

MA 614 — ENUMERATIVE COMBINATORICS
MWF 12:00–12:50 — CB347

COURSE WEBPAGE: www.ms.uky.edu/~lee/ma614sp07/ma614sp07.html

INSTRUCTOR: Carl Lee, 967 POT, 257-1405, lee@ms.uky.edu, www.ms.uky.edu/~lee

OFFICE HOURS: MWF 11:00–11:50 and by appointment, since I realize that some of you will be unable to come at these times. Also, I may need to schedule some additional formal times for the class to meet, since there are some class days when I will be out of town.

TEXT: Richard Stanley, *Enumerative Combinatorics, Volume I*, Cambridge, 2006.

TOPICS: An introduction to the basic notions and techniques in enumerative combinatorics. Topics include generating functions, principle of inclusion and exclusion, bijections, recurrence relations, partially ordered sets, the Möbius function and Möbius algebra, Lagrange inversion formula, the exponential formula and tree enumeration.

Tentative Course Outline:

1. Generating functions
2. Stirling numbers of the first and second kind
3. Permutations and permutation statistics
4. q -analogues
5. The twelve-fold way
6. Principle of inclusion-exclusion
7. Partially ordered sets and lattices
8. The fundamental theorem of distributive lattices
9. The incidence algebra
10. The Möbius inversion formula
11. The Möbius function and computational techniques
12. The Möbius algebra

13. Semi-modular lattices and hyperplane arrangements
14. The zeta polynomial
15. Rank-selection
16. R -labelings
17. Eulerian posets
18. *Exponential generating functions
19. *The exponential formula
20. *Tree enumeration
21. *Lagrange inversion formula

*These topics are treated in Chapter 5 of Stanley's *Enumerative Combinatorics*, volume 2.
Other Useful References:

1. J.H. van Lint and R.M. Wilson, *A Course in Combinatorics*.
2. R.P. Stanley, *Enumerative Combinatorics*, volume 2.
3. H.S. Wilf, *Generatingfunctionology*.

GRADING:

Homework: 50%

Exams: 30%

Final: 20%

HOMEWORK: Usually collected weekly, but some problems may be collected more frequently. Problems are assigned to be solved. Searching the textbooks or the library for solutions is not permitted. On regular assignments you may discuss the problems with other current class members and with me. However, when it comes time for you to write up the solutions, I expect you to do this on your own. If you receive assistance from someone else, include a written acknowledgment. Such an acknowledgment is a professional courtesy and will not affect your grade.

EXAMS: There will be two or three exams and a final exam (April 30).

IMPORTANT DATES:

Wednesday, January 10, First day of classes
Wednesday, January 17, Last day to add a class
Wednesday, January 31, Last day to drop a class without a grade
Monday–Saturday, March 12–17, Spring break—no classes
Friday, March 9, Last day to withdraw from a class
Friday, April 27, Last day of classes
Monday, April 30, 1:00 p.m., Final exam.

CHEATING AND PLAGIARISM: Cheating and plagiarism are not worth it, and they are damaging to your self-integrity, so don't do it. Here is the website for the University Ombud: <http://www.uky.edu/Ombud>.