Convexity

MATH-461

Summary
Convexity is a fundamental concept in mathematics. This course is an introduction to convexity and its ramifications in high-dimensional Geometry.

Content
- Convex sets, basic notions
- John's Theorem
- Lattices and Minkowski's Theorem
- Dual lattices and transferrence bounds
- The Brunn-Minkowski Inequality
- Measure concentration
- Metric embeddings
- The Johnson-Lindenstrauss Lemma

Keywords
- Convexity
- Polyhedron
- Lattice
- Geometry

Learning Prerequisites

Required courses
- Analysis 1+2
- Linear Algebra 1+2

Recommended courses
- Discrete Optimization

Learning Outcomes

Remarque
pas donné en 2019-20
By the end of the course, the student must be able to:
• Choose an appropriate method for solving a problem in convex geometry
• Prove theorems in convexity
• Design methods to solve problems

Transversal skills
• Demonstrate a capacity for creativity.
• Assess one's own level of skill acquisition, and plan their on-going learning goals.
• Continue to work through difficulties or initial failure to find optimal solutions.

Teaching methods
Ex cathedra lecture, exercises at home and in the classroom.

Expected student activities
Attendance of lectures and exercises
Completion of exercises at home
Study of literature

Assessment methods
Written exam during exam session
Dans le cas de l’art. 3 al. 5 du Règlement de section, l’enseignant décide de la forme de l’examen qu’il communique aux étudiants concernés.

Supervision
Office hours          Yes
Assistants           Yes
Forum                No

Resources
Biography
Jiri Matousek: Lectures on Discrete Geometry
Alexander Barvinok: A Course in Convexity