Title: MAT 280: Khovanov homology

Abstract: Khovanov homology is a topological invariant of knots and links which has an easy combinatorial definition. It was used to answer some long-standing questions in 3-dimensional topology such as Milnor conjecture about knot genus (previously proved by Kronheimer and Mrowka using gauge theory). The main objective of the course is to define Khovanov homology, study its properties and discuss the proof (due to Jacob Rasmussen) of Milnor conjecture using Khovanov homology.

Program:

5. Cobordisms, 4-ball genus and Rasmussen's proof of the Milnor conjecture.

If time permits, we may cover more recent developments in Khovanov homology.

Course materials:

There is no textbook, but the course will closely follow several research papers:


Additional reading: