Textbooks

There is no required text. Suggested textbooks:


Course Description

The course is intended primarily for honours and graduate students in mathematics. The course focuses on extremal combinatorics and its applications to discrete geometry and additive number theory. Highlights of the course include:

- Sperner’s, Erdos-Ko-Rado and Kruskal-Katona theorems in extremal set theory;
- Turan-type problems in graph and hypergraph theory;
- Ramsey theory, including Van der Waerden’s and Hales Jewett theorem;
- Szemerédi-Trotter theorem and its applications to additive combinatorics;
Evaluation

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Weightage</th>
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<tbody>
<tr>
<td>Homework assignments</td>
<td>30%</td>
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<tr>
<td>Midterm (in class)</td>
<td>15%</td>
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<tr>
<td>Final (take home)</td>
<td>35%</td>
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<tr>
<td>Presenting a paper (or making a progress on an open problem)</td>
<td>20%</td>
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</tbody>
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Tentative list of topics

   - [BB] 3, 7
   - [BB] 4
   - [TV] 7
   - [BB] 5
   - P. Keevash, B. Sudakov. The exact Turan number of the Fano plane.
   - [JM] 4
   - [JM] 4
   - [TV] 8
8. Helly’s theorem. Tverberg’s theorem. Colorful Caratheodory theorem
   - [JM] 8
   - [TV] 9
    - L. Lovasz. Shannon capacity of a graph.
    - J. Kleinberg, M. Goemans. Lovász theta function and a semidefinite programming relaxation of the vertex cover.

Assignment Details

There will be 3 homework assignments, each worth 10% of your total grade. You are allowed and encouraged to discuss the homework problems with other students.
Academic integrity

McGill University values academic integrity. Therefore all students must understand the meaning and consequences of cheating, plagiarism and other academic offenses under the Code of Student Conduct and Disciplinary Procedures (see http://www.mcgill.ca/integrity for more information). Most importantly, work submitted for this course must represent your own efforts. Copying assignments or tests from any source, completely or partially, allowing others to copy your work, will not be tolerated.

Miscellaneous

- In accord with McGill University’s Charter of Students’ Rights, students in this course have the right to submit in English or in French any written work that is to be graded.

- In the event of extraordinary circumstances beyond the University’s control, the content and/or evaluation scheme in this course is subject to change.