

HONORS 200-18, Fall 2005

“Playing Dice with the Universe: Probability in Science, Games, and the News.”

Instructor

Prof. David Goldberg (goldberg@drexel.edu)

Office: Disque Hall, Room 810

Phone: (215) 895-2715

Office Hours: M 3:00-3:50

Lectures

M 2:00-2:50

Room: McAlister 5051A

Readings

This course will have no fixed textbook. However, readings, in the form of lecture notes and articles, will be handed out during every lecture.

Course Webpage

I will make certain materials available, including images, links, and copies of documents handed out in class available on the course webpage:

<http://www.physics.drexel.edu/courses/Honors-200/>

Course Overview

Whether you realize it or not, much of the universe around you is governed by random fluctuations. Why did a galaxy form here rather than there? Why doesn't all of the air in a room suddenly fly out the window? Why does the house have the edge in Vegas? In this course, we will explore how probability dominates our every day lives, from science to games, to the stock market, to politics. It will be *very* discussion-oriented, and, as you will see, a large fraction of your grade depends on participation.

Grading Policy

- 20% – Exercises. I will give you \sim 2-4 exercises to make sure you have mastered the rudimentary tools of probabilities. These will be straightforward, but necessary to a deeper understanding of the problems addressed in class.
- 40% – Class Participation. This means attendance and actual participation in discussion. I expect you to bring new and original ideas to class, and to defend them.
- 40% – Term Paper. You will write an 8 page paper (double-spaced) for this course. It may be on any topic relating to probability/statistics that you choose. In order to keep you on track, you will adhere to the following schedule:
 - Week 3: Submit a title, and a 1 paragraph abstract of your topic.
 - Week 6: Submit a draft of your paper. This may be more of an outline at this stage, but your basic argument should be taking place.

- Week 8: Submit a semi-final draft of the paper. I will comment and make suggestions.
- Week 10: Submit your final paper.

List of Topics

Lecture Topics

1. Fundamentals of probabilities.
2. The Stock Market
3. Games of Chance
4. Coincidences
5. The Small World Problem
6. Polling & Error
7. Quantum Mechanics
8. Statistics in the Air
9. The Formation of Galaxies, and Ripples in the Universe
10. The Fate of Humanity