

Statistical methods in natural sciences (VT 2017)

Location: Seminar room 1003 at EBC, entrance at Norbyvägen 18D.

Course text book: Quinn, G.P. and Keough M.J. 2002. *Experimental design and data analysis for biologists*. Cambridge. This very good and general book is required reading, and should be purchased, borrowed or otherwise be made available, well ahead of time by everyone taking the course.

Important note: The course **assumes** that you have a basic understanding of statistical estimation and inference (corresponding to chapters 1-3 in the course text book).

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Date	Time	Topic	Reading ¹
Tue 24/1	12.00 -14.00	Course start - information and introduction. L1: Statistical inference, power analysis and experimental design. Introduction to practical I. Brief introduction to statistical software (at the end).	Pp 32-44; 155-172; A.
Thu 26/1	12.00 -13.00 ²	<i>R support/workshop</i>	
Thu 26/1	13.00 -15.30	L1 continued and L2: Meta-analysis. Presentation of practical I.	Pp 50-51; A.
Tue 31/1	13.00 -15.30	L3: Linear regression and multiple regression analysis.	Pp 72-99; 111-142.
Thu 2/2	13.00 -15.30	L4: One-way analysis of variance and F-tests, transformations of data.	Pp 58-68; 173-207.
Tue 7/2	12.00 -14.00	L5: More complex linear models: nested, factorial, randomized blocks and repeated measures designs.	Pp 208-254; 262-273; 301-315.
Thu 9/2	13.00 -15.30	L6: Analysis of covariance. Introduction to practical II.	Pp 339-352.
Tue 14/2	12.00 -13.00 ²	<i>R support/workshop</i>	
Tue 14/2	13.00 -15.30	Presentation of practical II.	
Thu 16/2	13.00 -15.30	L7: Generalized linear models, including logistic regression and linear models with Poisson and binomial errors. Introduction to practical III.	Pp 359-372.
Tue 21/2	12.00 -13.00 ²	<i>R support/workshop</i>	
Tue 21/2	13.00 -15.30	Presentation of practical III.	
Tue 28/2	12.00 -14.00	L8: Resampling and randomization techniques. Introduction to practical IV.	Pp 25-26; 45.
Thu 2/3	12.00 -13.00 ²	<i>R support/workshop</i>	
Thu 2/3	13.00 -15.30	L9: Multivariate methods I: Principal Component Analysis, Discriminant Function Analysis and Manova. Presentation of practical IV.	Pp 401-417; 425-458.
Tue 14/3	12.00 -14.00	L10: Multivariate methods II: multivariate classification and ordination techniques. Introduction to practical V.	Pp 459-493.
Thu 16/3	12.00 -13.00 ²	<i>R support/workshop</i>	
Thu 16/3	13.00 -15.30	Presentation of practical V.	
Tue 21/3	13.00 -15.30	L11: Other current topics in statistics (morphometrics, Bayesian inference, mcmc estimation)	A
Thu 23/3	13.00 -15.30	Final literature discussion - discuss book and solve/discuss a series of hand-out questions.	

¹ Page numbers refer to the course text book; A = refers to separate material that will be distributed by email.

² Non-obligatory **R** support session, for those that want help to do the practicals in R