Math 581: PDEs on non-smooth domains

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In this course we will study partial differential equations on non-smooth domains. In particular we will be interested in the relationship between the boundary regularity of the solutions to elliptic second order divergence form partial differential equations and the geometry of the boundary. While in the smooth setting this question uses tools from classical PDEs, in the non-smooth setting tools from harmonic analysis are needed to tackle the problem. We will first review classical results, mostly, to put the work in context. Then we will focus our attention on non-smooth domains such as Lipschitz, Chord Arc, Reifenberg and Non-Tangentially Accessible domains.

To the extent that it is possible the material will be self contained. Most of the course will be based on papers dating from the 1980’s to today.

Some references:


**Prerequisites:** Graduate analysis class. While some knowledge of Partial Differential Equations and Geometric Measure Theory would be useful is not absolutely crucial. If you have questions about whether this is the right course for you please come see me.