MA 796: Schubert Calculus  
Spring 2020

Location:  
SAS Hall 1218  
TH 3:00–4:15

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

Office hours:  
T 1:30–2:30, W 12:30–1:30 or by appointment

Prerequisites:  
Some familiarity with linear algebra and combinatorics

Optional textbooks:  

Course webpage:  
http://riliu.math.ncsu.edu/796  
The course webpage contains useful information about the course, including the syllabus, assignments, and schedule (tentative).

About the course:  
Given four lines in 3-space, how many lines intersect all four? This question and others like it involving intersections of linear spaces lie in a branch of mathematics called Schubert calculus, which dates back to the nineteenth century and is the subject of Hilbert’s fifteenth problem. Nowadays, such questions are typically phrased in terms of the cohomology rings of the Grassmannian and flag varieties. In this course, we will give a modern treatment of the subject from a combinatorial perspective. In particular, we will study in detail the relationship to combinatorial constructions such as Young tableaux, symmetric functions, and Schubert polynomials.

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.