



**Karolinska
Institutet**

Course syllabus for

Biostatistics 1, 7.5 credits

Biostatistik 1, 7.5 hp

This course syllabus is valid from autumn 2019.

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

Autumn2019 , [Autumn2023](#) , [Autumn2024](#)

Course code	4FH083
Course name	Biostatistics 1
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	Utbildningsnämnden PHS
Decision date	2018-10-09
Revised by	Education committee PHS
Last revision	2019-03-06
Course syllabus valid from	Autumn 2019

Specific entry requirements

A Bachelor's degree or a professional degree equivalent to a Swedish Bachelor's degree of at least 180 credits in public health science, healthcare or other relevant social sciences subject area. And proficiency in English equivalent to English B/English 6.

Objectives

The aim of the course is to a) provide students with robust knowledge of basic statistics to carry out common statistical analyses used in epidemiology, b) develop skills needed to conduct pertinent analyses, c) adequately interpret the results, d) learn to use of a statistical software.

After completion of the course, the student should be able to:

- Describe empirical distributions of data
- Extract information from theoretical probability distributions
- Describe basic probability rules
- Explain the logic of statistical inference
- Construct and interpret point estimates and confidence intervals.

- Formulate and conduct test of hypothesis
- Explain the type of errors associated with statistical inference
- Compare two or more populations
- Differentiate parametric vs. non-parametric statistics identifying conditions for their use.
- Describe, carry out and interpret common types of statistical analyses of continuous and categorical data

Content

The contents of the course were purposely set and organized hierarchically to be aligned with the learning outcomes as follows: Type of data (dichotomous, continuous, nominal, categorical, ordinal, etc.); handling datasets including defining, computing, selecting and recoding variables for data analyses; measures of central tendency (mean, median, mode); measures of dispersion (range, extreme values, percentiles, variance, standard deviation); table of counts and relative counts; data presentation (tabulations, bar/pie graphs, boxplots, scatterplots, etc.); theoretical probability distributions (normal, binomial, Poisson, Chi-square); central limit theorem; type I error, type II error, power, confidence level; point estimate and confidence intervals; measures of associations (OR-odds ratio); hypothesis testing (null and alternative hypotheses, one-sided, two-sided tests); test of independence for categorical data (Pearson difference between 2 means (student's t-test of independent samples); difference among more than 2 means (ANOVA, F-test, ; non-parametric statistics (sign-test, Mann-Whitney and Wilcoxon tests for independent samples); measures of linear association (Pearson and Spearman correlation) . Analyses will be carried out using the statistical software Stata.

Teaching methods

A combination of teaching techniques (i.e. interactive and traditional lectures, group and independent work, group dynamics, and computer labs) will be used depending on the specific study subject aimed at engaging students in the teaching-learning process to promote reflective thinking and active collaborative education following a deep approach to learning. Lectures, group activities and computer tutorials will be interconnected so that students can link the theoretical knowledge with the practical skills of performing statistical analyses using a computer.

Examination

The course learning outcomes will be assessed using different quantitative instruments:

Weekly review (max 5 points)

Weekly quizzes (max 20 points)

Home assignment (max 15 points)

Final exam max 60 points

Total score max 100 points

To "pass" the course students must attain 65 points or more of the total score. Students that exceed 90 points of the total score will receive "pass with distinction".

Compulsory participation

Some lectures are compulsory as indicated in the schedule.

The course director assesses if and, in that case, how absence can be compensated. Before the student has participated in all compulsory parts or compensated absence in accordance with the course director's instructions, the student's results for respective part will not be registered in LADOK. The grades used are fail, pass or pass with distinction.

Limitation of number of occasions to write the exam

The student has the right to write the exam six times. If the student has not passed the exam after four participations he/she is encouraged to visit the study advisor.

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

Examination will be provided during a time of two years after a possible cancellation of the course. Examination can take place according to an earlier literature list during a time of one year after the date when a major renewal of the literature list has been made.

Other directives

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

The course language is English.

Literature and other teaching aids

Mandatory literature

Course literature is based on key articles, power-point presentations, and handouts. However, the following books will be used as reference or as additional support.

Pagano, Marcello; Gauvreau, Kimberlee

Principles of biostatistics

2. ed. : Pacific Grove : Duxbury, cop. 2000 - xvi, 525 s. , [42] s.

ISBN:0-534-22902-6 ; No price LIBRIS-ID:5036554

[Library search](#)

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](#)

Recommended literature