MATH 857: Classic Convexity (Spring 2018)
MWF 1:00-1:50 Morrill 109

Instructor: Maria Alfonseca, Minard 408E34
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Office Hours: MWF 11:00-11:50 am and by appointment.

Topics: This course is an introduction to classic convexity theory, and it combines concepts and tools from Analysis, Geometry and Combinatorics. The main notions in convexity (convexity itself, the definition of polytope) are easy to define and intuitive to grasp, yet one can prove some very strong results from the definitions. We will focus on the jewels of the theory such as Helly's theorem, Euler's formula, Cauchy's theorem, Minkowski's existence theorem for polytopes, the Brunn-Minkowski inequality and Prékopa-Leindler inequality. We will also introduce the theory of mixed volumes and valuations on the class of convex bodies and, if time permits, study also lattice polytopes.

The overlap with last year's course will be minimal, as we will not use the Fourier transform.

The references for this course are:

- Barvinok, *A course in Convexity*, American Mathematical Society (Graduate Studies in Mathematics, 54).
- Bonnesen, Fenchel, *Theory of Convex Bodies,* BCS Associates, 1998.

Attendance: Attendance is expected and required. You are responsible for all the material covered in class and all the assignments and announcements made. If you need to miss class due to sickness or other reason, please email me.

Grading policy: There will be no final exam. The grade will be based on homework, class presentations and colloquium attendance.
The overall grade will be calculated according to the following rule:

- Class presentations: 40%
- Homework: 50%
- Colloquium Attendance: 10%

Special Needs: Any students with disabilities or other special needs, who need special accommodations in this course are invited to share these concerns or requests with the instructor and contact the Disability Services Office as soon as possible.

Veterans and student soldiers with special circumstances or who are activated are encouraged to notify the instructor in advance.

Academic Honesty: The academic community is operated on the basis of honesty, integrity, and fair play. NDSU Policy 335: Code of Academic Responsibility and Conduct applies to cases in which cheating, plagiarism, or other academic misconduct have occurred in an instructional context. Students found guilty of academic misconduct are subject to penalties, up to and possibly including suspension and/or expulsion. Student academic misconduct records are maintained by the Office of Registration and Records. Informational resources about academic honesty for students and instructional staff members can be found at www.ndsu.edu/academichonesty.