

DEPARTMENT OF MATHEMATICS SYLLABUS

Course # & Name: MAT 114: Convex Geometry

Recommended Text(s) & Price: Lecture notes written by the faculty have been used successfully in the recent past. They contain a fair number of exercises. 71 pages available for free.

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Lecture(s)	Sections	Comments/Topics
3		Fundamental definitions: Affine sets, convex set, convex hull. Examples.
3		Caratheodory's theorem, Radon's theorem.
3		Helly's theorem and applications.
3		Separating and supporting hyperplanes. Faces, extreme points.
3		Sets of constant width, diameter Borsuk's problem.
3		Polyhedra and Polytopes. Examples and main operations (e.g. Projections, Schlegel Diagrams).
3		Graphs of polytopes, Euler's formula. Coloring problems.
3		Duality and Polarity.
3		Convex bodies and Lattices. Minkowski's first theorem, Blichfeldt's theorem.

Additional Notes:

Remarks: This course should serve as a bridge between the lower division courses and more abstract upper division courses.

There are a few excellent supplementary resources: Eggleston's *Convexity*, Yaglom and Boltyanskii's *Convex Figures*, and Ziegler's *Lectures on Polytopes*. For the final part, *The Geometry of Numbers* by C.D. Olds, Anneli Lax, and Guiliana Davidoff is appropriate for undergraduates.