



**Karolinska
Institutet**

Course syllabus for

Advanced Statistics in Epidemiology, 7.5 credits

Avancerad statistik inom epidemiologi, 7.5 hp

This course has been cancelled, for further information see Transitional provisions in the last version of the syllabus.

Please note that the course syllabus is available in the following versions:

Spring2013 , Spring2014 , Spring2015 , Spring2016 , Autumn2016

Course code	4FH065
Course name	Advanced Statistics in Epidemiology
Credits	7.5 credits
Form of Education	Higher Education, study regulation 2007
Main field of study	Public Health Sciences
Level	AV - Second cycle
Grading scale	Pass with distinction, Pass, Fail
Department	Department of Global Public Health
Decided by	Programnämnd 5
Decision date	2012-10-29
Revised by	Education committee PHS
Last revision	2018-10-09
Course syllabus valid from	Autumn 2016

Specific entry requirements

A Bachelor's degree or a professional qualification worth at least 180 credits in public health science, healthcare or other relevant social sciences subject area. English language skills equivalent to English B at Swedish upper secondary school.

Objectives

The objective of this course is to teach the students the biostatistics skills needed to perform statistical analysis of public health and epidemiologic data. The student will develop knowledge to choose, apply and interpret appropriate regression models to conduct his/her present and future research in public health epidemiology.

After successfully completing the course students should be able to:

- * explain the main assumptions of linear regression models and in what scenarios they can be violated;
- * propose, adjust, interpret, and perform diagnostic checks of linear regression models;
- * explain the assumptions and uses of logistic and count data regression models and how these differ from linear regression models;

- * propose, adjust, interpret, and perform diagnostic checks of logistic and count data regression models;
- * appropriately specify, adjust, and interpret results of non-parametric and semi-parametric models for survival data;
- * use SPSS software to carry out the above tasks.

Content

The course covers linear regression, logistic regression, count data regression, generalised linear models, life tables and non-parametric and semi-parametric models for survival data. Among the topics covered are: hypothesis testing and confidence intervals for regression model parameters, maximum likelihood estimation and least squares criteria, model diagnostics, goodness of fit, collinearity and multicollinearity, fitted values, residuals.

Teaching methods

The course is a mix of lectures and computing tutorials. In lectures, statistical concepts needed to understand regression models are introduced, illustrated, and discussed in class and group discussions. In computing tutorials, the statistical concepts are illustrated with examples from epidemiological studies and/or epidemiological data. Lectures and tutorials are alternating so as to give the student an opportunity to practice the methods taught in lectures in the computer laboratory. The software used is SPSS and once per week, STATA software exercises are introduced.

Examination

The acquired knowledge and skills will be examined through home examination, theoretical examination and practical examination. The grades used are fail, pass, pass with distinction.

Limited number of examinations or practical training sessions

Students who have not passed the regular examination are entitled to participate in five more examinations. If the student is not approved after four examinations, he/she is recommended to retake the course at the next regular course date, and may, after that, participate in two more examinations. If the student has failed six examinations/tests, no additional examination or new admission is provided.

The number of times that the student has participated in one and the same examination is regarded as an examination session. Submission of a blank examination is regarded as an examination. An examination for which the student registered but not participated in, will not be counted as an examination.

Transitional provisions

The course has been cancelled and offered for the last time spring 2016. Examination according to this syllabus will be offered for the last time spring 2018 for students that did not pass the course.

Other directives

Course evaluation will be carried out in accordance with the guidelines established by the Board of Education.

The course language will be English.

Literature and other teaching aids

Kirkwood, Betty R.; Sterne, Jonathan A. C.

Essential medical statistics

2. ed. : Malden, Mass. : Blackwell Science, cop. 2003 - x, 501 s.

ISBN:0-86542-871-9 LIBRIS-ID:8731249

[Library search](#)

Hosmer, David W.; Lemeshow, Stanley; Sturdivant, Rodney X.

Applied logistic regression

3. edition : Hoboken, N.J. : Wiley, 2013 - xvi, 500 s.

ISBN:9780470582473 (hbk.) LIBRIS-ID:13988873

URL: [Länk](#)

[Library search](#)

Teaching aids

IBM SPSS Statistics Base 19 Users Guide.

IBM SPSS Regression 19.

IBM SPSS Advanced Statistics 19.

Armitage, Peter; Berry, Geoffrey; Matthews, J.N.S.

Statistical methods in medical research

4. ed : Oxford : Blackwell Science, 2002 - xi, 817 s.

ISBN:0-632-05257-0 LIBRIS-ID:8293285

[Library search](#)

Dupont, William D.

Statistical modeling for biomedical researchers : a simple introduction to the analysis of complex data

2. ed. : Cambridge, UK : Cambridge University Press, 2009. - xx, 522 s.

ISBN:978-0-521-84952-4 (hardback) LIBRIS-ID:11299500

[Library search](#)