The Hebrew University of Jerusalem

Syllabus

Introduction to Probability and Statistics - 80430

Last update 17-10-2025

HU Credits: 6

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: Mathematics

Academic year: 2026

Semester: 1st and/or 2nd Semester

Teaching Languages: Hebrew

Campus: E. Safra

Course/Module Coordinator: Prof. Ori Gurel Gurevich (Sem. A) / Dr. Ori Resnstein (Sem. B)

Coordinator Email: Ori.Gurel-Gurevich@mail.huji.ac.il

Coordinator Office Hours:

Teaching Staff:
Dr. Ori Rosenstein,
Prof. Ori Gurel-Gurevich,
Nimrod Gabison,
Daniel Rosenblatt,
Gilad Derfner,
Michael Barmak

Course/Module description:
This course is an introduction to the mathematical theory of probability, which is the foundation for the description and analysis of systems with randomness. In addition the course teaches a few basic lessons in Bayesian statistics and forms an introduction to a first course in statistics.

Course/Module aims:
The student will obtain probabilistic thinking. The student will obtain the capacity to model simple probabilistic systems. The student will be able to tell probability from statistics. The student will be able to compute elementary probabilistic bounds based on moment and MGF estimates.

Learning outcomes - On successful completion of this module, students should be able to:
Construct discrete sample spaces
Compute probabilities in discrete models and apply Bayes's theorem
Use independence in problem solving
Compute expectation, variance and co-variance of discrete and continuous random variables
Compute the distribution of a sum of independent random variables
Compute density and distribution of random variables
Translate between properties of a random variable and its distribution function
Use linearity of expectation in problem solving
Distinguish between different modes of convergence
Prove the weak law of large numbers
Understand and use the central limit theorem
Construct optimal tests for simple hypotheses
Use Maximal likelihood estimate
Find Linear regression between two variables

Attendance requirements(%):

Teaching arrangement and method of instruction:

Course/Module Content:
Basic concepts of probability theory: sample spaces, conditional probability, dependence and independence, discrete random variables, expectation and variance, continuous random variables, modes of convergence.
Fundamental results: Bayes' theorem, Markov and Chebychev's inequalities, the weak law of large numbers and the central limit theorem .
Basic concepts in statistics: simple hypothesis testing, estimation, Analysis of variance, Regression analysis.
Other or additional topics may be studied.

Required Reading:
None.

Additional Reading Material:
Lecture notes

Grading Scheme:
Written Exam % 95
Submission assignments during the semester: Exercises / Essays / Audits / Reports / Forum / Simulation / others 5 %

Additional information:
In case it will not be possible to conduct the exam on campus, it will be online instead.
Other or additional topics may be studied.
There may be small changes between courses depending on the semester in which the course is taught.