



**LUND**  
UNIVERSITY

Faculty of Science

## **BIOA11, Biology: Genetics and Evolution, 15 credits**

*Biologi: Genetik och evolution, 15 högskolepoäng*

First Cycle / Grundnivå

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### **Details of approval**

The syllabus was approved by Study programmes board, Faculty of Science on 2018-02-05 to be valid from 2018-02-05, autumn semester 2018.

### **General Information**

The course is compulsory for a Degree of Bachelor of Science in biology and molecular biology.

*Language of instruction:* Swedish

*Main field of studies*

Molecular Biology

Biology

*Depth of study relative to the degree requirements*

G1F, First cycle, has less than 60 credits in 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:

- account for how the meiosis is done and for the principles of inheritance; Mendel's laws, connection and gene interactions as well as sex-linked inheritance
- describe different types of viruses and account for the genetic materials of virus replication cycles as well as medical relevance
- account for genetic material and mechanisms for gene replacement in bacteria as well as how horizontal gene transfer lead to evolutionary adaptation
- describe basic principles of methods in gene technology, e.g. DNA-cloning, PCR and DNA-sequencing

- describe different types of mutations, account for how mutations arise and describe basic principles of the systems for DNA repair
- describe the basics of transcription, translation and mechanisms for regulation of gene expressions
- describe different levels of chromosome organization and different types of chromosome aberrations
- account for basic population genetics as well as explain basic evolutionary principles, including how mutations at the DNA and chromosome level and recombination contribute to evolutionary adaptation

### **Competence and skills**

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

- master basic genetic analysis in in controlled crosses and phylogenetic trees
- use basic statistical methods
- carry out basic population genetics calculations
- carry out some basic laboratory methods in microbiology and molecular genetics, and interpret the results
- write a laboratory report

### **Judgement and approach**

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

- compile, evaluate and discuss results of simple laboratory sessions
- demonstrate a scientific approach and review scientific statements critically
- demonstrate an understanding of the importance of evolution for properties and adaptations of organisms

### **Course content**

The course covers systems for inheritance, mechanisms for sex determination, meiosis, recombination, gene mapping and chromosome analysis. Additional fields that are included in the course are differentiation genetics, transcription and translation. Further, genome organisation, mutations and mobile DNA-elements, repair of DNA-damage, gene expression and its regulation in different types of organisms, is included. The course also covers genetics of bacteria, including transfer of genetic material, and different types of viruses, their genetic material and replication cycles, as well as their medical relevance. The course treats evolutionary processes at both organism and gene level, as well as population genetics.

During the course, basic statistical methods are introduced, e.g. Chi-square test and probability calculation. Furthermore, different concepts in gene technology are treated, including genetic modification of organisms, and examples of applications of gene technology are presented.

## Course design

The teaching consists of lectures, exercises and laboratory sessions. Participation in laboratory sessions and exercises is compulsory.

## Assessment

Examination takes place in writing in the form of examinations during the course as well as through compulsory components. 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.

*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 examinations and approved compulsory parts, are required. The final grade is determined by a weighing of the results of the parts that are included in the examination.

## Entry requirements

For admission to the course, knowledge equivalent to BIOA10 is required Cell and microbiology 15 credits.

## Further information

The course may not be included in qualification together with BIOA01 Genetics and Microbiology 15 credits.

## Subcourses in BIOA11, Biology: Genetics and Evolution

Applies from H18

- 1801 Exam 1, 6,0 hp  
Grading scale: Fail, Pass, Pass with distinction
- 1802 Exam 2, 7,5 hp  
Grading scale: Fail, Pass, Pass with distinction
- 1803 Laboratory Work, 1,5 hp  
Grading scale: Fail, Pass