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Course syllabus for

Basic statistics and computer based statistic analysis, 7.5 credits

Grundläggande statistik och datorbaserad statistisk analys, 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:
Autumn2012 , Autumn2015 , Autumn2016

Course code	4FH059
Course name	Basic statistics and computer based statistic analysis
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	2012-03-29
Course syllabus valid from	Autumn 2012

Specific entry requirements

Bachelor's degree or professional qualification worth at least 180 credits in public health science, healthcare or other relevant social sciences subject area. Proficiency in the English language documented by an internationally recognized test such as TOEFL with a total score of at least 79 (internet based), 550 (paper based), 213 (computer based), IELTS with a total score of at least 6,0 (no band less than 5,0), or other documentation that certifies English language skills equivalent to English B at Swedish upper secondary school.

Objectives

The aim of the course is to provide students with a robust knowledge of basic biostatistics to carry out the common statistical analyses used in epidemiology and to develop the skills needed to conduct pertinent analyses utilizing a computer program (SPSS) and adequately interpret the results.

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

- Understand the basic principles of descriptive and inferential statistics.
- Build, organize and administer databases using the SPSS software.

- Understand the concept of probabilistic sampling and sampling distributions.
- Define conceptual/operational null/alternate hypotheses based on research questions.
- Construct and interpret point estimates and confidence intervals.
- Identify appropriate options for statistical analyses based on the type of data.
- Differentiate parametric vs. non-parametric statistics identifying conditions for their use.
- Understand, carry out and interpret common types of statistical analyses of continuous and categorical data (parametric and non-parametric) using SPSS.
- Understand the basic principles of regression analyses.

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.); proportions, ratios and rates; building, cleaning and administering databases in SPSS (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); data presentation (tabulations, bar/pie graphs, boxplots, scatterplots, etc.); prevalence and incidence (cumulative and density); direct and indirect methods of rate standardization; sample size calculation (type I error, type II error, power, confidence level); point estimate and 95% confidence intervals; measures of associations (OR-odds ratio and RR-relative risk); hypothesis testing (null and alternative hypotheses, one-sided, two-sided tests); confidence intervals (for proportions, means, OR and RR); difference between proportions (Pearson Chi2 and Fisher's exact test); difference between 2 means (student's t-test of independent and related samples); difference among >2 means (ANOVA, F-test, Bonferroni test for multiple comparisons); non-parametric statistics (Kolmogorov-Smirnov test of normality); difference between 2 medians (Mann-Whitney and Wilcoxon tests for independent and related samples); difference among >2 medians (Kurskal-Wallis and Kendall tests for independent and related samples); linear correlation (Pearson and Spearman correlation coefficients for normal and abnormal data); diagnostic test and ROC curve (sensitivity, specificity, predictive positive and negative values); quality of measurement (intra- and inter-observer reliability, kappa coefficient); confusion and interaction (crude and adjusted estimates, statistical methods for adjustment); principles of regression (linear and logistic, simple and multivariate). Analyses will be carried out using IBM-SPSS version 20.

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 assignments (4 x 10 points each)………...40 points
Final theoretical exam……………………………… 30 points
Final practical exam……………………………... 30 points
Total score………………………………………….. 100 points

To "pass" the course students must attain 65 points or more of the total score, with at least 25 points for the assignments and 20 points for each exam. Students that exceed 90 points of the total score in the first attempt will receive "pass with distinction".

Compulsory participation
Some lectures are compulsory

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.

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

After each course occasion there will be at least six occasions for the examination within a 2-year period from the end of the course.

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

Altman, Douglas G.
Practical statistics for medical research

London: Chapman and Hall, 1991
ISBN:0-412-38620-8 LIBRIS-ID:8286190
Library search

Armitage, Peter; Berry, Geoffrey; Matthews, J.N.S.
Statistical methods in medical research

4. ed : Oxford : Blacwell Science, 2002 - xi, 817 s.
ISBN:0-632-05257-0 LIBRIS-ID:8293285
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

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