Summary
Introduction to multivariate data analysis and modelling. The course helps for a critical choice of methods and their integration in a research planning. It prepares for complex data analysis in various fields of environmental sciences. Use of dedicated R libraries

Content
- Biological and environmental descriptors, multidimensional data, coding and transformation
- Resemblance and dependence measures, association matrices
- Analysis of discontinuities: unsupervised clustering techniques
- Analysis of discontinuities: supervised clustering, regression and classification trees
- Gradient analysis: ordination techniques in reduced space (PCA, CA, PCoA, NMDS)
- Direct gradient analysis: symmetric coupling of tables (COIA, MFA)
- Direct gradient analysis: constrained ordination (RDA, CCA, pRDA, pCCA, db-RDA)
- Statistical tests for multivariable responses

Keywords
Multivariable analysis, statistics for complex data sets

Learning Prerequisites
Recommended courses
Probabilities and statistics
Experimental Design and Data Analysis with R" (EDDAR - ENG 467)

Learning Outcomes
By the end of the course, the student must be able to:
- Select appropriately methods for data analysis knowing the basic principles of calculation et the field of their application
- Construct a plan for data analysis
- Interpret properly the results given by the different methods
• Apply the methods with exercises and a personal project
• Work out / Determine means for combining data from two or more independent data sets describing the same objects and test the relationship

Teaching methods
Lecture and exercises on computer, personal project for applying methods.

Expected student activities
Participating at the lecture and reading hand-out
Applying the various methods with exercises and provided data set
Personal project with report and defense

Assessment methods
40 % spot written control (2h) during the semester
10 % continuous control (exercises) during the semester
50 % oral exam (30 min) during exam session

Supervision
Office hours Yes
Assistants Yes

Resources
Bibliography

BIBLIOGRAPHY

*** for theory and fundamental concepts
* to work with R (codes)

Ressources en bibliothèque
• Numerical Ecology / Legendre
• Numerical Ecology with R /Borcard
• Data analysis in community and landscape ecology / Jongman

Notes/Handbook
Available on Moodle.epfl.ch

Websites
• http://www.r-project.org/
• http://cran.r-project.org/

Moodle Link
• http://moodle.epfl.ch/course/view.php?id=1361

Prerequisite for

Statistiques multivariables avec R
Master project