

Convex Polytopes Exam Syllabus :

The basic concepts of linear and affine algebra: Affine, convex and polyhedral sets, the Caratheodory theorem and supporting hyperplanes for convex sets. The facial structure and polarity - duality in Convex polytopes. Graph of a d -polytope and its d -connectedness , 3-polytopes and Steinitz's theorem. Affine and projective transformations and the fundamental theorem of projective transformations . Affine, projective and combinatorial equivalence of polytopes. Classical examples; simplices, hypercubes, pyramids, bipyramids, prisms, r -fold pyramids, r -fold prisms, cyclic and neighborly polytopes, simplicial and simple polytopes. Euler's theorem and Dehn-Sommerville equations. Study of simple convex polytopes and Lower Bound and Upper Bound theorems for convex polytopes.

Text : A. Brøndsted, An Introduction to Convex Polytopes, Springer, 1982.

References :

1. M. Reza Emamy-K., Elements of convex polytopes, UPR notes, 2000.
2. B. Grünbaum, Convex Polytopes. Edited by: V. Kaibel, V. Klee, and G. M. Ziegler, Springer, 2003.
3. P. McMullen and G.C. shephard, Convex Polytopes and Upper Bound Conjecture, London Math. Soc. Series, Vol 3, Cambridge, Cambridge University Press 1971.