DIFFERENTIAL GEOMETRY I
MATH 425/525, JANUARY-APRIL, 2023

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Topics: Manifolds, smooth structures, tangent and cotangent spaces, vector fields, immersion and embedding, submanifolds, Sard theorem, Frobenius theorem, tensors and differential forms, vector bundles, orientation of manifolds, integration on manifolds, and if we have time, we will give a brief introduction to Lie groups.

Prerequisites: Undergraduate training in analysis (for example Math 320) and linear algebra.

Textbook: Introduction to Smooth Manifolds, John M. Lee, Springer edition, 2nd Ed. The entire e-book can be viewed online and downloaded via the UBC Library website.

Reference:

- Foundations of Differentiable manifolds and Lie groups, by F.W. Warner, Springer ed.
- An Introduction to Differentiable Manifolds and Riemannian Geometry, by W. Boothby (free download available via UBC Library)
- Lectures on Differential Geometry, by S.S. Chern, World Scientific
- A Comprehensive Introduction to Differential Geometry, Vol.1, 3rd Ed, by M. Spivak

Evaluation:

- Course grade will be based on bi-weekly assignments. There will be no midterm or final exams.
- You are encouraged to use LaTex to write your homework solutions.
- Copying solutions from another student, any website or other source, and turning them in as your own is a violation of the Academic Code.