



# *The Hebrew University of Jerusalem*

## *Syllabus*

### *Advanced Data Analysis - 77742*

*Last update 16-08-2018*

*HU Credits: 4*

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

*Responsible Department: Physics*

*Academic year: 0*

*Semester: 1st Semester*

*Teaching Languages: English*

*Campus: E. Safra*

*Course/Module Coordinator: Dr. Assaf Horesh*

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

*Coordinator Office Hours: by appointment*

*Teaching Staff:*

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Dr. Assaf Horesh

Course/Module description:

The class will teach advanced methods of analyzing experimental and observational data and will introduce the relevant statistical and numerical tools

Course/Module aims:

To teach advanced methods of data analysis

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

1. Calculation of prob. distributions and fitting to experimental data including noise and systematics
2. Fitting and analysis of BIG DATA
3. Applying Bayesian analysis
4. Using Monte-Carlo integration
5. Analyze dynamical multi-scale time series
6. Multi dimensional stochastic optimization

Attendance requirements(%):

Teaching arrangement and method of instruction: Lectures

Course/Module Content:

Intro to data analysis  
Probability distributions  
Generating functions, moments, and central moments  
Covariance and correlation matrices  
Fitting and hypothesis testing  
PCA  
Bootstrap and Jackknife methods  
Bayesian statistics  
Monte-Carlo methods  
Dealing with statistical and systematic uncertainties  
Advanced and numerical methods

Required Reading:

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None

Additional Reading Material:

None

Course/Module evaluation:

End of year written/oral examination 0 %

Presentation 0 %

Participation in Tutorials 0 %

Project work 100 %

Assignments 0 %

Reports 0 %

Research project 0 %

Quizzes 0 %

Other 0 %

Additional information:

open for third year students, by approval