האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM

The Hebrew University of Jerusalem

Syllabus

ELEMENTS OF INFORMATION THEORY - 67561

Last update 18-08-2022

HU Credits: *4*

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

Responsible Department: *Computer Sciences*

Academic year: *0*

Semester: *1st Semester*

Teaching Languages: *Hebrew*

Campus: *E. Safra*

Course/Module Coordinator: *Or Ordentlich*

Coordinator Email: *or.ordentlich@mail.huji.ac.il*

Coordinator Office Hours: *TBA*

Teaching Staff:

Prof Or Ordentlich,
Mr. Tomer Berg

Course/Module description:
The course introduces the basic information measures: entropy, mutual information and divergence, and illustrates how to use those quantities for developing and analyzing performance of compression, communication and statistical inference systems.

Course/Module aims:
To form a gentle introduction to the fascinating field of information theory

Learning outcomes - On successful completion of this module, students should be able to:
-Explain the basic ideas underlying lossless compression and design low-complexity lossless compression systems.
-Explain the basic ideas underlying reliable communication over a noisy channel.
-Compute the fundmemtal limits for basic problems in statistical inference, communication and compression.

Attendance requirements(%):

Teaching arrangement and method of instruction: Lecture + recitation

Course/Module Content:
-Information measures
-Losslsess compression for sources with a known/unknown statistical model
-Fano's inequality and its application
-Applications of information theory in statistics
-Communication over a noisy channel and the channel capacity theorem

Required Reading:
Lecture note that will be uploaded to the course's website

Additional Reading Material:

Cover, T. M., and Joy A. Thomas. "Elements of information theory." (2006).

Course/Module evaluation:
End of year written/oral examination 90 %
Presentation 0 %
Participation in Tutorials 0 %
Project work 0 %
Assignments 10 %
Reports 0 %
Research project 0 %
Quizzes 0 %
Other 0 %

Additional information:
The course is intended for undergraduate students. In the academic year 2022-2023 only, it will also be open for graduate students (since "introduction to information and inference will not be taught that year).