



INSTITUTE OF ENVIRONMENTAL MEDICINE

C6F3042, Biostatistics I: Introduction for Epidemiologists, 3 credits (hec)

Biostatistik I: Introduktion för epidemiologer, 3 högskolepoäng

Third-cycle level / Forskarnivå

Approval

This syllabus was approved by The Committee for Doctoral Education on 2023-11-16, and was last revised on 2025-04-25. The revised course syllabus is valid from spring semester 2025.

Responsible department

Institute of Environmental Medicine, Faculty of Medicine

Prerequisite courses, or equivalent

No prerequisite courses, or equivalent, demanded for this course.

Purpose & Intended learning outcomes

Purpose

The aim is to introduce classical statistical concepts and methods with emphasis on methods for continuous outcome data.

Intended learning outcomes

After successfully completing this course, students should be able to:

- define the concept of probability, laws of probability, and make simple probability calculations,
- suggest a statistical distribution to describe a naturally occurring phenomenon and evaluate the appropriateness of the distribution given real data,
- present appropriate tabular and graphical descriptions of study data,
- explain the difference between hypothesis testing and interval estimation and the relation between p-values and confidence intervals for the mean,
- explain the necessary assumptions for inference under various tests for continuous data,
- fit and interpret the coefficients of linear regression, with or without adjustment, with or

without an interaction,

- explain and apply non-parametric tests for differences in distribution,
- explain the concepts of confounding and effect modification, describe the difference between them and use models correctly to account for them.

Course content

The course introduces classical statistical concepts and methods with emphasis on methods used in epidemiology and public health. Topics covered include: the importance of statistical thinking; types of data (nominal, binary, discrete and continuous variables); data summary measures; graphical representations; notions of probability; probability models (distributions); principles of statistical inference for the mean via the central limit theorem, concepts of confidence intervals and hypothesis tests; and an introduction to linear regression.

Forms of teaching and learning

Lectures, exercises focusing on analysis of real data using statistical software, exercises not requiring statistical software, group discussions, literature review.

Language of instruction

The course is given in English

Grading scale

Pass (G) /Fail (U)

Compulsory components & forms of assessment

Forms of assessment

To pass the course, the student has to show that the intended learning outcomes have been fulfilled. The course grade is based on the individual written examination. Students who fail will be offered a re-examination within two months of the final day of the course. Students who fail the re-exam will be given top priority for admission the next time the course is offered. If the course is not offered during the following two academic terms then another re-examination will be scheduled within 12 months of the final day of the course.

Compulsory components

The individual written examination (summative assessment).

Course literature

Recommended texts:

Kirkwood BR. Essentials of Medical Statistics. 2th ed. John Wiley & Sons; 2003.

Rabe-Hesketh S, Everitt BS. A Handbook of Statistical Analyses Using Stata. 4th ed. College Station: Stata Press; 2006.

Juul S. An Introduction to Stata for Health Researchers. College Station: Stata Press; 2006.
Dawson B, Trapp R. Basic & Clinical Biostatistics. 4th ed. McGraw-Hill Medical; 2004
Woodard M. Epidemiology: Study Design and Data Analysis. 2nd ed. Chapman & Hall; 2004