

BIOR18, Biology: Microbiology, 15 credits

Biologi: Mikrobiologi, 15 högskolepoäng

Second Cycle / Avancerad nivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2007-04-12 (2007188) and was last revised on 2025-04-09 by The Education Board of Faculty of Science. The revised syllabus comes into effect 2025-04-09 and is valid from the autumn semester 2025.

General information

The course is an optional second-cycle course for a degree of Bachelor or Master of Science in Biology. The language of instruction is English.

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<i>Main field of study</i>	<i>Specialisation</i>
Biology	A1N, Second cycle, has only first-cycle course/s as entry requirements
Molecular Biology	A1N, Second cycle, has only first-cycle course/s as entry requirements

Learning outcomes

The aim of the course is to give broad and thorough insight into modern microbiology, including training in microbiological laboratory skills.

Knowledge and understanding

On completion of the course the student shall be able to:

- describe a modern view of the phylogeny and diversity of prokaryotes
- account for the structure and function of the prokaryotic cell, and be able to compare the distinctive features of bacteria and archaea

- account for the main types of energy metabolism in microorganisms: their role in biogeochemical cycles and how they are connected to the synthesis of the building blocks for anabolic processes
- explain kinetic and physiological aspects of the growth and cell cycle of bacteria
- describe global regulatory systems and give examples of bacterial cellular differentiation
- account for molecular methods for analysis and characterisation of natural communities of microorganisms
- describe the main types of antibiotics, their modes of action, and the evolution of resistance to antibiotics
- describe the main types of bacterial toxins and their modes of action

Competence and skills

On completion of the course the student shall be able to:

- apply microbiological methodology and experimental work
- together with another student, independently plan and carry out an extensive project about the enrichment, isolation, and characterisation of a certain group of bacteria
- compile and orally present a microbiological project

Judgement and approach

On completion of the course the student shall be able to:

- discuss and evaluate the importance and use of microorganisms in medicine, food industry, biotechnical industry, and plant cultivation

Course content

The course includes:

- The phylogeny, classification, and diversity of prokaryotic microorganisms.
- The structure and function of prokaryotic cells. Transport of small molecules across membranes. Protein translocation across membranes.
- Oxidation of organic compounds. Turnover of carbon and nitrogen. Aerobic and anaerobic energy metabolism. Chemolithotrophy. Bacterial photosynthesis. Synthesis of building blocks for macromolecules.
- Microbial growth. The cell cycle and cellular differentiation in bacteria.
- Global regulatory systems in bacteria. Motility and chemotaxis. Communication between cells.
- Introduction to microbial ecology. Biogeochemical cycles.
- Introduction to medical bacteriology. Toxins. Antibiotics and antibiotic resistance.
- Overview of applied microbiology (food, industrial microbiology, interactions between plants and bacteria).
- Sterilisation techniques, media and cultivation. Enrichment and isolation.

Course design

The teaching consists of lectures, seminars, laboratory sessions and an extensive laborative project, which is also presented orally. Participation in laboratory sessions, seminars, project and thereby other integrated teaching, is compulsory.

Assessment

Examination takes place through a written examination at the end of the course, as well as through participation in seminars and written laboratory reports, written assignments and project report during the course. For students who have not passed the regular examination, an additional examination in close connection to this is offered.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Grades

Grading scale includes the grades: Fail, Pass, Pass with distinction

To pass the entire course, approved written examination, approved laboratory reports, approved written assignments, approved project report, and participation in all compulsory parts, are required.

The grading scale for written examination is Fail, Pass and Pass with distinction, while the grading scale for laboratory reports, written assignments and project report is Fail and Pass.

The final grade is decided by the result on the examination.

Entry requirements

For admission to the course, and 90 credits of scientific studies including knowledge corresponding to BIOA10 Cell and Microbiology 15 credits, BIOA11 Genetics and Evolution 15 credits, and chemistry 30 credits, are required. English 6/B

Further information

The course is given by the Department of Biology, Lund University.