Course syllabus

Statistics, Probability Theory, Second Cycle, 5 credits

Course code:	ST437A	**Credits:**	5
Main field of study:	Statistics	**Progression:**	A1N
Last revised:	13/03/2025		
Education cycle:	Second cycle	**Approved by:**	Head of school
Established:	01/11/2022	**Reading list approved:**	13/03/2025
Valid from:	Autumn semester 2025	**Revision:**	3

Learning outcomes

Knowledge and understanding

After completed studies, the student shall have
- advanced knowledge of probability theory
- advanced knowledge of various distributions and their properties
- understanding of the basic principles within probability theory.

Competence and skills

After completed studies, the student shall be able to
- identify, structure and analyse practical problems using probability theory
- apply tools of probability theory to complex problems in statistics.

Judgement and approach

After completing the course the student shall have the ability to
- independently seek new knowledge and judge its relevance for the statistical issue at hand.

Content

• Set theory, basics of probability theory, definition of a random variable, distribution function, density and mass functions
• Distributions of transformations of random variables, moments and moment generating function
• Common families of univariate distributions, exponential families
• Multivariate distributions: joint and marginal distributions, conditional distributions, bivariate transformations, common multivariate distributions in matrix form
• Math for asymptotics
• Asymptotic theory.

Examinations and grades

Written Examination, 4 credits (Code: A001)
Grades used are Fail (F), Sufficient (E), Satisfactory (D), Good (C), Very Good (B) or Excellent (A).

Assignments, 1 credits (Code: A002)
Grades used are Fail (U) or Pass (G).

According to the Higher Education Ordinance, Chapter 6, Section 18, a grade is to be awarded on the completion of a course, unless otherwise prescribed by the university. The university may determine which grading system is to be used. The grade must be determined by a teacher specifically nominated by the university (the examiner).

In accordance with university regulations on grading systems for first and second-cycle courses and study programmes (Vice-Chancellor's decision ORU 2018/00929), one of the following grades is to be used: fail (U), pass (G) or pass with distinction (VG). For courses included in an international master's programme (60 or 120 credits) or offered to the university's incoming exchange students, the A to F grading scale is to be used. The vice-chancellor, or a person appointed by them, may decide on exceptions from this provision for a specific course, if there are special grounds for doing so.

The grades used on this course are Fail (F), Sufficient (E), Satisfactory (D), Good (C), Very Good (B) or Excellent (A).

Comments on grades

To obtain a passing grade for the course as a whole, a passing grade is required on all course components. The final grade for the entire course is a function of the grades of the course components. Detailed information on the requirements for different grade levels is given at the start of the course.

Modes of assessment

Written Examination, 4 credits (Code: A001)

Assignments, 1 credits (Code: A002)

For students with a documented disability, the university may approve applications for adapted or other modes of assessment.

As a rule, assessment and examinations are to be done in accordance with the most recent version of the course syllabus. If a course has undergone significant changes and the university is of the opinion that a transitional provision is required, such a provision must be evident from the most recent version of the course syllabus.

For further information, see the university's local examination regulations.

Specific entry requirements

First-cycle courses of 90 credits in Statistics, alternatively first-cycle courses of 30 credits in statistics and 60 credits in mathematics, alternatively first-cycle courses of 60 credits in statistics including 7.5 credits of Statistical theory, alternatively first-cycle courses of 60 credits

in statistics and the course Statistics, Mathematics, 5 credits or corresponding qualifications. The applicant must also have qualifications corresponding to the course "English 6" or "English B" from the Swedish Upper Secondary School.

For further information, see the university's admission regulations.

Other provisions

The language of instruction is English.

Students who have been admitted to and registered on a course have the right to receive tuition and/or supervision for the duration of the time period specified for the particular course to which they were accepted (see, the university's admission regulations (in Swedish)). After that, the right to receive tuition and/or supervision expires.

Reading list and other learning resources

Required Reading

Casella George, Roger L. Berger,
Statistical Inference, latest edition
Pacific Grove, Calif.: Duxbury

As well as supplementary material that will be provided during the course.