I11M Applied statistical modelling

Modul	**Applied statistical modelling (Angewandte Statistische Modellierung)**							
Code	**M.qmw.01**							
Coordinator	Prof. Dr. S. König							
Language	Englisch							
Stud. Workload	180h (84 Kontaktstunden)							
Credits	6 ECTS							
Frequency (WS/SS)	SS							
Instructor	Prof. Dr. S. König, NN							
Contents	Linear models constitute one of the most commonly applied methods for data analyses in the field of agricultural science. They comprise a wide range of possibilities with respect to assumptions about variables and their distributions, including fixed, random and mixed regression models. In the beginning of the course, students are introduced to the basic concepts of matrix algebra and their applications, including Generalized Inverses and estimability. They are also introduced to the writing of static models and basic programming skills in the software package R, which is used for the practicals and exercises. Different formulations of linear models are then introduced, including Regression Models, Classificatory Models and Mixed Models including covariates, fixed and random effects. Additional issues related to model building are presented, such as Multicollinearity, Model Choice and Model Comparison and tests of hypotheses. An extension of those topics includes Generalized Linear Mixed Models for the analyses for categorical or Poisson distributed data (count variables), as well as non-parametric tests. A large amount of hands on examples and exercises constitute an important aspect of the course, enabling the students to understand and assimilate the theoretical content. Practical analyses of example data sets also provide the students with the required experience and skills to perform their own modeling. The course provides a substantial framework for future statistical tasks in the context of Master- or PhD-theses.							
Objectives	The aim of the course is to familiarize students with the basic concepts of statistical linear models and their extensions that are routinely used in agricultural science applications. The second goal is for students to learn to apply the covered methods using the software package R.							
Literature	Lecture notes Searle S. R. (1982) Matrix Algebra Useful for Statistics, Wiley Series in Probability and Statistics. Mrode R. A. (2005) Linear Models for the Prediction of Animal Breeding Values, CABI Publishing. Dobson A. & Barnett A. (2008) An Introduction to Generalized Linear Models, Chapman & Hall. Wood S. (2006) Generalized Additive Models: An Introduction with R , Chapman & Hall.							
Study system usability	Economy			Organic			Tropical	
	-			C			C	
Entrance requirements	Mathematics (linear algebra), Statistics							
Instruction type	Lecture		Seminar	Excursion	Practice		Tutorial	Project
Duration [contact h]	28				28		28 (optional)	
Examination type	Oral test	Written test	Homework	Presentation	Protocol	Work report	Proj. work	Proj.pres.
		x	x					
Grade composition	50% written test, 50% homework							