

STOCKHOLM UNIVERSITY Department of Statistics Dan Hedlin

Autumn semester 2012 (updated 2012-10-30)

Statistical Methods (Parts 1 and 2), 15 ECTS. (Statistiska metoder, AN, 15 hp)

Course description for Part 1 (previously referred to as Block 1), 7,5 ECTS.

Literature

- Hansson, S.O. (2007). The art of doing science. Department of Philosophy and the History of Technology, Royal College of Stockholm. Chapters 1, 3-8. Will be made available by the lecturer (=Dan); however the original Swedish version, "Konsten att vara vetenskaplig", can be found here: <u>http://home.abe.kth.se/~soh/downloads.htm</u>.
- Biemer, P.P. (2011). Latent class analysis for survey error. Wiley. Chapters 2-4 and also Chapter 5 if time permits.
- Freedman, D.A. (2009). Statistical models. Theory and Practice. 2nd Ed. Cambridge University Press. Chapter 1, Ch 5, part of Ch 6 + some of the articles reprinted in the book. Chapter 8 if time permits.
- Additional articles.

Preliminary plan

The art of doing science

SOH=The art of doing science, by Sven Ove Hansson. Ch=Chapter

SOH sections 1.3-1.5. What type of science is statistical science (is it science at all)? SOH section 1.6. Are there objective statistical methods? Is frequentist inference objective? See also article "Statistical analysis and the illusion of objectivity" by J.O. Berger and D.A Berry. SOH Ch 2. Extremely important but not part of this course.

SOH Ch 3. On observations and measurement. Is it possible to "just observe" and record data objectively?

SOH Ch 4. Note Hansson's point that experiments have always been in use, worldwide. So what is statistics' contribution to the area? See also Freedman Chapter 1.

SOH Ch 5. The value of parsimonious approaches, Occam's razor, randomness and tests.

SOH, Ch 6, Models. How does statistical models relate to science?

SOH, Ch 7. Can statistics explain anything in the real world at all?

SOH, Ch 8. On causes. SOH, Ch 9. Not part of this course

Latent class analysis for survey error.

Biemer Ch 2. Measurement errors. How can they be observed and modelled? How can (nonobserved) measurement error be reported to users of statistics? Biemer Ch 3. Models for two measurements of the same characteristic. Biemer Ch 4-5. Latent class models, i.e. models on events or characteristics that you cannot observe.

What is random in a statistical analysis?

The conditionality principle, random sample sizes and model-based inference. What is random in poststratification? Why use random sampling? Article: Hansen, Madows and Tepping (1983). Journal of the American Statistical Association, pages 776-793. Possibly some other articles and notes.

Data snooping (using the same data twice)

Friedman Ch 5. Perhaps an article by Chatfield, but it is long.

Causation

Friedman Ch 6. Path models and causation. Can we ever infer causation in statistics?

Is EDA a scientific method? Is factor analysis a scientific method?

Article: Armstrong, The American Statistician

Assessment and grading criteria

Part 1 is assessed through course work (one or several).

	1	
A.	Excellent	90-100 points
B.	Very good	80-89 points
C.	Good	70-79 points
D.	Satisfactory	60-69 points
E.	Pass	50-59 points
Fx.	Inadequate	40-49 points
F.	Completely inadequate	Anything less than 40

The maximal total credit is 100 points. Grades are given on a seven-point rating scale:

To pass Part 1 a minimum grade of E is required.

All the credit points from the assignments need to be achieved at this period of teaching (semester). Students not passing the course during the present semester, are requested to contact the course coordinator at the beginning of the course (the next time the course will be given) for information about the current rules for examination (they must make all the assignments again at that time).

No credit points from the assignments achieved at this semester can be transferred to the next time the course will be given.

Final grade for the complete course Statistical Methods (Parts 1 and 2), 15 ECTS. (Statistiska metoder, AN, 15 hp):

Grades for Part 1 and Part 2 (independent of order)	Final grade for the complete course	
A + A, A + B	А	
A + C, B + B, B + C	В	
A + D, A + E, B + D, B + E, C + C, C + D	С	
C + E, D + D, D + E	D	
$\mathbf{E} + \mathbf{E}$	E	

To pass the complete course a minimum grade of E on each of Part 1 and Part 2 is required.

Course coordinators and examiners:

Part 1: Dan Hedlin, office B795, tel. 08-162975 Part 2: Raul Cano, office B742, tel. 08-162977.

The course description for Statistical Methods Part 2, 7.5 ECTS, is given in another document.