



Design and evaluation of ecological studies

5 ECTS

Place:

Department of Freshwater Ecology, National Environmental Research Institute,
Aarhus University, Vejlssøvej 25, DK-8600 Silkeborg, Denmark.

Time:

May 9, 08:30 to May 13, 18:00.

Participants:

The course is open to Danish (including ECOGLOBE) as well as international PhD students. Minimum 15 and maximum 25 participants.

Objectives:

The PhD students will be trained in planning and evaluating their own experimental, ecological investigations. An aim of the course is to enable the students to critically evaluate research papers from the international scientific literature. The students will learn to use statistical software, and will produce their own personalized statistics manual for designing, evaluating and presenting results from ecological experiments. The manual will include step-by-step procedures for a range of commonly used tests. Consequently, the focus is on hands-on experience with ecological data analysis, acquired through computer exercises, and on understanding concepts rather than formulas. Several examples of studies, which reflect the complexity in different experimental ecological disciplines, will be reviewed.





Contents:

- Ecological data and sources of variability in experimental ecology.
- Designing experimental, ecological studies using power analysis.
- Handling of raw data and testing assumptions prior to statistical testing.
- Evaluation of results attained using t-tests, ANOVAs, multiple pairwise comparisons, correlations, regressions and analysis of counts/frequencies.
- Presentation of results in accordance with the specific conventions of ecological research.
- Production of personalized step-by-step statistics manual for planning, evaluating and presenting results from ecological experiments.

Preparation for course:

Before the start of the course, participating PhD students have to answer a questionnaire, read 5-10 original research papers and 200 pages in the course textbook (Quinn & Keough, 2002) corresponding to a work load of 50 hours.

Course structure:

The topics of the 5 days are as detailed below, and each topic starts with a lecture followed by computer exercises which are carried out in teams of two participants. During the course, each participant has to produce a personalized step-by-step statistics manual for planning, evaluating and presenting results from ecological experiments, and the computer exercises form the basis for individual chapters in this manual. During the course, the participants should be prepared to work outside the scheduled classes in order to complete the computer exercises.

Evaluation:

The personalized statistics manual (approximately 60-80 pages, corresponding to a work load of 30-40 hours outside, and in the week after the end of, the scheduled classes) has to be completed and submitted no later than May 23, 2011, for approval (pass/fail) by the organizer.

Literature:

Quinn GP, Keough MJ. (2002, 6th printing 2007). Experimental design and data analysis for biologists. Cambridge University Press. ISBN: 0-521-00976-6. Further material including research papers will be available through the course homepage.



Course Programme

Sunday, May 8

18:00 Arrival (if needed)

Monday, May 9

08:30 – 10:00 Lecture 1: Welcome, Introduction to Course & The Basics
10:00 – 10:15 Coffee
10:15 – 12:00 Computer Exercises
12:00 – 13:00 Lunch
13:00 – 15:00 Computer Exercises
15:00 – 15:15 Coffee
15:15 – 17:00 Lecture 2: ANOVAs & Pairwise Comparisons
19:00 Course Dinner

Tuesday, May 10

08:30 – 10:00 Lecture 3: ANOVAs continued
10:00 – 10:15 Coffee
10:15 – 12:00 Computer Exercises
12:00 – 13:00 Lunch
13:00 – 15:00 Computer Exercises
15:00 – 15:15 Coffee
15:15 – 17:00 Computer Exercises

Wednesday, May 11

08:30 – 10:00 Lecture 4: Correlations, Regressions & ANCOVA
10:00 – 10:15 Coffee
10:15 – 12:00 Computer Exercises
12:00 – 13:00 Lunch
13:00 – 15:00 Computer Exercises
15:00 – 15:15 Coffee
15:15 – 17:00 Computer Exercises

Thursday, May 12

08:30 – 10:00 Lecture 5: Analysis of Counts/Frequencies, Experimental Design & Power Analysis
10:00 – 10:15 Coffee
10:15 – 12:00 Computer Exercises
12:00 – 13:00 Lunch
13:00 – 15:00 Computer Exercises
15:00 – 15:15 Coffee
15:15 – 17:00 Lecture 6: Presenting Statistical Results & Report Requirements



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Friday, May 13

08:30 – 10:00	Computer Exercises
10:00 – 10:15	Coffee
10:15 – 12:00	Student Discussion of Papers
12:00 – 13:00	Lunch
13:00 – 15:00	Computer Exercises
15:00 – 15:15	Coffee
15:15 – 17:00	Computer Exercises
17:00 – 18:00	Pizza & Evaluation
18:00	Departure

Monday, May 23

Submission of final report by e-mail to Ulrik Nørum (uln@dmu.dk).

Monday, June 6

Report graded passed/failed by the organizer.

Fee:

There is no fee for ECOGLOBE PhD students. For other PhD students the fee is 4 000 DKK.

Travel and accommodation:

All other expenses for accommodation and travel are paid by the individual PhD students, except for lunches, the course dinner Monday, May 9, and pizzas Friday, May 13, which are included in the fee.

Registration:

To Ulrik Nørum (uln@dmu.dk) no later than April 1, 2011. Payment of fee should be made no later than April 15, 2011. Details on method of payment will be given on the course homepage.

Teacher: Ulrik Nørum (uln@dmu.dk), Senior Scientist, PhD