UNIVERSITY OF NEBRASKA AT OMAHA

MATH 8620: GENERAL TOPOLOGY

MW 7:00 PM – 8:15 PM | **ZOOM** *(recorded)*| Dr. Roslanowski

Topology (from the Greek τοποσ, place, and λογοσ, study) is concerned with the properties of space that are preserved under continuous deformations, such as stretching and bending, but not tearing or gluing. This can be studied by considering a collection of subsets, called open sets, that satisfy certain properties, turning the given set into what is known as a topological space.

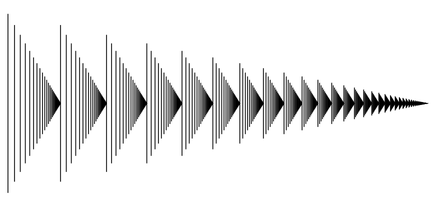
Textbook: *Lecture Notes* authored by the instructor will be available to students through Canvas.

Course content description: *General topology has roots in geometry and analysis through the study of spaces, dimensions, and transformations. Its development was influenced by the parallel development of (axiomatic) set theory. This course introduces topological spaces from the point of view of separation axioms, countability axioms, compactifications, Baire property, and other completeness properties. Basic concepts of Descriptive Set Theory are also introduced.*

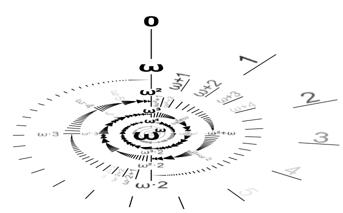
Pre-requisites: *MATH 4610/8618 or* ***permission of instructor***

We will start with some Set Theory topics, including ordinal numbers and transfinite induction.

A graphical "matchstick" representation of the ordinal ω^2. Each stick corresponds to an ordinal of the form $\omega\cdot m+n$ where *m* and *n* are natural numbers:



Representation of the ordinal numbers up to ω^ω. Each turn of the spiral represents one power of ω:



(You can use such induction to prove that there exists a set $B \subseteq R^2$ which intersects every straight line in exactly two points. Try it!) Then we will study Borel and Lusin classes in Polish spaces,

$$\Delta^0_\xi(X) \subseteq \begin{matrix} \Sigma^0_\xi(X) \subseteq \\ \\ \Pi^0_\xi(X) \subseteq \end{matrix} \; \Delta^0_{\xi+1}(X) \subseteq \begin{matrix} \Sigma^0_{\xi+1}(X) \subseteq \\ \\ \Pi^0_{\xi+1}(X) \subseteq \end{matrix} \begin{matrix} \dots \\ \dots \\ \dots \end{matrix}$$

Separation Axioms and compactness-like properties in general topological spaces, compactifications and more.

Want to know more? Enroll in this course for Spring 2021!

For More Information:

Dr. Roslanowski | 402.554.3105 | aroslanowski@unomaha.edu

University of Nebraska Omaha