

2013 Women and Mathematics Course Descriptions

Lecture Course on Combinatorics

Lecturers:

Week 1: Lauren Williams, University of California, Berkeley, "Topics in enumerative combinatorics"

Week 2: Margaret Readdy, University of Kentucky, "Polytopes"

Course Description: Combinatorics is the study of finite or countable discrete structures. These structures are widespread throughout mathematics, including geometry, topology and algebra. We will give an introduction to some of the techniques in the field, and how they relate to objects such as matroids, polytopes and hyperplane arrangements. We will also indicate current work and open problems.

Pre-requisites: Linear algebra

References: Martin Aigner, "A Course on Enumeration", Richard Stanley, "Enumerative Combinatorics I and II", Günter M. Ziegler, "Lectures on Polytopes", Branko Grünbaum, "Convex Polytopes", Springer, 2nd edition, 2003, H. S. M. Coxeter, "Regular Polytopes"

Lecture Course on Graph Theory

Lecturers:

Week 1: Penny Haxell, University of Waterloo, "Basic Graph Theory"

Week 2: Maria Chudnovsky, Columbia University, "Graph Structure"

Course Description: The study of the structure of graphs with certain induced subgraphs forbidden has been an active area of research in graph theory in recent years, after the

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long-standing Strong Perfect Graph Conjecture was proved using structural methods. The goal of this course will be to cover some of the recent developments in the area. We will start with some general background in graph theory, including basic colouring, Ramsey theory, and simple theorems about forbidden induced subgraphs, and work our way up to the latest research results.

Pre-requisites: Working knowledge of basic concepts of graph theory

References: Reinhard Diestel, "Graph Theory", D. West, "Introduction to Graph Theory, 2nd edition