0368.4163 Randomness and Computation March 4, 2009

Course Information
Lecturer: Ronitt Rubinfeld

Lectures: W 11-2:00, Room 209 in Dan David Building.

Instructor: Ronitt Rubinfeld, `ronitt@cs.tau.ac.il`,

Course Website: `http://www.cs.tau.ac.il/r̃onitt/COURSES/S09/index.html`

Course topics The course will cover topics from the themes listed below. The list is subject to change due to personal whims, class interest and timing issues. The topics will not be covered in the order given below.

- Randomness and existence (probabilistic proofs, explicit constructions)
- Randomness in algorithm design (Uniform generation of combinatorial objects, uniform generation vs. approximate counting algorithms, Small space algorithms for graph connectivity, Property testing)
- Randomness as a resource (derandomization, recycling randomness, pseudorandom generators, randomness from weak random sources, extractors, limited independence)
- Randomness and interaction (Interactive proof systems, probabilistically checkable proof systems)
- Computational learning theory (Learning vs. predictability, learning via Fourier representations, learning weak learning, boosting)
- Tools(Influence of a variable on a function, Random walks on graphs, Expander graphs, List decoding, Fourier representation of a function, Sample spaces with limited independence)

Course Requirements 5 homework sets (65%). Scribe notes(25%). Class participation (10%).

Prerequisites Undergraduate Algorithms. Complexity theory is helpful but not required.

Office hours By appointment.