The Hebrew University of Jerusalem

Syllabus

Principles and Applications in Stat Analysis - 52221

Last update 13-09-2023

HU Credits: 5

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: Statistics

Academic year: 0

Semester: 1st Semester

Teaching Languages: Hebrew

Campus: Mt. Scopus

Course/Module Coordinator: Micha Mandel

Coordinator Email: micha.mandel@mail.huji.ac.il

Coordinator Office Hours: Monday 14:00-14:45

Teaching Staff:

Ms. Mai Mann,
Mr. Niv Brosh,
Prof Micha Mandel

Course/Module description:
The course defines the foundation principle for data analysis and in particular deals with point and interval estimation, testing statistical hypotheses, descriptive statistics and simple regression.

Course/Module aims:
Learning the foundation of Frequentist statistical inference, in particular, point and interval estimation, and hypothesis testing.

Learning outcomes - On successful completion of this module, students should be able to:
1. To calculate point estimators based on the method of moments and on maximum likelihood.
2. To deal with some properties of the estimators (biasedness, variance, mean square error), to compare between estimators, to select optimal estimators and to (weight) average between estimators.
3. To construct confidence intervals for the mean, variance, difference (or sum) of means and some other parameters. To compute the confidence level.
4. To conduct tests for simple and composite hypotheses. To compute and interpret the p-value.
5. To compute the required sample size for point and interval estimators and for hypothesis testing.
*6. To understand and to apply graphical methods of descriptive statistics*γ
7. To calculate and to interpret simple linear regression.

Attendance requirements(%):
0

Teaching arrangement and method of instruction: Frontal lecturers will deal with the theory. The tutorials will look again on theory with an emphasis on examples. The weekly assignments are designed in order to apply the studied material and to make sure of its understanding.

Course/Module Content:
Descriptive statistics, quantiles, histogram, scatter plot. Linear regression. Population and samples, estimation, unbiased estimators, mean square error.

Estimation methods: the method of moments, maximum likelihood estimators. Confidence intervals: ideas and principles. Examples: mean, difference in means, proportion, difference in proportions, variance.
Testing hypothesis: ideas and principles. Examples: as above for confidence intervals. Goodness of fit. A-parametric inference.

Required Reading:
None

Additional Reading Material:
4. Freund, Mathematical Statistics, Prentice Hall
5. Bertsekas and Tsitsiklis, Introduction to Probability, Athena Scientific.
6. Ross, A first Course in Probability, Prentice Hall.
7. Meyer, Introductory Probability and Statistical Applications, Addison Wesley.
8. Mood, Graybill and Boes, Introduction to the Theory of Statistics, McGraw Hill.
9. Hogg and Graig, Introduction to Mathematical Statistics, Macmillan.

Grading Scheme:
Written / Oral / Practical Exam 60 %
Submission assignments during the semester: Exercises / Essays / Audits / Reports / Forum / Simulation / others 20 %
Clinical Work / Lab Work / Practical Work / Workshops 20 %

Additional information:
Weekly assignments with solutions will be posted in Moodle.
Weekly online quizzes will be given and will comprise 20% of the final grade (based on the average of the best nine).
Two projects will be given during the course and comprise 20% of the final grade.

The exam grade must be at least 50 in order to pass the course.

The course's records will be opened before the final exam.