Computational Methods and Uncertainty Quantification for Inverse Problems
SYLLABUS: MATH 514, Topics in Applied Math

Professor: John Bardsley
Office: Math 308
Phone: 243-5328
Email: bardsleyj@mso.umt.edu
Time and Place: MWF 11:10-noon, Math 108.
Course Web Page: http://web.math.umt.edu/bardsley/courses/514/514.html
Office Hours: noon-1pm Monday, Wednesday, Friday.

LEARNING GOALS: By the end of the course you should:

1. understand what characterizes a typical inverse problem;

2. be able to implement methods of regularization and regularization parameter selection for solving inverse problems;

3. be able to solve inverse problems in both one- and two-dimensions, using both direct and iterative methods;

4. understand the relationship between Markov random field priors, Bayes’ Law, and classical regularization methods in inverse problems;

5. be able to implement MCMC methods for sampling from the posterior density function in inverse problems;

6. be proficient at using MATLAB to do all of the above.

ASSESSMENT: Your course grade will be determined by your performance on the homework, and potentially, by your performance on a final project.

* Students may work together on the homework, however each student must write-up his or her own solutions to hand in.

STUDENT CONDUCT: Just be honest, and see the above ‘*’ comment. Details of the Student Conduct Code can be found in the “A to Z Index” on the UM home page.

FOR ANY STUDENT WITH A DISABILITY: If you have a disability that has, or might have, an effect on your performance in this class, please let me know. I will do my best to accommodate you.

Important Dates:
February 12: Last day to drop with a refund.
February 13 – March 28: Drop requires instructor and advisor’s signature.
March 29 – May 6: In addition, a drop requires the Dean’s signature.
May 13, 8-10am: Final exam time. Subject to change.