

Module Name	1.5 Statistical and Mathematical tools in process Analysis
Identification code	AEF306, EM1.5 (QIS-registration for examination) 71500
Subtitle	
Courses embedded	
Term	Winter
Coordinator	Dr. G. Hörmann
Teachers	Dr. G. Hörmann Prof. Dr. I. Unkel
Tuition language	English
Programme involvement	Elective MSC Environmental Management
Teaching form, contact time per week class size	Lecture 15h/45h, Dr. Hörmann/Prof. Dr. Unkel Exercises 45h/135h, Dr. Hörmann/Prof. Dr. Unkel 25
Workload overall Contact time	60h/180h
ECTS credit points	6
Preconditions prescribed	
Prerequisites recommended	
Learning outcomes	Students learn to apply statistical methods for ecological research. After an introduction into common computer tools for data management and data analysis (spreadsheets, data bases, shells for statistics modeling) The students learn to use methods for the statistical interpretation of ecological data. Exercises include the use of common computer programs for calculations, e.g. Excel and R, fundamentals fundamentals of descriptive and inferential statistics, e.g. means, standard deviation, ANOVA, regressions. Furthermore, students learn specific methods of biological ecology, e.g. similarity coefficients, ordination, multivariate methods. Time series analysis is used to analyze fluctuations and interference between parameters. A special unit is devoted to the treatment of spatial data..
Content	Descriptive statistics: mean, standard deviation, confidence interval. Inferential statistics: regression, ANOVA. Biological methods: rarefaction, ordination methods, clustering. Time series analysis: spectral analysis, cross correlation, analysis of spatial data
Assessment	Written exam 100%
Teaching media	Presentations, computer exercises
References	- http://davidmlane.com/hyperstat/intro.html - Jongman R.H.G., Braak C.J.F., van Tongeren O.F.R.: Data analysis in community and landscape ecology. Cambridge University Press, 1995. - Kabacoff, R.I., R in Action. Manning Publications, 2011 - www.r-project.org - Logan Murray, 2010: Biostatistical Design and Analysis Using R - A Practical Guide
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