Math 136 — Differential geometry **Due**
Midterm Project **October 29**

Your task is to write a paper related to the differential geometry of surfaces. You should write it as if you are teaching your classmates so the goal is to make it understandable and informative.

Guidelines

(1) The paper should be your own work, no collaborations are allowed.
(2) You are allowed to use any resources while preparing but you should cite your references and you should synthesize the subject matter into your own words.
(3) The suggested topics below come from Kühnel's book and you can quote freely from there (with attributions). Make sure you write down any formal Theorems, Lemmas, etc, precisely. Don't just copy the textbook's presentation. You should focus on turning the presentation into a cohesive lecture that your peers could learn from. In particular, there might be parts where it will be necessary to fill in more details than the book provides.
(4) The paper should include a combination of precise mathematical statements and proofs as well as examples and computations illustrating the intuition.
(5) The paper should be about 5 pages long but clarity of exposition is more important than length.
(6) You should write your paper in **LaTeX** and submit it on Canvas by **11:59pm on Friday, October 29**.

Topics

Pick one of the following.

(1) **Minimal surfaces:** These are surfaces with fixed boundary which achieve the minimum area (think e.g. soap films that form when you dip wire frames into soap). These are discussed in [Ku] 3D.
(2) **Surfaces in Minkowski space:** Minkowiski space is the Euclidian space equipped with a *different* inner product. One can develop differential geometry using this new inner product which leads to *Lorentzian geometry* and forms the basis of the theory of general relativity. This is covered in [Ku] 2E and 3E.

If you'd like to do another topic, please discuss it with me and I will let you know if it is appropriate.