MINIMAL SURFACES

DIFFERENTIAL GEOMETRY, SPRING 2015

Central Theme

Describe Minimal Surfaces and their connection with complex function theory.

Minimum Requirements

Write a paper exploring the basics of minimal surfaces.

- 7-10 pages, in LaTeX, with attention paid to standard English grammar, spelling and usage.
- Give a clear definition of a minimal surface, and show how to find a set of isothermal coordinates on one. Use this to create a Weierstrass representation of the surface using complex functions.
- Compute several examples.
- Include images where appropriate.

Extensions to Explore

If you feel so inclined, look up how minimal surfaces get their name: as local area minimizers. This will involve some basic "calculus of variations."

Resources

Shifrin has a little bit about minimal surfaces in the last chapter. Struik is hiding some stuff, too, but it is pretty terse. You might also consult do Carmo's *Differential Geometry of Curves and Surfaces*.

I have a copy of *Six Themes on Variation* which has a chapter by Mike Wolf that might be of use.