Classical and non-classical tools for minimal surfaces

Giovanni Alberti

In the first part of this series of lectures I will recall those basic notions from classical Complex Analysis, Differential Geometry and Calculus of Variations which are used in studying minimal surfaces and area-minimizing problems, both in the parametric and intrinsic approach (area formula, conformal maps in the plane, Riemann mapping theorem, mean curvature and Gauss curvature of a surface, first variation of the area). This should cover in particular most of the background material needed for the lectures of Stefan Hildebrandt. The last two lectures contain an introduction to Finite Perimeter Sets, including the main results of the theory (compactness, structure of distributional derivative, rectifiability) and, depending on time, the outline of a few applications.