

Graph Theory

Instructor: Instructor Allan Bickle

Course Number: MA 49500GT

Credits: Three

Time: 12:30–1:20 PM MWF

Description

A graph is a mathematical object with a set of vertices and a set of edges that are two-element subsets of vertices. Graphs are used to model many different problems in transportation, scheduling, chemistry, security, networks, and more. Topics will include trees, connectivity, Eulerian graphs, isomorphisms, vertex coloring, planarity, and Hamiltonian graphs. Additional topics may include matchings, edge coloring, domination, list coloring, decompositions, and Ramsey numbers.

We will prove the most important theoretical results and show how to use them in practice for a variety of applications. Some of the appeal of graph theory is drawing graphs to visualize problems. This class will encourage "hands on" exploration of a variety of fun and interesting problems.

Textbook: Fundamentals of Graph Theory by Allan Bickle, AMS (2020).

Pre-requisite: MA 37500 or permission of the instructor

Introduction to Partial Differential Equations

Instructor: Professor Kiril Datchev

Course Number: MA 49500PDE

Credits: Three

Time: 12:00–1:15 PM TTh

Description

Partial differential equations describe laws of nature governing all moving bodies, notably waves, electricity, heat, gases, fluids, and astronomical objects. In this course, we will analyze these using techniques including conservation equations, characteristics, integral solution formulas, energy methods, scaling, function spaces, Fourier series, maximum principles, variational methods, mostly following the textbook, as time and student interest allows.

Prerequisites: Ordinary differential equations at the level of 366 or equivalent, and real analysis at the level of 341 or equivalent.

Textbook: Introduction to Partial Differential Equations, by David Borthwick.