

Applied Statistical Regression – AS 2012

People:

Lecturer: **Dr. Marcel Dettling** (marcel.dettling@zhaw.ch)
Coordinators: **Christopher Nowzohour** (nowzohour@stat.math.ethz.ch)
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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	17.09.2012	---	---
02	24.09.2012	L/L	Linear Modeling, Smoothing
03	01.10.2012	E/E	Introduction to R
04	08.10.2012	L/L	Simple Regression, Variable Transformations
05	15.10.2012	L/E	Fitting Multiple Linear Regression Models
06	22.10.2012	L/L	Inference for Multiple Linear Regressions
07	29.10.2012	L/E	Extensions: Categorical Variables, Interactions
08	05.11.2012	L/L	Model Diagnostics: Residual Plots
09	12.11.2012	L/E	Model Choice: Variable Selection
10	19.11.2012	L/L	Cross Validation, Modeling Strategies
11	26.11.2012	L/E	Logistic and Binomial Regression
12	03.12.2012	L/L	Regression for Nominal and Ordinal response
13	10.12.2012	L/E	Poisson Regression for Count Data
14	17.12.2012	L/L	Advanced Topics

Exercise Schedule:

The exercises start on October 1, 2012 from 8.15 to 10.00 with an introduction to the statistical software package R. This takes place at the computer labs, the rooms will be communicated by the coordinators via e-mail. Then, the exercise schedule is as follows:

Series	Date	Topic	Hand-In	Discussion
01	01.10.2012	Data Analysis with R	---	01.10.2012
02	01.10.2012	Simple Regression	08.10.2012	15.10.2012
03	15.10.2012	Multiple Regression 1	22.10.2012	29.10.2012
04	29.10.2012	Multiple Regression 2	05.11.2012	12.11.2012
05	12.11.2012	Multiple Regression 3	19.11.2012	26.11.2012
06	26.11.2012	Logistic Regression	03.12.2012	10.12.2012
07	10.12.2012	Count and Ordinal Data	---	10.12.2012

All exercises except the R introduction take place at HG E41 (group of Nowzohour) and HG D1.1 (group of Jimenez). All students whose last name starts with letters A-K visit the group of Nowzohour, whereas the ones with letters L-Z visit the Jimenez 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 final 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 1. 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/as2012/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\$.