The Hebrew University of Jerusalem

Syllabus

LEARNING THEORY - 67938

Last update 03-07-2018

<u>HU Credits:</u>   4

<u>Degree/Cycle:</u> 2nd degree (Master)

<u>Responsible Department:</u> Computer Sciences

<u>Academic year:</u> 0

<u>Semester:</u> 1st Semester

<u>Teaching Languages:</u> English and Hebrew

<u>Campus:</u> E. Safra

<u>Course/Module Coordinator:</u> Amit Daniely

<u>Coordinator Email:</u> amit.daniely@mail.huji.ac.il

<u>Coordinator Office Hours:</u>

<u>Teaching Staff:</u>

Dr.

Course/Module description:
 The course will discuss learning from a computational and statistical standpoints. We will assume familiarity with machine learning (e.g. 67577), and will deepen our theoretical and mathematical understanding of the matter.

We will discuss questions such as: Which functions are learnable? How? How many resources are needed? When do specific learning algorithms succeed? How to design a learning algorithm for a given task?

Course/Module aims:
 To introduce the scope and the goals of learning theory, and to understand basic techniques and results.

Learning outcomes - On successful completion of this module, students should be able to:
 Read professional literature and research papers in learning theory. Do research in learning theory.

Attendance requirements(%):
 None

Teaching arrangement and method of instruction: Frontal lectures, Homework

Course/Module Content:
 1. Functions classes: Separation results and Algorithms

2. Statistical Learning Theory: Uniform Convergence, VC dimension, Radamacher complexity, Stability

3. Online Learning and Online Convex Optimization

4. Computational Learning Theory: Hardness of learning, The statistical queries model

5. Glimpse into neural networks and deep learning

Required Reading:
 None

 Additional Reading Material:
  Will be published during the course

 Grading Scheme:

Additional information: