MCS 549 – Mathematical Foundations of Data Science
Syllabus

Lev Reyzin

Fall 2021

Time and location: M-W-F, 12:00pm-12:50pm. When in-class, the lecture will be at Lincoln Hall (TH) 215 – students will also be able to attend in-class lectures via Zoom. For lectures that are only online (synchronous), students will be able to attend via Zoom. For lectures that are online asynchronous, then students will be asked to watch recordings posted on Piazza at their convenience. All lectures will be recorded and will appear on the course Piazza page.

Instructor: Lev Reyzin, SEO 417, `lreyzin@uic.edu`

Prerequisite background: Familiarity with the design and analysis of algorithms, basic computational complexity, and mathematical maturity.

Office hours: to be announced, in SEO 417 when in-person and on Zoom when online.

Website: `http://homepages.math.uic.edu/~lreyzin/f21_mcs549/`

Textbook: Avrim Blum, John Hopcroft, and Ravindran Kannan. *Foundations of Data Science*

Topics: This course covers the mathematical foundations of modern data science from a theoretical computer science perspective. Topics will include random graphs, small world phenomena, random walks, Markov chains, streaming algorithms, clustering, graphical models, singular value decomposition, and random projections.

Grading: Students will be graded based on their performance on problem sets and on a presentation. The weighing of the components is specified below.

- 75% take-home problem sets
- 25% in-class or online presentation, as specified by the instructor – each student will present a research paper approved by the class instructor

Problem set collaboration policy: Unless otherwise specified on an assignment, students may discuss problem sets with one another, but they should afterward write the solutions on their own. Collaborators (people you speak to about an assignment) must be named at the top of the assignment. No collaboration will be allowed on exams.

Late work policy: In general, late work will not be accepted. Problem sets are to be turned in by 12pm the day they are due, via Gradescope. Exceptions must be asked for in advance of the due date and will be made rarely, on a case-by-case basis.

Disability policy: Students with disabilities who require accommodations for access and participation in this course must be registered with the Office of Disability Services (ODS). Please contact ODS a 312/413/-2183 (voice) or 312/413-0123 (TTY).