18.703  Modern Algebra

Spring 2019  Tu-Th 2:30–4:00  Room 2–135

V. Kac

Office Hours: by appointment, 2–176

Syllabus

Lecture 1 (February 5):  Binary operations, groups, group tables
Lectures 2, 3 (February 7, 12):  Cyclic groups, applications to number theory
Lectures 4, 5 (February 14, 21):  Groups of permutations, braid groups, dihedral groups
Lecture 6 (February 26):  Lagrange's theorem and its applications
Lecture 7 (February 28):  Homomorphisms and isomorphisms
Lecture 8 (March 5):  Normal subgroups and conjugacy classes, factor groups
Lecture 9 (March 7):  Classification of finitely generated abelian groups
Lecture 10 (March 12):  Group action, Burnside formula and applications to combinatorics
Lectures 11, 12 (March 14, 19):  Sylow theorems and applications
Lecture 13 (March 21):  Test 1
Lecture 14 (April 2):  Rings and fields
Lectures 15, 16 (April 4, 9):  Integral domains and applications
Lecture 17 (April 11):  Fundamental homomorphism theorem, ideals, factor rings. Quaternions
Lecture 18 (April 16):  Rings of polynomials, Eisenstein criterion
Lectures 19, 20 (April 18, 25):  Principal ideal domains and applications
Lecture 22 (April 30):  Unique factorization domains and Gauss lemma
Lecture 21 (May 2):  Euclidean domains
Lecture 23 (May 7):  Field extensions, applications to planar geometry
Lecture 24 (May 9):  Test 2
Lectures 25, 26 (May 14, 16):  Discussion


Grader: TBA

The grade for the course will be based on home assignments (50%) and on two tests (50%). No final.