MATH 503 Discrete Mathematics 2015 Fall

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Prerequisites: Familiarity with discrete structures (such as MATH 443) is desirable but not imperative. Talented undergraduate students are welcome however good grades and some honours math courses are required.

Tue Thu   11:00 - 12:30   Mathematics Annex   1118

There will be no class on Thursday, September 10. The first meeting is on Tuesday, September 15.
If you have any question regarding the course then find me during the first week of September or write me an email.
(I will attend a conference from 7 to 11 Sept.)

Grading: Homework assignments 40%, Take home midterm 20%, Take home final 40%.

Course book (recommended):

Laszlo Lovasz, Combinatorial Problems and Exercises

Course Material and Topics:

Discrete mathematics (combinatorics) is a fundamental mathematical discipline as well as essential component of many mathematical areas, and its study has experienced an impressive growth in recent years. While in the past many results in this area were obtained mainly by ingenuity and detailed reasoning, the modern theory has grown out of this early stage and often relies on deep, well-developed tools.

The main aim of this course is to introduce many core ideas from this topic, such as extremal set theory, Ramsey theory and design theory as well as some of the dominant proof techniques such as probabilistic methods and algebraic methods.

The course outline follows (with sections taken from Lovasz' book) with approximately 1 to 2 lectures being spent on each topic.

- Basic enumeration methods (section 1)
- Connectivity in Graphs and Menger's theorem (section 6)
- Factors of Graphs and Tutte's theorem (section 7)
- Graph colourings and perfect graphs (section 9)
- Block designs and Wilson's theorem
- Extremal graph theory and Turan's theorem (section 10)
- Strongly regular graphs and algebraic methods (section 11)
- Hypergraphs and extremal set theory (section 13)
- Ramsey Theory and probabalistic methods (section 14)

Problem Sets

1. TBA