

# Math 236 — Random Structures

## Syllabus and Course Procedures

Spring 2012

**Instructor** Brian D. Jones  
**Office** 303 Rutherford B. Hayes Hall  
**Phone** 5386  
**e-mail** jonesbd@kenyon.edu  
**Office Hours**

Mon 9:10-10:00  
Tue 9:10-11:00  
Wed 12:10-1:00  
Fri 9:10-10:00

**Text Materials** The problems in this course are sufficiently varied and eclectic such that no single text yet exists. Text materials for this course will consist primarily of course notes and exercises that I've written, lecture notes, and a few key research papers may serve as additional reading. Some materials will be provided to you in hard copy, while others will be provided to you in electronic form via the Kenyon network.

**Course Grade** Your course grade will be determined using a weighted average as follows:

Written Homework Assignments	40 %	
Problem Presentations	8 %	
Midterm Exam		
In-Class	7 %	<b>Friday March 30</b>
Take-Home	10 %	<b>Friday March 30 - Wednesday April 4</b>
Individual Topic Research		
Written Report	10 %	
Presentation	5 %	
Final Exam:		
In-Class	20 %	<b>Friday, May 7, 8:30-11:30 pm</b>

**Course Philosophy and Goals** This is primarily a *problem-solving* course. The activities of thinking, head-scratching, sketching out ideas, calculating, and re-thinking will occupy most of your time in this course. The backdrops of this course are randomness and probability, but this is not a probability course. There is significant overlap with a formal probability class, but there are several differences as well. One big difference is that a traditional probability course spends a large amount of time studying continuous probability distributions, whereas in this course we will spend most of our time in the discrete world. Another major difference is that traditional courses focus on probability distributions on sets of *numbers*. We will enjoy studying distributions on sets, graphs, permutations, matrices, groups, functions, and other interesting mathematical objects.

- The goals of this course are fairly simple. I hope that students
- improve their problem-solving skills and strategies
  - increase their set of mathematical tools
  - enjoy the exploration of many interesting and beautiful mathematical objects
  - become more acquainted with and appreciative of probability and its applications

**Written Homework Assignments** The majority of your time in this course will be spent working problems, and most exercises I think you'll find challenging and very satisfying (once you've cracked them!) Written homework assignments will usually be assigned and collected once or twice a week. It will be the norm for an assignment to be comprised of many problems, requiring much time, thought, and effort. Notice that when grades are determined, homework is weighted much more than any other component of the course; therefore, be prepared to devote a significant amount of time working on the homework sets. Never procrastinate in starting an assignment! You are encouraged to discuss problem concepts and solution techniques with your fellow students, but your final homework written reports must be your own work. Homework solutions should be legible and presented in a logical fashion. Although this is a mathematics course, please accompany your mathematical derivations with explanations and ideas written in complete English sentences.

**Problem Presentations** Nearly every reading assignment in this course will involve *Reading Exercises*, which students are expected to do. I will usually not collect these exercises, though I sometimes will, but instead students will frequently present these reading exercises to the class. These student presentations serve two purposes — to enable students to hone their mathematical communication skills, and to solidify the understanding of the relevant course topic among the student audience. Also, students will occasionally be asked to present submitted homework problems, particularly in the case of a tough one where further class discussion is warranted.

**Individual Topic Research** You and a partner will research an individual topic of your choosing, and write a brief paper giving an overview of the topic and presenting at least one mathematical result within this topic. Each team will summarize their work in a presentation to the class. The written paper will be due on the last day of the semester, May 11. More specific details of the Individual Topic Research requirements will be distributed early in the semester.

**Midterm Exam** There will be one midterm examination, consisting of in-class and take-home portions. The in-class portion will focus primarily on conceptual understanding and solution tools, while the take-home portion will stress problem-solving, applications, and extensions. The take-home exam will be particularly challenging, but it is my goal that the examination problems serve as unifying examples of the course topics as well as extensions of key course concepts. Take-home exam problems are strictly independent endeavors; absolutely no collaboration between students on the take-home exam!

**Final Exam** The final exam will be a three-hour in-class exam covering the material for the entire course. Like the in-class portion of the midterm exam, this exam will test your conceptual understanding and solution tools skills, definitions and interpretations. But in addition a three hour final exam period allows for a few more involved problems.

**Late Policy** All assignments must be turned in at the beginning of the class period on the assigned due date, unless specified otherwise by the instructor. No credit will be given to unexcused late papers. *If you have a conflict due to illness or sports, e-mail me right away.*

**Academic Honesty** Any work you submit for credit in this course must result directly from your own understanding, thoughts, and ideas. Presenting the work of others as your own is strictly prohibited.

**Disabilities** If you have any disability and therefore may have need for some type of accommodation in order to participate fully in this class, please feel free to discuss your concerns in private with Erin Salva, Coordinator of Disability Services (phone 5145).