



## *The Hebrew University of Jerusalem*

### *Syllabus*

## **AGROTECH LABORATORY - 71252**

*Last update 26-07-2020*

*HU Credits:* 3

*Degree/Cycle:* 1st degree (Bachelor)

*Responsible Department:* agro informatics

*Academic year:* 0

*Semester:* 2nd Semester

*Teaching Languages:* Hebrew

*Campus:* Rehovot

*Course/Module Coordinator:* Dr. Eran Tas

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

*Coordinator Office Hours:* By appointment

*Teaching Staff:*

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Dr. Yair Mau,  
Dr. Nimrod Schwartz,  
Dr. Eran Tas

Course/Module description:

*This course deals with the design of a data collection experiment, including the planning and execution of an experiment for data measurement, data processing with advanced technologies, and report of the findings using advanced tools. In this course, we will assemble measuring devices for monitoring in a soil-water-plant-atmosphere system, we will analyze the data using a variety of mathematical tools, and we will summarize the findings according to the research questions that were defined. We will make extensive use of the Arduino platform for planning and building the sensors, while analysis and data reporting will make use of Jupyter Notebooks, employing both Python and Markdown.*

Course/Module aims:

*To participate in a direct manner in the planning of an experiment, design and build a measuring device for data collection, to manage and process the data, and to write a report using an open electronic notebook environment. Our goal is to accomplish all these steps based on the principles of open and reproducible science.*

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

- Design and execute a simple experiment, that answers a clear scientific question.*
- Build an Arduino-based measuring device for data collection and real time analysis.*
- Analyze a dataset using a variety of statistical tools, such as interpolation, least square method, principal component analysis, etc.*
- Write a reproducible computer code for analyzing the dataset using the Jupyter Notebook platform.*
- Publish the experimental setup and data analysis on open platforms such as GitHub and Figshare.*

Attendance requirements(%):

100

*Teaching arrangement and method of instruction: Lectures, exercises in a computer lab, meetings with the lecturers.*

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Course/Module Content:

- The scientific question and determining the goals
- Experiment design and its development environment
- Arduino and its development environment
- Sensors: properties, sensitivity, accuracy
- Time series: properties and selected analysis methods
- Jupyter Notebook and Markdown as tools for reproducible science
- Analysis of results, making use of statistics, interpolation, least squares method, principal component analysis
- Report of the findings
- Writing and submission of report
- Online platforms for publishing the report

Required Reading:

*The Scientific Paper Is Obsolete*

<https://www.theatlantic.com/science/archive/2018/04/the-scientific-paper-is-obsolete/556676/>

Additional Reading Material:

Course/Module evaluation:

End of year written/oral examination 0 %

Presentation 0 %

Participation in Tutorials 20 %

Project work 0 %

Assignments 20 %

Reports 60 %

Research project 0 %

Quizzes 0 %

Other 0 %

Additional information: