



Course syllabus for

Biostatistics 1: Introduction to biostatistics, 7.5 credits

Biostatistik 1: Introduktion till biostatistik, 7.5 hp

This course syllabus is valid from autumn 2024.

Course code	5BD000
Course name	Biostatistics 1: Introduction to biostatistics
Credits	7.5 credits
Form of Education	Higher Education, study regulation 2007
Main field of study	Biostatistics and Data Science
Level	AV - Second cycle
Grading scale	Pass with distinction, Pass, Fail
Department	Department of Medical Epidemiology and Biostatistics
Decided by	Programme committee for study programmes in biomedicine
Decision date	2023-10-11
Revised by	Programme committee for study programmes in biomedicine
Last revision	2024-03-06
Course syllabus valid from	Autumn 2024

Specific entry requirements

A Bachelor's degree or professional degree of at least 180 credits or the equivalent. The applicant must have completed a total of at least 60 credits in mathematics, statistics, and programming, of which univariate calculus, multivariate calculus, linear algebra, numerical methods, probability theory and statistics, and programming with a high-level language must be included. Proficiency in English equivalent to the Swedish upper secondary school course English 6/English B.

Objectives

The course aims to equip the student with an understanding of the biomedical research process and how statistical theory and methods are applied in biology, medicine, and health science. The course aims to illustrate how the theoretical skills, knowledge, and competences attained previously can be applied to address practical problems in biology, medicine, and health science.

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

Regarding knowledge and understanding

- Demonstrate a basic knowledge and understanding of human biology and physiology, and explain

how and why knowledge in these domains impacts design and statistical analysis of biomedical research.

- Differentiate between regression modelling strategies for different purposes, including description, prediction, and causal inference in biomedical research.
- Demonstrate a basic knowledge and understanding of the legal and ethical frameworks for human biomedical research and the use of personal information therein.

Regarding competence and skills

- Apply appropriate regression models to address specific research questions in biomedical research.
- Create data visualizations that effectively communicate quantitative information relevant to biomedical research.
- Demonstrate competence in sourcing, evaluating, and utilizing information resources relevant to biomedical and statistical research.

Regarding judgement and approach

- Demonstrate insight into how biostatistics and data science contribute to biomedical research and healthcare decision making, and the responsibilities of the individual in how these disciplines are applied.

Content

Both theoretical and practical (hands-on data analysis) components will be included. The course includes an introduction to human biology, genetics, and physiology and an introduction to biomedical research, emphasising its multidisciplinary nature and the role of biostatistics and data science in biomedical research. The course includes an introduction to philosophy of science and its interplay with statistical science and biomedical science. The course also includes introductions to the theory of visual display of quantitative information, epidemiology, causal inference, the legal and ethical frameworks for human biomedical research, and information literacy. The course includes statistical methods for prediction in biomedical research, including discrimination and calibration.

Teaching methods

The central teaching methods of the course are lectures, technology-supported learning (especially computer-based data analysis), self-studies, and group work. The course emphasizes active learning, i.e. applying knowledge in practice and critical reflection.

Examination

The examination consists of assignments (with written and/or oral presentation) and an individual written examination. The deliverable elements of the assignments (e.g., holding an oral presentation or submitting a written report) are to be completed before the end of the course according to the times specified in the schedule.

If there are special grounds, or a need for adaptation for a student with a disability, the examiner may decide to deviate from the syllabus' regulations on the examination form, number of examinations, the possibility of supplementation or exemptions from compulsory sections of the course. Content and learning outcomes as well as the level of expected skills, knowledge and abilities may not be changed, removed, or reduced.

Compulsory participation

It is compulsory to attend the introduction to the course and the sessions in which the assignments are presented/discussed. The examiner assesses if and, in that case, how absence from compulsory

components can be compensated. Before the student has participated in all compulsory parts or compensated absence in accordance with the examiner's instructions, the student's results will not be registered in LADOK. Absence from a compulsory activity may result in that the student cannot compensate the absence until the next time the course is given.

Limit to the number of examinations

A student who does not pass the first examination is entitled to participate in five more examinations. If the student does not pass 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, 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, is not counted as an examination.

Other directives

The course language is English

Literature and other teaching aids

Study material and reference articles will be provided during the course.