

CCSU
DEPARTMENT OF MATHEMATICAL SCIENCES

COLLOQUIUM

Friday, December 1
3:00 – 4:00 PM
Maria Sanford, Room 101

WEIERSTRASS REPRESENTATION FOR MINIMAL SURFACES

JAMES CHADIC

(MA in Mathematics Thesis Presentation)

CENTRAL CONNECTICUT STATE UNIVERSITY

Abstract: An important aspect when studying problems in mathematics is to have the ability and flexibility to investigate a topic from several perspectives. In this talk, we will demonstrate a bridge between the theory of Minimal Surfaces (which is a field of Geometry) and Complex Analysis (which is a field of Analysis), by using the Weierstrass Representation Method. We will be using this powerful method to generate minimal surfaces, and will be determining holomorphic functions that represent some well-known minimal surfaces (such as the Helicoid, Catenoid, the Enneper Surface etc...). In this talk, we will define and explore regular surfaces, study the properties and the benefits of computing the coefficients of the First Fundamental Form and the Second Fundamental Form. In particular, we explain the equation in terms of these fundamental forms that characterizes minimal surfaces. We also discuss the importance of using isothermal coordinates and illustrate how to find isothermal coordinates when the surface is given in non-isothermal coordinates as in the case of the helicoid $\mathbf{X}(u, v) = (u \cos(v), u \sin(v), v)$.

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