

Discrete Geometry 1 (MTH G231) – Fall 2007

Time: Mondays & Wednesdays 3:30–5:00 pm

Place: 544 Nightingale Hall

Instructor: Egon Schulte (469 Lake, 373–5511, schulte@neu.edu)

Course Description

We cover basic concepts in discrete and combinatorial geometry.

Topics include

- convex sets and their basic properties,
- theorems of Helly, Radon, and Caratheodory,
- separation theorems for convex bodies,
- convex polytopes,
- Euler's theorem, Dehn-Sommerville equations,
- upper-bound theorem,
- regular polytopes and tessellations,
- symmetry groups, reflection groups, Coxeter groups,
- regular tessellations on surfaces,
- abstract regular and chiral polytopes.

We are not using a textbook but most of the material can be found in one of the following sources.

References

B.Grünbaum, *Convex Polytopes* 2nd Edition, Graduate Texts in Mathematics 221, Springer, 2003.

P.McMullen and G.C.Shephard, *Convex Polytopes and the Upper Bound Conjecture*, London Mathematical Lecture Notes Series, Vol. 3, Cambridge University Press, 1971.

H.S.M.Coxeter, *Regular Polytopes*, 3rd Edition, Dover, 1973.

P.McMullen and E.Schulte, *Abstract Regular Polytopes*, Encyclopedia of Mathematics and its Applications, Vol. 92, Cambridge University Press, 2002.