

Statistical methods in natural sciences (VT 2016)

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 book is required reading, and should be purchased, 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	Topics	Reading ¹
Tue 26/1	13.00 -15.30	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 28/1	12.00 -13.00 ²	<i>R support/workshop</i>	
Thu 28/1	13.00 -15.30	L1 continued and L2: Meta-analysis. Presentation of practical I.	Pp 50-51; A.
Mon 1/2	13.00 -15.30	L3: Linear regression and multiple regression analysis.	Pp 72-99; 111-142.
Thu 4/2	13.00 -15.30	L4: One-way analysis of variance and F-tests, transformations of data.	Pp 58-68; 173-207.
Tue 9/2	13.00 -15.30	L5: More complex analyses of variance: nested, factorial, randomized blocks and repeated measures designs.	Pp 208-254; 262-273; 301-315.
Thu 11/2	13.00 -15.30	L6: Analysis of covariance. Introduction to practical II.	Pp 339-352.
Wed 17/2	12.00 -13.00 ²	<i>R support/workshop</i>	
Wed 17/2	13.00 -15.30	Presentation of practical II.	
Thu 18/2	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 23/2	12.00 -13.00 ²	<i>R support/workshop</i>	
Tue 23/2	13.00 -15.30	Presentation of practical III.	
Thu 25/2	13.00 -15.30	L8: Resampling and randomization techniques. Introduction to practical IV.	Pp 25-26; 45.
Mon 29/2	12.00 -13.00 ²	<i>R support/workshop</i>	
Mon 29/2	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.
Thu 3/3	13.00 -15.30	L10: Multivariate methods II: multivariate classification and ordination techniques. Introduction to practical V.	Pp 459-493.
Tue 8/3	12.00 -13.00 ²	<i>R support/workshop</i>	
Tue 8/3	13.00 -15.30	Presentation of practical V.	
Thu 10/3	13.00 -15.30	L11: Other current topics in statistics (morphometrics, Bayesian inference, mcmc estimation)	A
Mon 14/3	13.00 -15.30	Final literature discussion - 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 need help to do the practicals in R