

Mat 517, Graph Theory II

Time: MW 9:00-10:15

Room: Tempe WCLR A302

Instructor: Andrzej Czygrinow

Text: R. Diestel, *Graph Theory*

Prerequisite: Mat 516 or Mat 513/Mat 416

This course covers topics of modern graph theory including coloring problems, extremal graph theory, elements of Ramsey theory, and sparse graphs (including main aspects of the proof of the Robertson-Seymour theorem). Although the course is a continuation of Graph Theory I, students who have taken Mat 513 or Mat 416 can definitely take it. Here are a few highlights of the course:

- We will give a proof of the weak perfect graph conjecture due to Lovász as well as an alternative argument which uses linear algebra.
- We will discuss concepts of regularity and prove the regularity lemma of Szemerédi. In addition to important applications in graph theory we will discuss algorithmic applications and other aspects of the so-called regularity method.
- We will study elements of the proof of the Robertson-Seymour theorem and important concepts that play a central role in the proof and are, at the same time, a subject of research in theoretical computer science.

We will follow Diestel's book closely, but some additional topics will be based on recent research papers.

The course is directed to students who have taken Mat 516 or Mat 513 students, but should also be accessible to Mat 416 students who are interested in graph theory.