



The Hebrew University of Jerusalem

Syllabus

Statistical Inference and Its Applications - 52325

Last update 04-11-2024

HU Credits: 6

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: Statistics

Academic year: 0

Semester: 1st Semester

Teaching Languages: Hebrew

Campus: Mt. Scopus

Course/Module Coordinator: Ariel Jaffe

Coordinator Email: ariel.jaffe@mail.huji.ac.il

Coordinator Office Hours: Wednesday 13:00-14:00

Teaching Staff:

Dr. Ariel Jaffe,
Ms. Alon Shira

Course/Module description:

Introduction to Statistical Theory

Course/Module aims:

To explain theoretical foundations behind statistical methods

Learning outcomes - On successful completion of this module, students should be able to:

to understand theoretical foundations of statistical inference

Attendance requirements(%):

None

Teaching arrangement and method of instruction: In-class lectures and TA sessions.

Course/Module Content:

1. Statistical Models

*Inferential versus descriptive statistics,
parametric and nonparametric models,
likelihood function,
identifiability,
sufficient statistic,
exponential families of distributions.*

2. Estimation in parametric models

*Refresh on estimation methods,
elements of Decision Theory, Bayesian estimation,
Unbiased estimation (Rao-Blackwell improvement, complete statistic and
Lehmann-Scheffé theorem, Fisher information and Cramer-Rao bound),
large sample asymptotic estimation and confidence sets.*

3. Hypotheses testing in parametric models

*Elements of Decision Theory,
Neyman-Pearson lemma and the likelihood ratio test,
examples of UMP tests,
Generalized likelihood ratio test*

Required Reading:

None

Additional Reading Material:

Lecture notes will be distributed during the course. Additional recommended reading:

Felix Abramovich and Ya'acov Ritov: Statistical Theory: A Concise Introduction

P.Bickel, K.Doksum, Mathematical Statistics: basic ideas and selected topics, 1977

Casella, George; Berger, Roger L. Statistical inference, 1990.

Grading Scheme:

Written / Oral / Practical Exam 65 %

Mid-terms exams 35 %

Additional information: