MA 591: Algebraic Combinatorics  
Fall 2016

Location:  
SAS Hall 1220  
TH 3:00–4:15

Instructor:  
Ricky Liu  
riliu@ncsu.edu  
SAS Hall 3264

Office hours:  
TH 4:15–5:15 (tentative) or by appointment

Prerequisites:  
MA 524 or permission of the instructor

Required textbook:  
Optional supplementary texts:  

Course webpage:  
http://www4.ncsu.edu/~riliu/591  
The course webpage contains useful information about the course, including the syllabus, assignments, and schedule (tentative).

About the course:  
Algebraic combinatorics is the study of the interaction between algebraic objects, such as rings and group representations, and combinatorial objects, such as permutations and tableaux. This course will cover three closely related areas—the ring of symmetric functions, the combinatorics of Young tableaux, and the representation theory of the symmetric group—and highlight the connections between them.  
Topics include: the five bases of symmetric functions, Hall inner product, the Cauchy identity, the involution $\omega$, quasisymmetric functions; Young tableaux, the hook length formula, the RSK correspondence, Littlewood-Richardson rules, jeu de taquin; representation theory
of the symmetric group, Specht modules, the Frobenius characteristic map, the Murnaghan- Nakayama rule, Schur-Weyl duality.

**Grading:**
Grades will be based on homework (70%) and a final project and presentation (30%). There will be no exams.

**Homework:**
Homework will be assigned roughly biweekly, due at the beginning of class. Late assignments will not be accepted. Collaboration is encouraged, but you are expected to write up your own solutions.

**Attendance:**
Students are expected to attend every course meeting. No accommodations for missed assignments or exams will be made except as described by NC State regulations at [http://policies.ncsu.edu/regulation/reg-02-20-03](http://policies.ncsu.edu/regulation/reg-02-20-03).

**Academic integrity:**
Students are expected to follow the ethical standards described by the Code of Student Conduct policy and Pack Pledge at [http://policies.ncsu.edu/policy/pol-11-35-01](http://policies.ncsu.edu/policy/pol-11-35-01) with respect to completion of homework assignments and exams.

**Statement for students with disabilities:**
Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with the Disability Services Office at Suite 2221, Student Health Center, Campus Box 7509, 919-515-7653. For more information on NC State’s policy on working with students with disabilities, please see the Academic Accommodations for Students with Disabilities Regulation at [http://policies.ncsu.edu/regulation/reg-02-20-01](http://policies.ncsu.edu/regulation/reg-02-20-01).

**N.C. State Policies, Regulations, and Rules (PRR):**
Students are responsible for reviewing the NC State University PRR’s located at [http://oucc.ncsu.edu/course-rights-and-responsibilities](http://oucc.ncsu.edu/course-rights-and-responsibilities) which pertains to their course rights and responsibilities.