MATH 365
Final Project Description

Purpose
The purpose of the final project is to use the techniques you have learned in computational mathematics to investigate a problem from engineering, the physical sciences, or mathematical sciences that interests you.

Important Due Dates

• Initial proposal: Friday, April 1, 2016
• Revised proposal: Friday, April 8, 2016
• Final project report: Wednesday, May 4, 2016
• Final project presentation: Wednesday, May 4, 2016 10:00am-12:00pm

Proposal
You will submit a typewritten draft of a proposal for your final project on April 1, 2016 in your drobbox folder. The proposal should contain the following information:

1. The members of your group (only 2 members allowed);
2. A description of the problem you wish to investigate for your project;
3. The numerical methods you plan on using;
4. The primary references you plan to work from.

I will read through your proposals and return them to you by April 6, 2016 with my comments and suggestions for improving your project. On April 8, 2016 you will submit a typewritten revised proposal based on my comments and suggestions.

Project Report
The report for your final project will be typewritten and anywhere from five to ten pages long, excluding any code you wish to include in the report. The report should consist of the following information

1. Introduction: An overview of the problem you are investigating including some background information for readers who may not be familiar with the problem. If applicable, incorporate some historical background about the problem, including where the problem arises and other people who have worked on it.
2. Methods: An explanation of the numerical methods you used to investigate the problem and why you chose these methods.
3. Results: The results of your investigation of the problem. This should include output from your program in nice tables and/or nice figures.
4. Discussion: Describe how your results relate to the solution of the problem; describe any errors with your results; describe how you might improve upon your results. Figures and tables should also be included here.
5. References: A list of all the references you used in your project.
6. **Code:** A listing of your programs used for the investigation. The programs should be well documented and available in electronic form if requested.

**Project Presentation**

Each group will be required to give a 15 minute oral presentation to the class about their project on May 4, 2016. The presentation should be structured like the final report and should use overheads or the whiteboard.

**Grading**

The final project is worth 30% of your final grade. The breakdown for is as follows:

- Proposal: 2%
- Report: 23%
- Presentation: 5%

**Topics of previous projects**

Below are some topics of some of the previous students who have completed this course.

1. Estimating internal radiation exposure in humans from the Chernobyl nuclear disaster.
3. Locating geologic faults from LIDAR data.
5. Comparison of the efficiency and quality of various image compression methods.
6. Optimization methods for minimizing the surface energy of a bond.
7. Pacejka’s magic formula with applications to video driving games.
8. Smoothing splines for approximating noisy data.
13. Ranking algorithms for potentially untrustworthy webpages.
15. Heat transfer in an industrial chimney.
16. Application of the finite element method to estimating the axial load on a circular shaft.
17. Reconstructing debris flows surfaces using radial basis functions.
18. Investigating the dimensions of fractal sets.
19. Ranking FIFA Women’s World cup teams.
20. Predator-prey models for studying disease transmission

If you are having trouble coming up with a topic please come and see me.