The course focuses on understanding the theory and the use of tools for applying the linear regression model and its generalizations. With a practical focus, it explores different types of regression and problems that arise from applying it. The course also covers examples on diverse models for binary and count data, emphasizing the need to fit appropriate models to the underlying processes that are studied.

The course participants will be able to make use of standard regression analysis techniques, such as linear and logistic regression, and to analyse and critically examine the results. The participants also will gain introductory knowledge on nonlinear regression, generalized linear models and mixed effects models.

Date: 4 December – 22 December 2017, Dr. Hans Petersson

Research School in Applied Forest Statistics and Scientific Programming

Research Courses in 2017

Statistics and Linear Algebra
Applied Experimental Design and ANOVA
Bayesian Statistics and MCMC
Scientific Programming
Applied Spatial Statistics
Regression Analysis

Research School in Applied Forest Statistics and Scientific Programming

is an integrated, international and interdisciplinary research school for MSc-, PhD students and young postdoc researchers. This research school comprises training in quantitative methods as a pre-requisite for competitive high-quality research at national and international level. The courses form a consolidated and consistent system in applied statistics and scientific computing, which is the basis of any research at SLU. As such our research school is a platform for other research schools or individual courses in quantitative research to build on and to plug in. The courses are deliberately designed to stress the applied and interdisciplinary side of statistics for non-specialists. The course participants are also encouraged to bring their own problem to the class.

Chair of Mathematical Statistics Applied to Forest Sciences
Department of Forest Resource Management
SLU Umeå
Contact: jaime.uria.diez@slu.se

Statistics and Linear Algebra

The course participants will be able to analyse data visually, using exploratory data analysis, as well as statistically, using univariate statistical tools, and also to critically examine the validity of the statistical analyses.

The participants will possess an elementary knowledge of linear algebra, sufficient to build an understanding and working knowledge of multivariate statistical tools to be studied in the courses Multivariate Statistics, Regression Analysis and Design of Experiments.

Date: 1 March – 15 March 2017, Dr. Anders Muszta

Applied Experimental Design and ANOVA

The course participants will be introduced to the main experimental designs of field experiments, basic concepts of and the most important factors influencing experiments.

The participants will learn about the main designs of field experiments and of the most important statistical tests associated with the analysis of variance (ANOVA). A few of the topics addressed are: biological variability, randomised blocks, one-way ANOVA, split-plot ANOVA, chronosequences and analysis of covariance.

Date: 3 April – 7 April 2017, Prof. Arne Pommerening

Bayesian Statistics and *Markov Chain Monte Carlo Methods*

The participants will be able to analyse data from a Bayesian perspective and also to critically examine the validity of the analyses.

A few of the topics addressed include: Markov chains and how and when their probability distributions converge to a stationary distribution; the Monte Carlo method of approximating integrals based on the Law of Large Numbers from Probability Theory, fundamental principles of Bayesian inference.

Date: 3 May – 17 May 2017, Dr. Anders Muszta

Scientific Programming and Simulation

For many studies increasingly the application of advanced quantitative methods including simulations are required. Standard software for these specialised applications is not available and researchers are often faced with the task to develop their own computer code. This task is not easy for non-specialists, particularly if several programming languages have to be used at the same time.

The participants will be introduced to the essential concepts and techniques in programming necessary to directly engage in its scientific use.

Date: 12 June – 16 June 2017, Dr. Gerhard Nachtmann, Dr. Sebastian Schnell, Prof. Arne Pommerening

Applied Spatial Statistics

During the last 50 years spatial statistics has emerged as a special branch of statistics with a wide range of methods that have considerably improved our ability to identify and quantify spatial patterns and opened the possibility of linking them to environmental processes. Most of these methods were first developed in mathematical statistics and later found applications in various fields of natural sciences. The course discusses approaches to spatial woodland structure analysis and modelling in the wider context of spatial statistics with particular emphasis on point process statistics. It explores how these approaches relate to each other and considers important differences in concepts and assumptions.

Date: 16 October – 20 October 2017, Prof. Arne Pommerening