Faculty of Science

BIOR25, Biology: Molecular Ecology and Evolution, 15 credits

Biologi: Molekylär ekologi och evolution, 15 högskolepoäng

Second Cycle / Avancerad nivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2007-03-01 and was last revised on 2015-01-19. The revised syllabus applies from 2015-01-19, spring semester 2015.

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.

Language of instruction: Swedish and English

Main field of studies	*Depth of study relative to the degree requirements*
Biology	A1N, Second cycle, has only first-cycle course/s as entry requirements

Learning outcomes

Knowledge and understanding

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

- account for how genetic variation influences the ecology and evolution of organisms
- describe different models of evolution at gene and protein level
- account for how genetic variation is detected and evaluated at different levels including allelic variation, and variation within and between individuals, populations, and species
- explain the ecological importance of genetic variation for e.g. speciation, adaptations to different environments, behaviour, dispersal, and parasite-host interactions

Competence and skills
On completion of the course the student shall be able to:

- master the basics of various methods used to detect and analyse variation at gene, genome, and protein level within and between individuals, populations and species
- communicate achieved results orally and in writing
- search scientific information using biological databases

Judgement and approach
On completion of the course the student shall be able to:

- critically review the content of scientific papers and reports that use methods in molecular biology to answer questions related to ecology, evolution, and conservation biology
- Evaluate and compile scientific information

Course content

The course consists of two parts: a theoretical and practical part followed by a project in small groups.

The course includes the following topics:

- sampling and extraction of DNA from plants, animals or microorganisms
- the basics of how genes and proteins are analysed in order to understand adaptations of organisms to different environments
- use of some common methods to examine neutral genetic variation e.g. microsatellites, SNPs, and AFLPs
- laboratory session with PCR amplification and sequencing of genes or DNA fragments
- exercises using the most common methods for phylogenetic analyses based on DNA and protein sequences
- introduction to genome-based methods to analyse genetic variation, sequencing and DNA microarrays
- presentation of a set of models for evolution at gene and protein level, and how these models are applied to understand evolution at species and population level
- a project (about two weeks long) based on independent work with one of the methods highlighted during the course

Course design

The teaching consists of lectures, laboratory sessions, field exercises and seminars, and project. Participation in laboratory sessions, field exercises, seminars and projects, and thereby other integrated teaching, is compulsory.

Assessment

Examination takes place continuously during the course through compulsory parts, through a written examination after the first theoretical and practical session, and through oral presentation of the project at the end of the course.

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 and approved compulsory parts are required.

The final grade is decided through a weighing of the results of the parts that are included in the examination. A total of 50 credits are distributed on exercises (7 credits), the written examination (33 credits), and the final project (10 credits).

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, and BIOA01 Genetics and Microbiology 15 credits, are required.

Further information

The course may not be included in a degree together with BIO648 Molecular Ecology and Evolution 15 credits.

Subcourses in BIOR25, Biology: Molecular Ecology and Evolution

Applies from H07

0701 Molecular Ecology and Evolution, 15,0 hp
Grading scale: Fail, Pass, Pass with distinction