



## *The Hebrew University of Jerusalem*

### *Syllabus*

## **STATISTICS HANDS ON - 76996**

*Last update 05-08-2019*

*HU Credits:* 2

*Degree/Cycle:* 2nd degree (Master)

*Responsible Department:* Brain Science: Computation & Information Proc.

*Academic year:* 0

*Semester:* 2nd Semester

*Teaching Languages:* English

*Campus:* E. Safra

*Course/Module Coordinator:* Israel Nelken

*Coordinator Email:* [israel.nelken@mail.huji.ac.il](mailto:israel.nelken@mail.huji.ac.il)

*Coordinator Office Hours:* Appointments by email

*Teaching Staff:*

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Prof Israel Nelken  
Mr. David Beniaguev  
Mr. Nizar Abed

Course/Module description:

*A rapid introduction to statistical methods. Meetings will include frontal lectures and guided exercises in class.*

*The course requires working knowledge of Matlab or R.*

*The course grade will be determined by participation in the lectures and exercises, as well as the submission of a final project.*

Course/Module aims:

*The course will provide an introduction to classical statistical methods with emphasis on linear models.*

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

*Be familiar with the basic terminology of statistical methods*

*Ability to use statistical software: prepare data for analysis, define a model, and understand the output*

*Use graphics as a tool for statistical analysis*

*be able to generalize from the learned methods to statistical methods that have not been covered in the course*

Attendance requirements(%):

100

*Teaching arrangement and method of instruction: Lectures + personal guided study periods*

Course/Module Content:

*Basics: measurements, variable types (categorical, ordinal, ...); basic graphical methods (histograms, box plots, scatter plots, ...); measures of location and scale of a distribution; dependence and independence.*

*The practice of statistical inference, using the t-test: informal development of the formulas; significance and power; using simulations to study the t-test; formal development. Assumptions of the t-test (distribution and independence), their importance. what to do when the assumptions fail.*

*Introduction of linear models: Linear regression; ANOVA; ANOVA as linear regression; the general linear model; other family members. Maximum likelihood for*

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*estimating linear models and generalizations. The problem of over-specification. Linear mixed-effects models as an example of multi-level models. The danger of classical statistics: multiple comparisons, double-dipping, forking paths, p-hacking and so on. Models with low power and resulting errors. A peek into Bayesian statistics.*

Required Reading:

*Documentation of all Matlab (or R) functions that we will use in the course*

Additional Reading Material:

*Any basic statistical book. A very complete description of classical methods can be found in:*

*Biometry: The Principles and Practices of Statistics in Biological Research 3rd Edition*

*R. R. Sokal, F. J. Rohlf*

Course/Module evaluation:

*End of year written/oral examination 0 %*

*Presentation 0 %*

*Participation in Tutorials 30 %*

*Project work 70 %*

*Assignments 0 %*

*Reports 0 %*

*Research project 0 %*

*Quizzes 0 %*

*Other 0 %*

Additional information: