

## Mathematics 83600 - Topics in Probability

**Schedule:** Thursday, 4:15 p.m. - 6:15 p.m.

**Text:** *Random Walk: A Modern Introduction*, by Gregory F. Lawler and Vlada Limic. An apparently complete version of the textbook is available in electronic form at one of the authors' webpage at [www.math.uchicago.edu/~lawler/srwbook.pdf](http://www.math.uchicago.edu/~lawler/srwbook.pdf)

The following additional recommended books have been put on reserve:

1. Intersections of Random Walks by Gregory F. Lawler; ISBN: 978-0817638924
2. Principles of Random Walk by Frank Spitzer; ISBN: 978-0387951546
3. Probabilistic Techniques in Analysis by Richard F. Bass; ISBN: 978-0387943879
4. Conformally Invariant Processes in the Plane by Gregory F. Lawler; ISBN: 978-0821846247

**Prerequisites:** Math 83100 and Math 83200, though these are not technically indispensable for students with some exposure to the ideas from these courses. Some knowledge of complex analysis might be helpful.

**Course Description:** This will be a course on random walk, with an emphasis on the similarities and differences between the discrete (random walk) and continuous (Brownian) realms. Topics will include:

- Local central limit theorems
- Approximation by Brownian motion via the Skorokhod and the KMT schemes
- Green's function and the potential kernel
- The Dirichlet problem
- The Harnack and Beurling inequalities
- The Poisson kernel
- The loop-erased random walk
- An introduction to the Schramm-Loewner evolution (time permitting)

**Evaluation:** There will be a few homework assignments which will be collected throughout the semester. The course grade will be based on these and on participation.