Statistics using R (Gothenburg in spring 2017, examiner Olle Nerman)

This is the course for graduate students in science who are struggling with proper statistical treatment of their data on a basic level. The course is built on a set of exercises that displays the increasing complexity in data analysis using statistical methods.

There is typically a gap between statistical knowledge and hands-on skills of graduate students in sciences and their actual abilities. Increasingly, scientific data analyses, and statistical understanding, are needed for their theses and in their future research careers. In particular, there is a growing importance of empirical research involving large, multivariate, partly unstructured data. This motivates graduate courses that train students in using flexible statistical computing environments, explorative modelling based on appropriate graphics, and on model selection techniques. Certainly a whole bunch of more traditional, formal statistical approaches are still relevant to their particular areas of science research.

R is the primary programming tool for statistical data analysis. It is a free statistical environment that has been created by the academic community. Besides statistics, it is also widely used in other empirical research fields and in industry. Our experience is that students who are used to other languages (Matlab, Python etc.) quickly get used to R, and that experience in R will be useful even if the use of Matlab or Python would be required in the future. Previous experience of programming is not required.

- The main purpose of this (5cu) graduate course is to introduce and train you in using the computational statistical environment R to an appropriate level of skills and understanding to facilitate use of R in your daily research. If you choose to cut the course after two first teaching blocks you will get a shorter (3cu) course variant.

- A second purpose is to make you better understand and extend your knowledge of basic statistical notions and when, where, and how to utilize basic standard methods.

- A third purpose is to make you more aware of the huge potential of statistical methods and analysis tools that are available to use, to adapt, or to develop further in connection to your specific data analysis problem areas.

The course is designed as a second course in statistics, and you should already have had at least a basic undergraduate course in statistics of a size corresponding to at least 2-3 weeks of full time studies. We will make it possible for students to work with data from their own research, when teaching methods relevant for that type of data. While the core course focuses primarily on hands-on skills for data analysis, optional exercises designed to deepen statistical understanding will also be available.

Two graduate students in Mathematical Statistics, Jonatan Kallus and Sebastian Jobjörnsson will teach initial parts and supervise computer labs.

Besides this course, Mathematical Sciences Department and the Science Faculty at GU plan to regularly offer graduate student courses of a more advanced and specialized nature. Here is a preliminary list of such courses

- Experimental Planning,

- Linear and Generalized linear models including mixed models,

- Computer Intensive Statistical analysis and Bayesian statistical methods,

- Time series analysis with spatial statistics, and

- Statistical Approaches in Large Scale Genomics.

These topics are all touched upon in this course in a final block of introductory talks of a spectrum of GU-Chalmers specialists. In this block you will also have the possibility to perform an individual project adapted to your own research.

The course takes place in Mathematical Sciences facilities on Chalmers Campus Johanneberg in three blocks, each with three full day studies in class. You should reserve

- Monday 27 February-Wednesday 1 March (9.00-16.00)

- Monday 8 March-Wednesday 10 March (9.00-16.00)

- Wednesday 5 April-Friday 7 April (9.00-16.00)

for lectures and computer labs in class. Students should add an equal amount of equally distributed self-study time, set aside between 1 March and 15 April.

Apply before Wednesday 15 February 2017, by sending a mail to kallus@chalmers.se. Please mention at which department you are studying.

See course page for more info:
http://www.chalmers.se/sv/institutioner/math/forskning/forskarutbildning/forskarutbildning-matematisk-statistik/forskarutbildningskurser-matematisk-statistik/Sidor/Statistics-using-R.aspx