

Course Specifications

Valid as from the academic year 2019-2020

Course size (nominal values; actual values may depend on programme)

Credits 5.0 Study time 150 h Contact hrs 60.0 h

Course offerings and teaching methods in academic year 2019-2020

A (semester 2)	English	seminar: coached	3.0 h
		exercises	
		practicum	27.0 h
		lecture	30.0 h

Lecturers in academic year 2019-2020

Radwanska, Magdalena	KR01	lecturer-in-charge
Magez, Stefan	KR01	co-lecturer

Offered in the following programmes in 2019-2020

	crdts	offering
Bachelor of Science in Environmental Technology	5	A
Bachelor of Science in Food Technology	5	A
Bachelor of Science in Molecular Biotechnology	5	A
Joint Section Bachelor of Science in Environmental Technology, Food Technology and Molecular Biotechnology	5	A

Teaching languages

English

Keywords

Taxonomy, Evolution, Biodiversity and Ecology of Microorganisms, Prokaryotes, *Bacteria*, *Archaea*, Viruses, Unicellular Eukarya, Cellular Morphology, Metabolism, Genomics and Genetics of Microorganisms, Pathogenic and Beneficial Roles of Microorganism.

Position of the course

Microbiology constitutes a basic course in biology of microorganisms including *Bacteria*, *Archaea*, Viruses and Eukarya. The course gives an introduction to the taxonomy, morphology, genomics, genetics, and biochemistry of microorganisms. Typical features of the taxa are discussed, various adaptations to the environments, potential applications for agriculture, medicine, and ecology are explained. Moreover, the course gives an introduction to the beneficial and pathogenic roles of microorganism in respectively health and diseases.

Contents

1. Introduction to Microbiology: Diversity, Taxonomy, and various functions of Microorganisms.
2. Cellular structures of Prokaryotic and Eukaryotic Microorganisms.
3. Microbial Growth and Metabolism.
4. Microbial Genomics and Genetics.
5. Microorganisms in Health and Diseases (Beneficial Role of the Microbiome, Antibiotic Resistance, Host-Pathogen Interactions, Infectious Diseases, Diagnostics).
6. Microbial Ecology and Biodiversity.
7. Contribution to the Nutrient Cycles.
8. The Role of Microorganisms in Agriculture.
9. The use of Microorganisms as Tools for Molecular Biotechnology.

Initial competences

Knowledge and understanding of the basic principles in biology is required. This corresponds to the competences acquired in the course of General Biology.

Final competences

- 1 Students gain knowledge of the taxonomy, biodiversity, and biological functions and features of *Bacteria*, *Archaea*, *Viruses*, *Unicellular Fungi* and *Eukarya*. This includes morphological structures, biochemistry, genomics and genetics of microorganisms. The student will:
 - be aware of the presence of microorganism in the every-day environment, including food;
- 2 - understand various functions of microorganisms;
- 3 - know the basic importance of microorganisms in health and diseases;
- 4 - be able to discuss the critical role of microorganisms in ecology, agriculture, and food production;
- 5 - be able to perform basic microbiology staining techniques and biochemical identification;
- 6 - be able to perform basic bacterial growth and quantification methods;
- 7 - be aware of the importance of microbiology in biotechnology;
- 8 - be aware of public debates surrounding biotechnology and the use of microorganisms;
- 9 - be aware of the complementarity of other disciplines such as biochemistry, molecular biology, genetics and biological evolution in general.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Lecture, practicum, seminar: coached exercises

Learning materials and price

Learning material is provided as PowerPoint presentations, a practical course booklet outlining all protocols and background information, and movies. All materials are available on Minerva. A textbook in Microbiology is followed with respect to the content. It is being advised to purchase the textbook, as its content covers the basic principles supporting various other courses throughout the curriculum.

References

Brock Biology of Microorganisms, Madigan et al, Fourteenth Edition, Pearson.

Course content-related study coaching

Practical courses are designed to directly support main principles in Microbiology that are outlined in lectures. The latter contain wrap-up and feedback sessions. This, in turn facilitates study coaching. Practical courses also include coached exercises targetting general Microbiology laboratory calculations.

Evaluation methods

end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Written examination with open questions

Examination methods in case of periodic evaluation during the second examination period

Written examination with open questions

Examination methods in case of permanent evaluation

Written examination, report

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible

Extra information on the examination methods

Participation in the practical courses is mandatory. The final exam will have open questions that directly relate to the lectures and experiments performed during practical courses.

Calculation of the examination mark

Written examination with open questions related to the lecture course material – 80%
Mid-term written examination will evaluate study progress – 10%
Practical course report – 10%

