

*Course syllabus*

# Biologisk översiktskurs Biology, Introductory Course

**EXTG15, 7,5 credits, G2 (First Cycle)**

**Valid for:** 2023/24

**Faculty:** Faculty of Engineering, LTH

**Decided by:** PLED W

**Date of Decision:** 2023-03-27

## General Information

**Main field:** Technology.

**Elective Compulsory for:** Pi3

**Elective for:** E4, F4

**Language of instruction:** The course will be given in English on demand

## Aim

The aim of the course is to give a general introduction to basic biology and to common modelling and computational methods in biology.

## Learning outcomes

### *Knowledge and understanding*

For a passing grade the student must

- be able to explain basic cell biology concepts
- be able to explain the mechanisms of evolution
- be able to present the levels of organisation in biology
- be able to explain basic genetic concepts and understand how inheritance works
- be able to independently apply computational and modelling methods used in biology

### *Competences and skills*

For a passing grade the student must

- show ability to apply computational methods used in the course
- possess general knowledge in biology that is sufficient to apply computational methods on biological problems.

## Contents

Structure and function of the cell. Structure and replication of nucleic acids. Protein synthesis. Gene regulation. Structure of the genome and the proteome. Basic physiology. Classic and population genetics. Evolution. Ecology and population biology basics and models.

Methods and concepts within theoretical biology such as population genetics, population ecology and game theory. The course also contains mathematical methods that are inspired by biology, such as genetic algorithms, neural networks and cellular automata. The programming language that is used is MATLAB, meaning that some knowledge of this software is useful.

## Examination details

**Grading scale:** UG - (U,G) - (Fail, Pass)

**Assessment:** The course has no written examination test. The grading is based on the quality of the hand- ins of the exercises. The general biology lectures are approved of by being present at the lectures. To pass the course requires presence on 90% of the lectures.

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.

## Admission

**Assumed prior knowledge:** FMAF05 Systems and Transforms or equivalent.

**The number of participants is limited to:** No

**The course overlaps following course/s:** EXTG10, TEK290, EXTG11

## Reading list

- The Biology content in the course is covered by Mader, S: Biology, latest edition, McGraw-Hill, calculation excersizes are described in handouts and exercize instructions.

## Contact and other information

**Course coordinator:** Anders.Brodin, Anders.Brodin@biol.lu.se

**Course homepage:** <http://www.biologi.lu.se/utbildning/grund-och-avancerad-utbildning/kurser/kurser-grundniva/biologiska-kurser-pa-grundniva-for-teknologer>

**Further information:** The course is an elective mandatory course in the third year of the engineering mathematics programme. The course runs in parallel with the course EXTG11 Biological modelling. Hence EXTG11 consists of the theoretical and computational parts of EXTG15.