MAT1375 Biometry

[25h+25h exercises] 4 credits

This course is not taught in 2005-2006
This course is taught in the 1st semester
Language: French
Level: First cycle

Aims

The student shall understand, and become able to use correctly and critically the principal methods for the statistical analysis of biological and environmental univariate data. He perceives the relationship between experimental design and analysis model and the necessity of planning experiments, and becomes familiar with computer-aided data analysis.
After completing this course, the student should master the basic methods for the analysis of univariate data, be able to choose the analysis model and method adapted to the design of simple factorial experiments, to analyse and interpret correctly the results of such experiments. He should be able to progress by himself and follow fruitfully advanced lectures on experimental design and data analysis.

Main themes

1) Introduction to the methods of analysis and inference for counts.
2) Linear regression: simple, multiple, polynomial.
3) Analysis of variance: one way, two ways, factorial; crossed or nested factors; fixed or random levels; multiple comparisons of means.
The theoretical lectures and practical works shall rely upon real cases. Practical works will be realized using computer software.

Content and teaching methods

1) Aims of the course, means, support, evaluation. Reminder: bases of statistical inference.
2) Analysis of count data: fitting a probability law, two- and three-way contingency tables (homogeneity tests, independence: marginal, partial, conditional).
3) Simple linear regression: model, estimation, inference, validation, prediction.
4) Multiple regression: modelling the effects, model and design, F-tests and AIC criterion; model selection.
5) One-way analysis of variance: principle, models, tests, comparison of means.
6) Multiple-way Anova: concepts of interaction, nesting, fixed or random factor levels, some designs for heterogeneity control.
7) "What next?" Some indications related to the interests of the students (e.g. linear and non linear modelling, non parametric methods, multivariate analysis, geostatistics, Monte-Carlo methods#).

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

PREREQUISITE
Course "Mat 1275", Statistics in the natural sciences, or an equivalent course.
EVALUATION
Examination based on solving exercises. Written preparation (in a computer class room), oral presentation.
SUPPORT
Syllabus, booklet of exercises + solutions, overheads, software (SAS). This course is on iCampus, where more information is available and where the yearly calendar of activities is posted.