This is an introduction to and survey of combinatorics at the graduate level. Concepts will be introduced from scratch but considered in some depth. Combinatorics is a subject that offers easily stated problems, the solutions of which often lead one to delve into a myriad of ‘mathematical tool boxes’. One who studies the subject is thus afforded the opportunity to learn about many branches of mathematics. Students seeking thesis problems might wish to consider that combinatorics is also a very active field of research.

Topics will be selected from the following (non-exhaustive) list: extremal set theory, Ramsey theory, combinatorial designs, error-correcting codes, graph colorings, matching theory, partially ordered sets, correlation inequalities (e.g. the ‘four functions theorem’), infinite combinatorics.

Any questions? Just ask the instructor, in person, by telephone, or by email.

Credits: 3

Prerequisites: students should have background suitable for graduate-level mathematical studies; combinatorial ideas will be introduced as needed. No specific combinatorial background is assumed.

Grading
Course grades are based on hand-in homework and a final presentation (not exams).

Text
Douglas B. West, Combinatorial Mathematics, Manuscript for forthcoming textbook, 2017

Additional References


László Lovász, Combinatorial Problems and Exercises, North-Holland, New York, 1993