

Math 591 – Tropical Geometry – Spring 2016

T, Th 1:30 - 2:45pm, G117 Tompkins Hall
Office Hours: T, Th 3-4pm, or by appointment

Instructor: Cynthia Vinzant
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Course website: <http://www4.ncsu.edu/~clvinzan/Math591.html>

Textbook: D. Maclagan and B. Sturmfels, *Introduction to Tropical Geometry*, Graduate Studies in Mathematics, 161. American Mathematical Society, 2015. (Optional)

Prerequisites: Math 521 or Math 724 or instructor consent

Course Description: Tropical geometry is the study of certain combinatorial shadows of solutions to systems of polynomial equations. It is based on tropical algebra, where the sum of two numbers is their minimum and the product is their sum. This turns polynomials into piecewise-linear functions, and their zero sets into polyhedral complexes. These combinatorial structures retain a surprising amount of information about their classical counterparts. This course will survey topics in tropical geometry, including Puiseux series and valuations, Gröbner complexes, tropical varieties, hyperplane arrangements and matroids, tropical convexity, connections with toric varieties, Bernstein's theorem, and Viro's patchworking.

Homework: Homework will be assigned every one to two weeks and collected in class.

Final Project: Students will write a final paper on a topic related to tropical geometry and give a presentation in class at the end of the semester. Further details and suggested topics will be posted on the course website and discussed in class.

Grades: Grades will be assigned based on homework (60%), oral presentation of the final project (15%), and written final project (25%).

Academic Integrity: Students are expected to follow the NC State code of student conduct, available at <http://policies.ncsu.edu/policy/pol-11-35-01>.

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 Disability Services for Students at 1900 Student Health Center, Campus Box 7509, 515-7653. More information on NC State's policy on working with students with disabilities is available at <http://policies.ncsu.edu/regulation/reg-02-20-01>.

Class Evaluations: Online class evaluations will be available for students to complete during the last two weeks of class. Students will receive an email message directing them to a website where they can login using their Unity ID and complete evaluations. All evaluations are confidential; instructors will never know how any one student responded to any question, and students will never know the ratings for any particular instructors.