1 Affine subspace, affine combination

affine subspace, hyperplane, half spaces, affine hull, relative interior, relative boundary, affine combination, affine independence

2 Convex combination, convex hull

convex combination, segment, convex set, intersections of closed half spaces, convex hull, characterization of convex hull via convex combinations

3 Theorems of Radon, Carathéodory and Helly, applications

Radon's theorem, Carathéodory's theorem, colorful Carathéodory theorem, finite and infinite Helly theorems, Jung's theorem

4 Minkowski sum and support function

Minkowski sum, Minkowski sum of convex sets, support function and its properties, reconstructing a convex set from its support function, support function of a Minkowski sum

5 Separation and isolation theorems

separation, strict separation, isolation, strict isolation, projections and their properties, isolation theorem for open convex sets, interiors of convex sets, general isolation theorem, separation of disjoint convex sets, strict separation of disjoint compact and closed convex sets

6 Faces, extremal and exposed points

supporting hyperplane, face, exposed point, extemal points, exposed points are extremal, minimal and maximal values of linear functionals, Krein–Milman theorem, Straszevicz theorem

7 Valuations and the Euler characteristic

indicator function, inclusion-exclusion formula, algebras of compact/closed convex sets, valuations, Euler characteristic

8 Convex polytopes and polyhedral sets, face structures

convex polytope, minimal representation, exposed and extremal points of convex polytopes, faces of convex polytopes, intersections of faces, faces of faces, polyhedral set, bounded polyhedral sets, face lattice, atoms of the face lattice, Euler characteristic of the boundary of a convex polytope, f-vector, Euler's theorem

9 Polarity

polar, basic properties of polar sets, polar of the polar, faces of compact convex sets and those of their polars, dual polytopes, volume product, Blaschke–Santaló theorem (without proof), Mahler's conjecture

10 Hausdorff distance

Hausdorff distance, support functions and the Hausdorff distance of compact convex sets, metric space of compact convex sets, completeness, *optional: Blaschke's selection theorem, density of convex polytopes*