Applied Statistical Regression – HS 2011

People:

Lecturer: **Dr. Marcel Dettling** (marcel.dettling@zhaw.ch)

Coordinators: **Christian Kerkhoff** (kerkhoff@stat.math.ethz.ch)
Philipp Rütimann (rutimann@stat.math.ethz.ch)

Course Schedule:

All lectures will be held at HG D1.1, on Mondays from 8.15-9.00, resp. 9.15-10.00.

Week	Date	L/E	Topics
01	**19.09.2011**	**---**	**---**
02	**26.09.2011**	**L/L**	**Simple regression**
03	**03.10.2011**	**E/E**	**Introduction to R**
04	**10.10.2011**	**L/L**	**Multiple regression**
05	**17.10.2011**	**L/E**	**Model diagnostics**
06	**24.10.2011**	**L/L**	**Model extensions**
07	**31.10.2011**	**L/E**	**Model choice 1**
08	**07.11.2011**	**L/L**	**Model choice 2**
09	**14.11.2011**	**L/E**	**Introduction to GLMs**
10	**21.11.2011**	**L/L**	**Logistic regression**
11	**28.11.2011**	**L/E**	**Regression for count data**
12	**05.12.2011**	**L/L**	**Regression for nominal and ordinal response**
13	**12.12.2011**	**E/E**	**Exercises**
14	**19.12.2011**	**L/L**	**Advanced Topics**

Exercise Schedule:

The exercises start on October 3, 2011 from 8.15 to 10.00 with an introduction to the statistical software package R, which will be held at the computer labs. Thereafter, the exercise schedule is as follows:

Series	Date	Topic	Hand-In	Discussion
01	03.10.2011	Data analysis with R	---	03.10.2011
02	03.10.2011	Simple linear regression	10.10.2011	17.10.2011
03	17.10.2011	Multiple regression/diagnostics	24.10.2011	31.10.2011
04	31.10.2011	Multiple regression/various	07.11.2011	14.11.2011
05	14.11.2011	Model choice	21.11.2011	28.11.2011
06	28.11.2011	Logistic regression	05.12.2011	12.12.2011
07	12.12.2011	Count and ordinal data	---	12.12.2011

All exercises except the first one take place at HG E41 (group of Kerkhoff) and HG D1.1 (group of Rütimann). All students whose last name starts with letters A-K visit the group of Kerkhoff, whereas the ones with letters L-Z visit the Rütimann group.

The solved exercises should be handed in at the end of the lecture of the due date or placed in the corresponding tray in HG J68 until 12.00am. Please note that only recapitulatory documents shall be handed in, but no R script files.

Software:

The exercises will be based on the statistical software package R. This is a freely available open source suite which works on all platforms, see (http://stat.ethz.ch/CRAN/). A good primer is the R tutorial that will be discussed in the exercises of October 4. Further documentation is available from CRAN.

Written Material

There is a scriptum for this course. The scriptum, as well as the slides that are presented during the lectures, the exercise sheets, the sample solutions and some instructional datasets are also available for download from the course website at http://stat.ethz.ch/education/semesters/as2011/asr.

Attendance Certificate:

There are no conditions for obtaining the attendance certificate. This also holds for PhD students that are after ETH credit points for their doctorate. All doctoral students, as well as other attendants who are after ECTS credit points need to attend and pass the exam for getting the credits awarded

Exam

There will be a written exam during the regular session that lasts 120 minutes. It will be "open book", thus you are allowed to bring any written materials you wish. We also recommend bringing a pocket calculator. However, notebooks/computers are not allowed.

Literature:

1) **Linear Models with R**, Julian J. Faraway, Chapman & Hall/CRC (2005). ISBN-10: 1584884258. 229 pages, ca. 70$.

   There is a freely available version on CRAN, entitled **Practical Regression and Anova using R**: http://cran.r-project.org/doc/contrib/Faraway-PRA.pdf. This free version is not identical to the book, but it is still a very good reference. For the later chapters of the course, the second volume of Faraway's regression literature is required:

   Extending the Linear Model with R, Julian J. Faraway, Chapman & Hall/CRC (2006). ISBN-10: 158488424X. 312 pages, ca. 75$.

2) **Applied Regression Analysis**, N. Draper and H. Smith, Wiley Interscience, 3rd Edition (1998). ISBN-10: 0471170828. 736 pages, ca. 100$.

3) **Introduction to Linear Regression Analysis**, D. Montgomery, E. Peck, G. Vining, Wiley-Interscience, 4th Edition (2006). ISBN-10: 0471754951. 640 pages, ca. 85$.

4) **Applied Regression Analysis and Generalized Linear Models**, J. Fox, Sage Publications, 2nd Edition (2008). ISBN-10: 0761930426. 688 pages, ca. 82$.