
W_04	Conventional lecture Laboratory analysis	Report Written exam	Evaluated test/written exam, report file
SKILLS			
U_01	Laboratory classes	Report Written test	Evaluated test/written exam, report file
U_02	Laboratory classes	Report Written test	Evaluated test/written exam, report file
U_03	Laboratory classes	Report Written test	Evaluated test/written exam, report file
U_04	Laboratory classes	Report Written test	Evaluated test/written exam, report file
U_05	Laboratory classes	Report Written test	Evaluated test/written exam, report file
U_06	Laboratory classes	Report Written test	Evaluated test/written exam, report file
SOCIAL COMPETENCIES			
K_01	Laboratory classes	Observation, report	Report file, rating card

- **Grading criteria, weighting factors.....**

Mark	Evaluation criteria	
Very good (5)	the student realizes the assumed learning outcomes at a very good level	the student demonstrates knowledge of the education content at the level of 91-100%
Over good (4.5)	the student accomplishes the assumed learning outcomes an over good level	the student demonstrates knowledge of the education content at the level of 81-90%
Good (4)	the student accomplishes the assumed learning outcomes at a good level	the student demonstrates knowledge of the education content at the level of 71-80%
Quite good (3.5)	the student accomplishes the assumed learning outcomes at a quite good level	the student demonstrates knowledge of the education content at the level of 61-70%
sufficient (3)	the student accomplishes the assumed learning outcomes at a sufficient level	the student demonstrates knowledge of the education content at the level of 51-60%
insufficient (2)	the student accomplishes the assumed learning outcomes at an insufficient level	the student demonstrates knowledge of the education content below the level of 50%

- **Student workload**

Form of activity	Number of hours
Number of contact hours (with the teacher)	60
Number of hours of individual student work	90

- **Literature**

Basic literature
BIOS Instant Notes in Microbiology, Simon Baker, Wydawca: Taylor & Francis Ltd, ISBN: 9780415607704, 2011
Instant Notes Microbiology, <u>K. Graeme-Cook</u> , <u>R. Killington</u> , <u>J. Nicklin</u> ; Scripts