MATH 330 ABSTRACT ALGEBRA

İzzet Coşkun, MWF 9:00-9:50

SEO 423, coskun@math.uic.edu

Welcome to Math 330! This course is an introduction to Abstract Algebra. Abstract Algebra is one of the main pillars of modern mathematics. In this course we will explore the basic objects of algebra such as groups, rings and fields.

Course webpage: http://www.math.uic.edu/~coskun/math3302013.html

Venue: AH 306

Office hours: M 10-12, W 10-11 and by appointment.

Text: J. Gillian, Contemporary Abstract Algebra, Sixth Edition Houghton Mifflin Company, Boston 2006.

Prerequisites: A grade of C or better in Math 215. I will assume that you are comfortable with writing rigorous proofs.

Requirements: There will be weekly homework, two mid-terms and a final. The midterms and the final will each count for 20 % of your grade. The homework will account for 40 % of your grade. The homeworks will be due Wednesdays in the beginning of class. No late homework will be accepted. You may collaborate on the homework problems, but you must write your own solutions and properly acknowledge any help you receive from others. Failure to complete more than 2 assignments will result in an F for the class.

Topics: The following is a tentative list of topics that will be covered in the course. Please read the suggested pages in the text book before class.

Aug 26	Integers	p. 3-14
Aug 28	Equivalence relations	p. 14-27
Aug 30	Symmetries	p. 31-39
Sep 2	No class: Labor Day	
Sep 4	Groups	p. 42-50
Sep 6	Elementary properties of groups	p. 50-55
Sep 9	Subgroups	p. 59-63
Sep 11	Center and Centralizer	p. 63-70
Sep 13	Cyclic groups	p. 73-78
Sep 16	Fundamental theorem of cyclic groups	p. 78-85
Sep 18	Permutation groups	p. 94-99
Sep 20	Properties of permutations	p. 99-105
Sep 23	Alternating group	p. 105-116

Sep 25	Isomorphisms	p. 120-126
Sep 27	Properties of isomorphisms	p. 126-128
Sep 30	Automorphisms	p. 128-134
Oct 2	Cosets	p. 137-140
Oct 4	Mid-term 1	
Oct 7	Lagrange's theorem	p. 140-143
Oct 9	Applications	p. 143-149
Oct 11	External direct products	p. 153-157
Oct 14	Applications	p. 157-165
Oct 16	Normal subgroups	p. 177-184
Oct 18	Internal direct product	p. 184-190
Oct 21	Group homomorphisms	p. 199-205
Oct 23	Isomorphism theorems	p. 205-213
Oct 25	Abelian groups	p. 217-227
Oct 28	Rings	p. 235-243
Oct 30	Integral domains	p. 248-252
Nov 1	Midterm 2	
Nov 4	Characteristic of a ring	p. 252-257
Nov 6	Ideals	p. 261-265
Nov 8	Factor rings	p. 265-271
Nov 11	Ring homomorphisms	p. 278-284
Nov 13	Field of quotients	p. 284-290
Nov 15	Polynomial rings	p. 291-296
Nov 18	PIDs	p. 297- 301
Nov 20	Factorization of polynomials	p. 303-313
Nov 22	UFDs	p. 320-333
Nov 25	Fields	p. 343-348
Nov 27	Field extensions	p. 352-365
Nov 29	Happy Thanksgiving	
Dec 2	Finite fields	p. 369-377
Dec 4	Finite fields	p. 381-388
Dec 6	Final Exam due	