

# Syllabus for Math 613-600: Graph Theory

Fall 2017, MWF 10:20–11:10, BLOC 121

**Instructor:** Catherine Yan

**Office hours:** Blocker 513F. Monday 1:30–3 pm and by appointment

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**Course Home Page:**

<http://www.math.tamu.edu/~cyan/Teaching/math613.html>

**Prerequisites:** An undergraduate course in discrete math is sufficient, e.g. Math 302 (Discrete Mathematics), or Math 431 (Structures and methods in Combinatorics) at TAMU.

**Course description:** This is a course at the beginning graduate level to help the students gain basic knowledge of the structure of graphs and the techniques used to analyze problems in graph theory and discrete structures.

The course will cover fundamental concepts such as graphs, cycle, path, circuit, trees, matchings and factors, connectivity and coloring, network. We will also introduce topics in currently active research areas, including Ramsey theory, extremal combinatorics, algebraic graph theory, combinatorial optimization, and probabilistic methods.

**Text:** *Introduction to Graph Theory*, by Douglas West, second edition. Prentice Hall, 2001.

A main reference is:

*A Course in Combinatorics*, by J.H. van Lint and R.M. Wilson, 2nd edition, Cambridge University Press.

**Grading:** Homework assignments will be given about biweekly. As exercise is an important part of combinatorics, anyone who doesn't hand in homework will get the grade F automatically. No late homework will be accepted except for university-approved excuses.

The grade will be determined by homework (80%) and a final project (20%). In addition, you must attend at least 50% of the lectures to get a C or above.

The Project is due on **December 6, 2017**. The description of the project will be available in the course webpage.

**Topics to be covered:** Each topic will take 1-2 week.

Basic concepts in graph theory, trees and algorithms, matchings and factors, flows in network, coloring of graphs and Ramsey theorem, Turan's theorem and extremal combinatorics, Dilworth's theorem and extremal set theory, linear algebra in graph theory, matrix tree theorem and De Bruijn sequences, Graph connectivity, planarity and coloring. If there is enough time, we will touch some basic topics in theory of random graphs.

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## **Americans with Disabilities Act (ADA) Policy Statement:**

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## **SCHOLASTIC DISHONESTY WILL NOT BE TOLERATED.**

**“An Aggie does not lie, cheat, or steal or tolerate those who do.”**

**CHEATING IS FORBIDDEN:** Students who cheat will be reported to the Dean with a recommendation that their course grade be set at F. The dean may take further action, including expulsion from the university.