



UNIVERSIDADE FEDERAL DE SANTA CATARINA
PÓS-GRADUAÇÃO EM ECOLOGIA



SYLLABUS

SEMESTER 01 / 2023

1. COURSE IDENTIFICATION

CODE	COURSE	WEEKLY HOUR/CLASSES		TOTAL HOURS SEMESTER
ECO410032-41000068DO/ME	Basic Statistics			60
	Number of students	minimum: 4	Maximum: 26	Credits: 4

2. TIMETABLE

13 March to 03 April 2023. Mornings (09:00–12:00h) Afternoons (14:00–17:00h, except Mondays until 16:00)
100% In person

3. INSTRUCTORS

Prof. Nei Kavaguichi Leite and Prof. Luis Macedo Soares

4. COURSE OFFER

Graduate Program in Ecology at UFSC

5. SYLLABUS

Sampling, collecting and displaying data. Types of data. Graphics and tables. Measures of central tendency, variability, and dispersion. Hypothesis testing, confidence intervals. Parametric tests: 't' test, Analysis of Variance. Non-parametric tests: chi-square, Mann-Whitney, Kruskal-Wallis, Friedman. Linear Regression and correlation.

6. GOALS

To train MSc and PhD students in their first steps in basic statistical analysis and inference. We expect that all students who finished the course will have a background to start learning Multivariate Data Analysis and Statistical Modeling.

7. PROGRAM CONTENT

- Ecological question and hypothesis;
- Sampling, collecting and displaying data. Types of data. Graphics and tables. Measures of central tendency and dispersion;
- Introduction to probabilistic models: discrete and continuous data;
- Inference, assumptions of parametric tests, non-parametric tests;
- t test, Analysis of Variance: single factor, two factor, randomizes blocks;
- Linear Regression, correlation and Analysis of Covariance;
- Future perspective to Ecologists: Multivariate Data Analysis and Statistical Modeling.

8. TEACHING METHOD / PROGRAM DEVELOPMENT

The course will be offer during March and early April 2023, in lectures in class.

9. EVALUATION METHOD

Quizzes about descriptive statistics, probabilistic models, t test. Linear regression exercise.

The final grade will be composed of the sum of the Quizzes (30%) and the Linear Regression exercise (70%).

10. SCHEDULE

	Morning (09:00–12:00h)	Afternoon (14:00–17:00h, except Mondays until 16:00)
Monday 13	Presentation and Introduction, Ecological question and hypothesis	Ecological question and hypothesis, Questionnaires about student's projects (hypothesis and main goals) before the course (attendance in person)
Wednesday 15	Sampling, collecting and displaying data. Types of data. Graphics and tables. Measures of central tendency and dispersion	Data bases versus spreadsheets. Data bases versus spreadsheets: exercises
Friday 17	Introduction to probabilistic models: discrete data, continuous data.	Inference
Monday 20	Assumptions of parametric tests	Comparing two means: <i>t</i> test
Wednesday 22	Non-parametric tests: chi-square, Mann-Whitney, Kruskal-Wallis, Friedman	<i>t</i> test, independent samples, paired samples
Friday 24	Linear Regression and introduction to Linear Models, Correlation	Linear Regression and introduction to Linear Models, Correlation
Monday 27	Analysis of Variance: single factor and poshoc tests	ANOVA and poshoc tests in R and Linear Models in R: contrasts and interpretation
Wednesday 29	Analysis of Variance randomizes blocks and factorial	ANOVA in blocks and factorial in R and Linear Models in R: contrasts and interpretation
Friday 31	Analysis of Covariance and Linear Models in R: contrasts and interpretation	Future perspective to Ecologists: Multivariate Data Analysis and Statistical Modeling (synchronous)
Monday 3	Questionnaires about student's projects (hypothesis and main goals): presentation after (attendance in person)	Questionnaires about student's projects (hypothesis and main goals): presentation after (attendance in person)

11. BASIC LITERATURE

Gotelli, N.J.; Ellison, A.M. *Princípios de Estatística em Ecologia*. 1ª Ed. Porto Alegre: Artmed, 532p, 2010.

IBGE. *Normas de apresentação tabular*. 3ª Ed. Brasília: IBGE, 61p, 1993.

Magnusson, W.E.; Mourão, G.; Costa, F.R.C. *Estatística sem matemática*. 2ª Ed. Londrina: Editora Planta, 214p, 2015.

Crawley, M. *The R Book*, 2 ed. Wiley.

Dytham, C. *Choosing and Using Statistics: A Biologist's Guide*. 3ª Ed. Chichester: Wiley-Blackwell, 320p, 2011.

Hector, A. *The New Statistics with R - An Introduction for Biologists*, 1ª Ed. Oxford: Oxford University Press, 199p, 2015.

Vieira, S. *Análise de Variância (ANOVA)*. 1ª Ed. São Paulo: Editora Atlas, 206p, 2006.