UNIVERSITY OF GOTHENBURG

DEPARTMENT OF BIOLOGICAL AND ENVIRONMENTAL SCIENCES

BIO172 Biostatistics and experimental design, one factor analyses, 7.5 credits

Biostatistik och experimentdesign, enfaktorsanalyser, 7,5 högskolepoäng
First Cycle

Confirmation

This course syllabus was confirmed by Department of Biological and Environmental Sciences on 2014-09-13 and was last revised on 2024-03-12 to be valid from 2024-03-12, spring semester of 2024.

Field of education: Science 100%
Department: Department of Biological and Environmental Sciences

Position in the educational system

The course is included in the Bachelor's programmes in biology and molecular biology. The course can also be offered as a freestanding course outside of the program.

The course can be part of the following programmes: 1) Bachelor's Programme in Biology (N1BIO) and 2) Bachelor's Programme in Molecular Biology (N1MB1)

Main field of studies	*Specialization*
Environmental Science	G2F, First cycle, has at least 60 credits in first-cycle course/s as entry requirements
Molecular Biology	G2F, First cycle, has at least 60 credits in first-cycle course/s as entry requirements
Marine Sciences	G2F, First cycle, has at least 60 credits in first-cycle course/s as entry requirements
Biology	G2F, First cycle, has at least 60 credits in first-cycle course/s as entry requirements

Entry requirements

Completed basic courses in biology of 60 credits in the subject areas cell biology,

molecular genetics, evolution, botanical and zoological physiology, ecology and biodiversity and systematics, or an equivalent discipline of which at least 45 credits must be approved.

Learning outcomes

Upon successful completion of this course, students will be able to:

Knowledge and understanding

- Be able to interpret basic descriptive statistical representations.
- Appreciate how resampling and permutation can create null distributions
- Explain principles of hypothesis testing, p-values, and confidence intervals.
- Understand the continuous nature of quantitative evidence

Competence and skills

- Design experiments and sampling procedures to quantify scientific parameters
- Use code to produce reproducible and portable records of analyses
- Manipulate data to create summaries and figures
- Test a statistical null hypothesis
- Build simple linear models
- Communicate statistical evidence in scientific language

Judgement and approach

- Relate scientific questions to linear equations
- Evaluate model quality and fit using diagnostics
- Interpret and evaluate coefficients for linear models

Course content

The course provides knowledge in experimental planning and statistics for experimental sciences with natural science examples as a basis. The course mainly deals with simple linear models. The content includes descriptive statistics, basic sampling and estimation methodology, probability distributions, principles of hypothesis testing as well as basic knowledge of spreadsheet software (e.g. MS Excel) and a statistical coding language (e.g. R).

The course is one of the compulsory courses in Bachelor's degree at Faculty of natural sciences, University of Gothenburg and corresponds to the faculty-specific course MSG830, Statistical analysis and experiment planning.

Form of teaching

The teaching is conducted through lectures, computer and calculation exercises and

samplings in the field.

Language of instruction: Swedish
The course is given in both Swedish and English. Note that some literature, examples and other supporting material may only be in English.

Assessment
Examination takes place through written examination and compulsory written assignments and computer exercises.

For students who have not passed the regular examination, additional examination sessions are offered. Possibility to supplement failed compulsory parts can be given, at the earliest, at the next course date and only in case of a vacancy.

A student who has failed a test twice has the right to change examiner, unless weighty argument can be adduced. The application shall be sent to the board of the department and has to be in writing.

Grades
The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U).
For the written examination, grading scale is applied Pass with distinction (VG), Pass (G) and Fail (U).

For written assignments and calculation exercises, grading scale is applied Pass (G) and Fail (U).

To achieve the grade Pass in the course, a 60% success rate on the written examination and Pass on all compulsory components are required. To achieve the grade Pass with distinction 85% on the written examination and Pass on all compulsory components are required.

Concerning application of the ECTS scale for grade please see the decision of Vice-Chancellor 28/05/2007, dnr Pass 8 1976/07 and 28/02/2011, dnr O 2009/5545.

Course evaluation
A written course evaluation is conducted at the end of the course. A compilation of previous course evaluations is presented on the Canvas site for the course and also presented together with potential changes to the following course.