

## Faculty common course 2021

Ansökan om medel för fakultetsgemensam forskarutbildningskurs 2021

### English course title

Kursnamn på engelska

Modern statistics in natural sciences

### Swedish course title

Kursnamn på svenska

Modern statistik i naturvetenskaper

### Extent (credits)

Omfattning (högskolepoäng)

5hp

### Language of instruction

Undervisningsspråk

English

### Recommended prerequisites

Rekommenderade förkunskaper

Basic statistical knowledge.

### General course objective/s and learning outcomes (Also specify which PhD examination goals that are addressed/covered. Describe how.)

Kursens syfte och mål (Beskriv vilka mål för examen på forskarnivå som beaktas och på vilket sätt.)

To give an introduction to the most commonly applied modern statistical techniques and tools used in a wide range of natural sciences. In addition to providing an overview of the statistical “tool-box”, the course generates an understanding of the philosophy and reasoning behind statistical design, modelling and inference. Practical elements (exercises) and group discussions gives the students hands-on experience, deeper insights and confidence. This is a general statistic course that attracts PhD students from biology, geosciences, chemistry, information technology and other related fields.

### Course contents

Kursinnehåll

The course is focused on analyses of experimental data, but observational data analyses are also covered briefly. The course includes: experimental designs leading to ANOVA or ANCOVA, including block experiments, repeated measurement designs, nested and factorial designs, multiple regression including strategies for selecting variables and evaluating models, generalized linear models (GLIM) including logistic and Poisson regression, contingency table tests, power analysis, multivariate analysis and ordination techniques, resampling and permutation statistics, Bayesian model fitting, MCMC techniques, geometric morphometrics.

### Instruction (course structure)

Undervisning (kursens uppläggnig)

The course is built around a series of 12 half-day and interactive lectures. In addition, the students then work off-schedule with a series of common practical elements/problems that are then discussed during tutored group discussions. Hands-on advice and individual tutoring of statistical software (R) is offered at several occasions during the course.

### Assessment (form of examination)

Examination (examinationsformer)

Attendance at all lectures and approved individual practical reports that students hand in.

**Course examiner (name, e-mail)**

Examinator (namn, e-post)

Göran Arnqvist, [Goran.Arnqvist@ebc.uu.se](mailto:Goran.Arnqvist@ebc.uu.se)

**Department with main responsibility**

Huvudansvarig institution

Department of Ecology and Genetics

**Contact person/s (course responsible teacher) (name, e-mail)**

Kontaktperson/er (kursansvarig lärare) (namn, e-post)

Göran Arnqvist, [Goran.Arnqvist@ebc.uu.se](mailto:Goran.Arnqvist@ebc.uu.se) (teacher)

Peter Eklöv, [Peter.Eklov@ebc.uu.se](mailto:Peter.Eklov@ebc.uu.se) (director of PhD studies)

**Course dates/period**

Kurs datum/period

Part time during late January – mid-March 2021.

**Maximum number of participants**

Antal platser

34

**Submit the application for admission to**

Skicka anmälan till kursen till

<http://www.biologi.uu.se/utbildning/forskautbildningskurser/>

**Submit the application not later than**

Skicka anmälan senast