

ENV-513 Multivariate statistics in R

| Peter | Hannes | Markus |
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| Cursus | Sem. | Type |
|--|----------|------|
| Civil & Environmental Engineering | | Opt. |
| Environmental Sciences and Engineering | MA1, MA3 | Opt. |

| Language of teaching | English |
|----------------------|----------|
| Credits | 4 |
| Session | Winter |
| Semester | Fall |
| Exam | Written |
| Workload | 120h |
| Weeks | 14 |
| Hours | 3 weekly |
| Lecture | 2 weekly |
| Exercises | 1 weekly |
| Number of positions | |

Summary

Data required for ecosystem assessment is typically multidimensional. Multivariate statistical tools allow us to summarize and model multiple ecological parameters. This course provides a conceptual introduction and guidelines for the use of multivariate statistical tools using the R platform.

Content

- 1. Biological and environmental data, multidimensional data, and the R platform
- 2. Resemblance, similarity and dependence measures
- 3. Unsupervised and supervised clustering techniques
- 4. Ordination techniques (PCA, CA, PCoA, NMDS)
- 5. Constrained ordination (RDA, CCA, db-RDA)
- 6. Statistical tests for multivariable responses (anosim, betadisper)

Keywords

Multivariable analysis, statistics for ecological data sets, ordination, clustering

Learning Outcomes

By the end of the course, the student must be able to:

- Explore multivariate datasets
- Select appropriately the methods for multivariate data analysis
- Explain the basic principles of various tools
- Interpret obtained results
- · Apply methods in exercices and in a personal project

Transversal skills

• Communicate effectively with professionals from other disciplines.

Teaching methods

Lectures and computer exercises. Personal projects.

Expected student activities

Multivariate statistics in R Page 1 / 2



- Active participation in lectures and excercises.
- Application of methods to example and a personal dataset
- Presentation of results (oral and written)

Assessment methods

- active participation (20%)
- oral presentation (30%)
- written exam (50%)

Supervision

Office hours Yes
Assistants Yes
Forum Yes
Others moodle

Resources

Moodle Link

• https://go.epfl.ch/ENV-513

Multivariate statistics in R Page 2 / 2