MATH 529: Differential Topology (Term 1, 2024)

Description: This is a course on differential forms and their application to the topology of manifolds. We will study de Rham cohomology, Cech cohomology, and the spectral sequence of a double complex.

Topics:

- Differential forms and integration
- de Rham cohomology
- Mayer-Vietoris sequence
- Poincaré duality
- Künneth formula
- Vector bundles
- Euler class and Euler characteristic
- Sheaves and Cech cohomology
- Frölicher spectral sequence
- Spectral sequence of a fiber bundle
- Leray spectral sequence

Prerequisites: MATH 525 (Differential Geometry I).

Textbook: R. Bott and L.W. Tu, *Differential Forms in Algebraic Topology*, 1982.

Homework: Homework will be typed or scanned and submitted on the Canvas page MATH 529. You are encouraged to work in groups on the homework, however you must write up your own solutions.

Grading Scheme: Homework 100%

Course Policies:

• **Missing/late homework:** No late homework will be accepted. You can receive one concession during the term by submitting a Department of Mathematics self-declaration form (which can be found here). The weight of the missed homework with accepted concession form will be transferred to the other assignments. More information on UBC's policy for academic concessions can be found here.