

Course Learning Outcomes MATH B6300

Students will become familiar with basic notions from homotopy theory including contractibility and homotopy equivalence.

Students will have a good understanding of the fundamental group of a topological space and its connection with covering spaces. The student will be able to compute the fundamental group of a space obtained by identifying sides of a polygon via van Kampen's theorem. Students will become familiar with free groups, free products and amalgamated products in terms of their universal properties.

Students will become familiar with manipulating exact sequences. Students will learn to compute homology groups using the Mayer-Vietoris sequence. Students will be able to compute the homology of a sphere and applications to proving the Brouwer fixed point theorem and the Jordan Curve Theorem.

Students will obtain extensive training of proving theorems by combining techniques from various parts of mathematics including algebra and topology.

Students will obtain insight how several mathematical topics are intertwined.