

Combinatorial Representation Theory – Math 616

Section 201, Term 2, 2011
TTh 2-3:30pm, Math 126
Office hours: by appointment

Instructor:

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Textbook:

Bruce Sagan, *The symmetric group*, Springer 2001, ISBN 0-387-95067-2.

Outline:

This is an introductory course on algebraic combinatorics, which connects the areas of algebra, discrete mathematics and algebraic geometry amongst others. Topics to be covered include

1. *Representation theory* Matrix representations and modules; Maschke's Theorem and Schur's Lemma; Group characters; Restricted and induced characters; Young tableaux and Specht modules.
2. *Combinatorial algorithms* Robinson-Schensted algorithm; Jeu de taquin.
3. *Symmetric functions* Bases of symmetric functions; Schur functions; The Littlewood-Richardson rule.

If time permits we will also study areas related to and applications of the above such as quasisymmetric functions, the descent algebra of the symmetric group, card shuffling, differential posets and chromatic symmetric functions.

Prerequisites:

Math 322 grade A+, or equivalent.

Grading:

Homework assignments and presentation scribing in latex (60%) presentations (40%).