



LUND
UNIVERSITY

Faculty of Science

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 and was last revised on 2014-09-01. The revised syllabus applies from 2014-09-01, autumn semester 2014.

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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Main field of studies

Biology

Molecular Biology

Depth of study relative to the degree requirements

A1N, Second cycle, has only first-cycle course/s as entry requirements

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Learning outcomes

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 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, discussion seminars, and laboratory sessions. An extensive laboratory project is included. Participation in laboratory sessions and seminars, and thereby other integrated teaching, is compulsory. Each course participant gives an oral presentation of the laboratory project. Study visits at laboratories/industries with various types of microbiological activities are included.

Assessment

Examination takes place through a written examination at the end of the course, and participation in compulsory parts. For students who have not passed the regular examination, an additional examination in close connection to this is offered.

Subcourses that are part of this course can be found in an appendix at the end of this document.

Grades

Marking scale: Fail, Pass, Pass with distinction.

To pass the entire course, approved examination, approved laboratory reports, approved written assignments, approved project report, and participation in all compulsory parts, are required. The final grade is decided by the result on the examination.

Entry requirements

For admission to the course, English 6/English B and 90 credits of scientific studies including knowledge corresponding to MOBA01 Cell Biology 15 credits, BIOA01 Genetics and Microbiology 15 credits, and chemistry 30 credits, are required.

Further information

The course may not be included in a degree together with BIO623 Microbiology 15 credits.

Subcourses in BIOR18, Biology: Microbiology

Applies from H14

- 0702 Theory, 10,0 hp
Grading scale: Fail, Pass, Pass with distinction
- 0703 Laboratory Work, 5,0 hp
Grading scale: Fail, Pass

Applies from H07

- 0701 Microbiology, 15,0 hp
Grading scale: Fail, Pass, Pass with distinction