Math 994 – Topics in Applied Math
Alexander Ramm, Spring 2008
"Inverse problems and applications"

The material will be taken from the book:
A.G. Ramm, Inverse Problems, Springer, New York, 2005.
Paper 529g.pdf (can be downloaded from my website: http://www.math.ksu.edu/ ramm)

Inverse problems are the theoretical basis for remote sensing and non-destructive evaluation. Examples from geophysics, medicine, and technology will be discussed. The basic idea is simple: one wants to get information about the properties of a body from the observation of waves scattered by the body.

Scattering by many small bodies will be studied. Applications to creating materials with desired properties (for example, with a desired refraction coefficient, or desired wave-focusing properties) will be developed. Possible implementation of this theory will be explained.

Modeling of ultrasound mammography will be developed.

Research problems will be formulated.

The background material required includes some knowledge of analysis.