



Mathematics 631.01 Discrete Geometry

Calendar Description: Euclidean, spherical and hyperbolic n-spaces, trigonometry, isometries, convex sets, convex polytopes, (mixed) volume(s), classical discrete groups, tilings, isoperimetric inequalities, packings, coverings.

Prerequisites: Mathematics 367 or consent of the Department.

Textbook: J. G. Ratcliffe, Foundations of hyperbolic manifolds. Second edition. Graduate Texts in Mathematics, 149. Springer, New York, 2006. xii+779

(see Course Descriptions under the year applicable: <http://www.ucalgary.ca/pubs/calendar/>.)

Syllabus

<u>Topics:</u>	<u>Number of Hours</u>
Euclidean Geometry (Euclidean n-Space; Geodesics; Arc Length; Euclidean Volume)	4
Spherical Geometry (Spherical n-Space; Spherical Arc Length; Spherical Volume; Spherical Trigonometry)	6
Hyperbolic Geometry (Lorentzian n-Space; Hyperbolic n-Space; Hyperbolic Arc Length; Hyperbolic Volume; Hyperbolic Trigonometry)	9
Inversive Geometry (Stereographic Projections; Mobius Transformations; Conformal Models of Hyperbolic Geometry)	9
Convex Polytopes in n-Dimensional Euclidean, Spherical, and Hyperbolic Spaces	8
TOTAL:	36

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