



LUND
UNIVERSITY

Faculty of Science

BIOR81, Biology: Evolutionary Animal Ecology, 15 credits

Biologi: Evolutionär zoekologi, 15 högskolepoäng

Second Cycle / Avancerad nivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2016-12-29 to be valid from 2016-12-29, autumn semester 2017.

General Information

The course is an elective course for a degree of Master of Science in Biology.

Language of instruction: English

Main field of studies

Biology

Depth of study relative to the degree requirements

A1F, Second cycle, has second-cycle course/s as entry requirements

Learning outcomes

The general aim of the course is that students, on completion of the course, shall have developed an evolutionary thinking to be applied when planning projects and when analysing their own and others' research results in animal ecology. They should also have acquired considerable specialised knowledge in evolutionary ecology and in empirical and theoretical methodology. The course shall prepare the students for postgraduate studies and for professions that require an understanding of formulation and analysis of ecological problems.

Knowledge and understanding

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

- account for the basics in evolutionary theory and its importance when explaining patterns and processes in nature
- account for modern theories in evolutionary ecology and have knowledge about the research front in this area

Competence and skills

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

- collect and process scientific information within evolutionary ecology
- compile and write a scientific literature study
- present a scientific study orally
- formulate own hypotheses and predictions and design simple experiments/studies
- carry out and interpret simple experiments/studies

Judgement and approach

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

- critically review and analyse ecological problems and studies
- discuss based on an evolutionary perspective and a scientific approach

Course content

The central topic of the course is evolutionary theory and its ecological applications. The course focuses on processes at both gene- and individual level, with an emphasis on animals. The course is divided into different parts based on subject content.

- Evolutionary ecology. The course starts with the basics of Darwin's theory of evolution. Thereafter, central concepts such as natural and sexual selection, fitness, proximate and ultimate explanations, and speciation are discussed. Important general analytical methods to study evolutionary processes are also discussed; quantitative genetics, optimality- and game theory as well as comparative and allometric methods.
- Ecophysiology and migration. This section highlights the importance of organism's physiological and morphological adaptations and limitations, both at ecological and evolutionary time scales. Energy metabolism, migration, locomotion, orientation and navigation, as well as morphological adaptations are concerned.
- Life history strategies. This section focuses on questions about when, where, and how organisms optimally carry out different parts of their life-cycle, especially reproduction. Concepts in focus are e.g. demography, reaction norms, phenotypic plasticity, hormones, maternal effects, epigenetics, sex allocation, aging, costs of reproduction and relevant "trade-offs", as well as the importance of immune defence, parasites and diseases.

- Mating systems and sexual selection. This section deals with social mating systems, extra-pair copulation, the evolutionary consequences of conflicts between the sexes and parent-offspring, as well as theories of sexual selection and mate choice.
- Coevolutionary processes and signals. In this section, coevolutionary processes within and between species are discussed, e.g. communication between individuals (such as pheromone communication), predator-prey interactions, parasite-host interactions as well as mimicry.
- Scientific methodology. This is partly integrated in the other parts of the course, but contains also specific parts, which include scientific methodology, literature project (review of articles that are carried out individually), experimental design, as well as short practical projects.

The course ends with a conference, where the students use their knowledge in evolutionary ecology, scientific methodology (experimental design, statistics etc) and presentation technique to design a scientific study and present it in the form of a scientific talk.

Course design

The teaching consists of lectures, field exercise, seminars (on book chapters and research papers), group work, own literature project and conference. Participation in field exercise, seminars, group work, presentation of literature project, conference as well as associated parts, is compulsory.

Assessment

Examination takes place in the form of a written examination after about seven weeks, a written presentation of the literature project, as well as through an oral presentation of an own study design at the conference at the end of the course.

For students who have not passed the regular examination, an additional examination in close connection to the end of the course 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 literature project, approved presentation at the conference, as well as 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: written examination, literature project and oral presentation at conference.

Entry requirements

For admission to the course, knowledge corresponding to BIOC02 Ecology 15 credits, as well as BIOR69 Population and Community Ecology 15 credits, or BIOR68 Aquatic Ecology 15 credits, is required. A degree of Bachelor of Science. English 6/English B.

Further information

The course may not be included in a degree together with BIOR35 Evolutionary Animal Ecology 15 credits.

Subcourses in BIOR81, Biology: Evolutionary Animal Ecology

Applies from H17

- 1601 Theory, 10,0 hp
Grading scale: Fail, Pass, Pass with distinction
- 1602 Exercises and Assignments, 5,0 hp
Grading scale: Fail, Pass